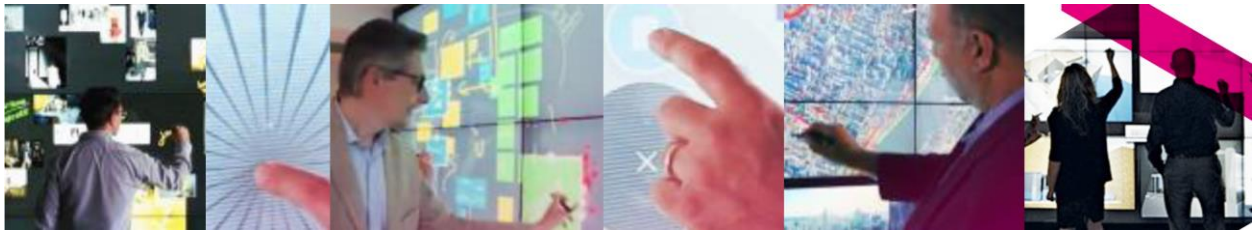
MULTITACTION



MT CANVUS 1.7
INSTALLATION MANUAL

Revision 14
December 2017

This manual is intended for the owners and operators of MT Canvus. It contains guidelines for the proper usage of the product. Information in this manual is subject to change without prior notice to product owners. For the latest product details and guidelines please visit the product website.

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1 Introduction

This manual describes how to install MT Canvus 1.7.

MT Canvus is an engaging and intuitive software solution for interactive video walls. It helps organizations to visualize big data, socialize ideas, educate clients and work collaboratively.

Multiple users can work on a video wall at the same time, using their hands, fingers and infrared pens to interact with screen content. MT Canvus also allows users to share content from their smart devices onto the video wall and, conversely, to share content from the video wall onto external monitors, projectors, or virtual webcams.

By encouraging users to collaborate to develop and circulate new ideas, MT Canvus can boost productivity and accelerate business processes.

MT Canvus on an interactive video wall

1.1 Desktop mode or video wall mode?

You choose to install MT Canvus 1.7 in *desktop mode* or *video wall mode*.

- **Video wall mode:** This is the standard mode for MT Canvus, and refers to MT Canvus running on a multi-touch video wall.
- **Desktop mode:** This mode refers to MT Canvus running on a Windows computer for a single user. In this mode, you can install and run MT Canvus on your laptop or desktop computer. This can be useful if you want to develop and test new canvases, or review existing canvases, away from your main video wall.

  Note: *Desktop mode is not supported on Ubuntu computers.*

You cannot directly switch modes after installing MT Canvus. Instead, you must uninstall and re-install MT Canvus. Also, these modes have different recommended computer specifications and use different configuration files.

1.2 MultiTaction support

If you need technical assistance, please contact MultiTaction Support:
https://www.multitaction.com/support-services

2 Set up the application computer

This section describes various tasks that must be performed to deploy MT Canvus.

2.1 About the application computer

For MT Canvus in video wall mode, the *application computer* is an external computer that runs MT Canvus and, if required, other touch-enabled applications including Cornerstone-based applications and TUIO-based applications. The application computer receives tracking data from the Cell's tracking engine, and sends video data back to the Cell for display on the LCD screen.

For MT Canvus in desktop mode, the application computer is simply the host desktop computer or laptop.

2.2 Recommended computer specifications

2.2.1 Meeting Room package

The recommended application computer for the MultiTaction Meeting Room package is a MultiTaction Hydra server (model MTPCH04N) with the following specifications:

- **OS:** MT Canvus (version 1.7 or later) supports the following operating systems:
  - **Linux:** Ubuntu 14.04 LTS distribution only.
    You can find installation instructions and OS images at www.ubuntu.com.
  - **Windows:** Windows 10 Professional
- **Case and motherboard:** Supermicro SuperWorkstation 5038A-I
- **CPU:** Intel Xeon E5-1650
- **GPU:** NVIDIA Quadro P5000, 16GB.
  Note: *This GPU has four video outputs and can drive up to four Cells, The Meeting Room package has three Cells. For larger MultiTaction video wall solutions, we recommend two, three or four NVIDIA Quadro P5000 graphics cards, depending on the number of Cells.*
- **Memory:** 16 GB DDR4 SDRAM
  Note: *For larger MultiTaction video walls solutions, we recommend 64 GB of memory.*
- **Hard drive:** Samsung 480 GB SSD
- **Capture card:** A capture card processes video input into the application computer from external devices or computers. The Meeting Room package does not include a capture card. You must purchase a capture card separately if you want to use Screen Sharing (section 10), Remote Touch (section 11) or features provided through an auxiliary computer (section 18). The recommended cards are:
  - Capture card, 2 channel: Datapath VisionAV-HD
  - Capture card, 4 channel: Datapath VisionSC-HD4+

  For details about the Datapath capture cards, see section 10.2.

2.2.2 Desktop mode

If you want to run MT Canvus in desktop mode, the recommended specifications for the host computer are:

OS Windows 10 Professional

MT Canvus 1.7 does not currently support Linux, OS X or earlier versions of Windows.

GPU The graphics card must be compliant with OpenGL 4.1 or later.

If the graphics card is insufficient for running MT Canvus, an advisory dialog warns that MT Canvus cannot run.

CPU Recommended: Intel Core i7

Minimum: Intel Core i3

RAM Recommended: 16GB

Minimum: 8GB

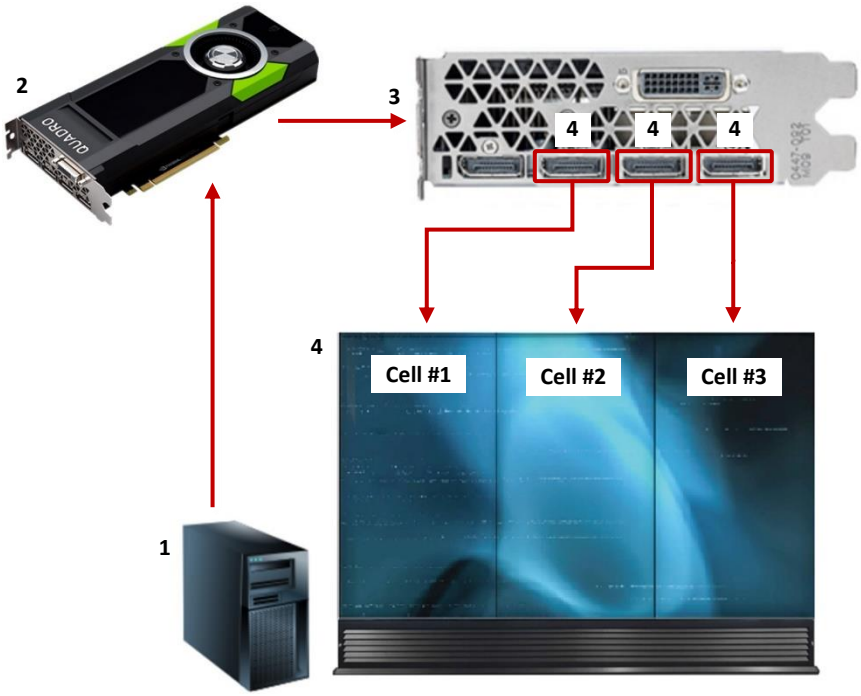
2.3 Connect the application computer

Before you install MT Canvus, connect the application computer to the video wall and to the internet. Video connections to the Cells

Note: *This section assumes that the application computer is using the recommended NVIDIA Quadro P5000 graphics card; see section 2.2.*

Connect a cable from the video outputs on the application computer's graphics card to the DVI-D video inputs on the Cells in your video wall. You will need to use adapters or converter cables for the DisplayPort to DVI-D connections. Ensure there is no stress or tension on the connected cables. After connecting all cables, connect the Cells and application computer to the mains supply.

If you are deploying the MultiTaction Meeting Room package, you must *connect the video connections exactly as shown below*:



Video connections for Meeting Room package.
1 *Application computer.* 2 *NVIDIA P5000 graphics card.* 3 *I/O bracket.* 4 *DisplayPort outputs connected to the Cells.* 5 *Meeting Room video wall, viewed from front.*

2.3.2 Network connections to the Cells and internet

Note: *This section refers to the rear connection panel on the recommended Supermicro SuperWorkstation; see section 2.2.*

Establish network connections between the application computer and the Cells in your video wall. You must also connect the application computer to the internet.

- **Internet:** Connect the top Ethernet port (*em1*) to your default gateway.
- **Cells:** Connect the bottom Ethernet port (*em2*) to the switch provided with the Meeting Room package. Then connect each Cell to the switch.

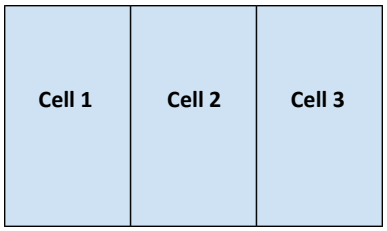
2.3.3 Configure network settings for each Cell

Configure the network settings for each MultiTaction Cell. Using the on-screen display (OSD) on each Cell in turn, configure the following network settings:

Type Manual
Address 10.77.84.10 - *see below*
Netmask 255.255.255.0
Gateway 10.77.84.1
DNS 8.8.8.8

When you view the Cells from the front, configure their network addresses to:

Cell 1 10.77.84.100
Cell 2 10.77.84.101
Cell 3 10.77.84.102



Cell configuration for Meeting Room package, viewed from the front

Tip: *To find these settings, display the OSD and tap the Setup tab. Then go to the Network pane. For details about the OSD, see the MultiTaction Cell User Manual*.

2.4 Install MT Canvus from a disk image

Applies to Ubuntu application computers only.

This section describes the setup procedure for the MultiTaction Meeting Room package using preconfigured disk images. For manual installation instructions, see section 2.5.

Note: *Preconfigured disk images for MT Canvus are only available for Ubuntu application computers. For Windows application computers, you must install MT Canvus manually; see section 2.5.*

MultiTaction provides preconfigured disk images for the standard Meeting Room package. This solution comprises three MultiTaction MT555 Cells in portrait mode plus an application computer with the specifications given in section 2.2. Each disk image includes a preconfigured Ubuntu 14.04 LTS operating system running a pre-installed version of MT Canvus.

You will need to write the image to a USB disk and then boot the target computer from that USB disk. When the application computer boots from the USB disk, its hard disk is automatically erased and overwritten with the standard Meeting Room package software setup. Any existing information on the hard disk is erased.

2.4.1 Write the MT Canvus image to a USB disk

Your MultiTaction representative has provided you with a preconfigured MT Canvus image. Write this image to a USB disk. On Linux computers, you can do this with the following command:

```
$ zcat <image> | sudo dd of=/dev/<usb device> bs=4M
```

For example, if your USB device is `/dev/sdg`, use this command:

```
$ zcat mt-canvus-1.6.6.rewriter.nvidia.img.gz | sudo dd of=/dev/sdg bs=4M
```

Note: *If you do not have an MT Canvus image, contact MultiTaction Support for advice; see section 1.1.*

2.4.2 Boot the target application computer from the USB disk

Connect the USB disk to the target application computer. Then reboot the application computer. The PC image will automatically detect the correct hard disk and overwrite it. After the process is completed, the application computer will beep and shut down automatically. Remove the USB disk and restart the application computer.

2.4.3 MT Canvus launches automatically

When the application computer restarts, MT Canvus launches automatically.

- **Ubuntu application computers:** Now configure the network settings; see section 2.6. Then, if you have not already done so, you will need to obtain an activation key to activate your MT Canvus license; see section 2.7.
- **Windows application computers:** If you have not already done so, you must obtain an activation key to activate your MT Canvus license; see section 2.7.

2.5 Install MT Canvus manually

Note the following:

- **Ubuntu application computers:** *This section applies only if you did not use the preconfigured disk images.*
- **Windows application computers:** *You must follow the instructions in this section. Preconfigured disk images are not currently available for MT Canvus on Windows application computers.*

2.5.1 Verify that Cornerstone is already installed

MultiTaction Cornerstone must already be installed on the application computer. For Windows application computers, this must be Cornerstone version 2.3 or later. For details, see the *MultiTaction Cell User Manual*.

2.5.2 Obtain the MT Canvus software

1. Register on the MultiTaction Cornerstone web site: https://cornerstone.multitouch.fi/
2. Contact MultiTaction Sales and request access to the Downloads page; see section 1.1.
3. Log on to the MultiTaction Cornerstone web site (see step 1).
4. Browse to the Downloads page https://cornerstone.multitouch.fi/canvus_download
5. Download the appropriate MT Canvus software installer. Versions are available for Ubuntu and Windows application computers.

2.5.3 Create a 'multi' non-administrative user account

(Applies only to Windows application computers hosting MT Canvus in video wall mode. Skip this task if you intend to install MT Canvus in desktop mode; see section 1.1.)

You must now create a non-administrative user account on the application computer. You will run the MT Canvus installer as this user in section 2.5.5. This will ensure that the configuration files are installed in their default locations, minimizing the need for you to customize the installation.

If you intend to share files in an external folder (see section 14) or store personal items on a network share (see the 'Remote Codice' feature in section 15), you must also assign the **Create symbolic links** privilege to this account.

Follow these steps on the application computer:

1. Create a *non-administrator* user account named 'multi'.

   For convenience, later sections in this manual refer to this multi user account as the *installation user*.

   Important! *This multi account must be an ordinary user, not an administrator. If multi is an administrator, the Remote Codice feature will not work!*

2. (*Optional*) If you intend to share files in an external folder or store personal items on a network share, you must assign the **Create symbolic links** privilege to the new user account.

   To do this in Windows 10:

   a. Log in to Windows as an administrator.
   b. Open the Local Security Policy applet (in Administrative Tools).
   c. Navigate to the Local Policies > User Rights Assignment screen.
   d. Edit the **Create symbolic links** properties.
   e. Add the new user account.

   For background info about configuring user rights, see this Microsoft TechNet article: https://technet.microsoft.com/en-us/library/dd277404.aspx

2.5.4 Install MT Canvus on Ubuntu computers

Follow these steps:

1. Execute the installation script with sudo. For example:
   ```
   $ sudo sh mt-canvus-1.6.6_build8087-1d4e19c.sh
   ```
2. The MT Canvus software is installed under /opt/mt-canvus-<version>.

   Make a note of this location. You will need to know this location if you later need to edit the mt-canvus.ini configuration file.

3. Start the MT Canvus application with the script in /opt/mt-canvus-<version>/bin. This is added to PATH automatically:
   ```
   $ mt-canvus.sh
   ```

Now configure the network settings; see section 2.6. Then you will need to obtain an activation key to activate your MT Canvus license; see section 2.7.

2.5.5 Install MT Canvus on Windows computers

Follow these steps:

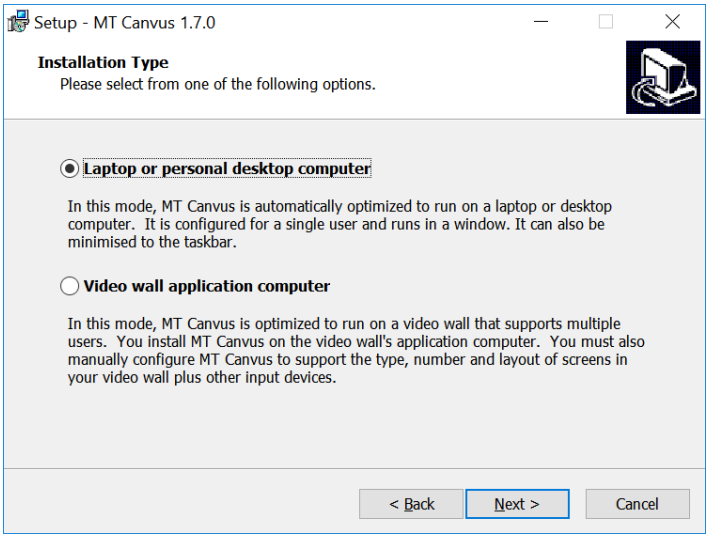
1. Log in as your *installation user*. If you intend to install MT Canvus in:
   - **Video wall mode:** Log in as multi, the non-administrative user that you created in section 2.5.3.
   - **Desktop mode:** Log in as an administrator.
2. Launcher the MT Canvus Setup Wizard.

   To launch the wizard, run the installer that you downloaded in section 2.5.2. The installer executable has this filename format:
   Mt-canvus-1.7.0-<ID number>.exe
3. Navigate to the **Select destination location** wizard page. You can accept the default installation folder or specify a non-default folder.

   Note: *Setup instructions later in this manual typically assume that configuration files in are in default locations.*

4. In the **Installation type** wizard page, you can choose to install MT Canvus in *desktop mode* or *video wall mode*:
   - **Video wall application computer:** Choose this option to install MT Canvus in *video wall mode*. This is the standard mode for MT Canvus, and refers to MT Canvus running on a multi-touch video wall.
   - **Laptop or personal desktop computer:** Choose this option to install MT Canvus in *desktop mode*. This mode refers to MT Canvus running on a Windows computer for a single user; see section 1.1.

   You cannot directly switch modes after installing. If you do want to switch modes, you will need to uninstall and re-install MT Canvus.



MT Canvus installation wizard, Installation Type screen

5. In the **Ready to install** wizard page, click Install to start the file transfer.
6. An MT Canvus shortcut is added to the Windows desktop:

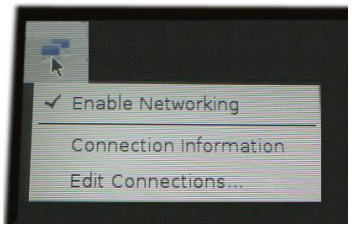
Now obtain an activation key to activate your MT Canvus license; see section 2.7.

2.6 Configure network settings for the application computer

Applies to Ubuntu application computers only.

Configure the network settings for the MT Canvus application computer.

1. Access the desktop: see section 5.1.1.
2. Click the Network Manager icon in the top-left corner of the desktop and choose Edit Connections.



Network Manager menu

3. Edit the network settings as required. For example, you may want to specify the IP address of the application computer, the default gateway or DNS server.
4. Return to MT Canvus; see section 5.1.2.

If you have not already done so, you must now obtain an activation key to activate your MT Canvus license; see section 2.7.

2.7 Licensing

MT Canvus must have an up-to-date license. The license defines the scope of your deployment. For example, it specifies the maximum number of computers you can install MT Canvus on, the maximum screen size, and the license expiry date.

- If you installed a new version of MT Canvus, you must obtain an activation key from your MultiTaction representative. You use this key to request a license.
- If you have an existing version of MT Canvus but your license has expired, or will soon expire, you must request a new activation key from your MultiTaction representative.

In both cases, you must launch the license wizard and enter your activation key. MultiTaction uses this key to generate your MT Canvus license.

2.7.1 Obtain an activation key

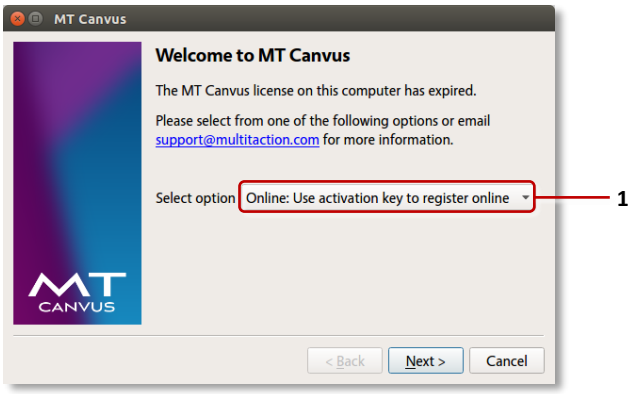
Your MultiTaction representative will provide you with a 16-character activation key for your MT Canvus license.

After receiving your activation key, launch the license wizard; see section 2.7.2.

2.7.2 Launch the license wizard

Follow these steps:

1. Start MT Canvus; see section 4.1.
2. If MT Canvus is not yet licensed (or the current license has expired), the license wizard launches.



License wizard, welcome screen. **1** *Task options.*

3. Choose a task option from the drop-down list:
   - **Online: Use activation key to register online:** If your application computer is connected to the internet, choose this option to automatically request, receive and activate a license for the current computer. See section 2.7.3.
   - **Offline: Create license request:** If your application computer is *not* connected to the internet, choose this option to generate a *license request file*. The file is saved on the application computer. See section 2.7.4.
   - **Offline: Activate license:** If your application computer is *not* connected to the internet, choose this option to activate the *license file* you received from your MultiTaction representative. See section 2.7.6.

2.7.3 Create and activate a license while online

If your application computer is connected to the internet, you can submit your activation key to automatically request, receive and activate a license for the current computer

Follow these steps:

1. When the license wizard starts, select Online: Use activation key to register online. Then click Next.
2. When prompted, enter your MT Canvus activation key. Then click Next.
3. Wait while your MT Canvus license downloads. Then click Finish.

   Your MT Canvus installation is now licensed and activated.
4. MT Canvus now starts automatically.

   Tip: *If you installed MT Canvus in desktop mode, it automatically opens in Full Screen mode. To toggle out of Full Screen mode and into Windows mode, press F11.*

2.7.4 Create a license request while offline

If your application computer cannot connect to the internet, you can generate a *license request file* on your application compute. You will then need to send this file to MultiTaction Support for processing.

Follow these steps:

1. When the license wizard starts, select Offline: Create license request. Then click Next.
2. When prompted, enter your MT Canvus activation key. Then click Next.
3. Save your MT Canvus license request file. For example, MT-Canvus.cslicensereq.

   You can save this file on the local computer or, for example, on a USB device.

You must now send the license request to MultiTaction Support; see section 2.7.5

2.7.5 Send a license request to MultiTaction Support

Applies only if you manually created a license request file in section 2.7.4.

Send your license request file to support@multitaciton.com.

After MultiTaction Support have processed your license request, they will send you a license file. For example, MT-Canvus.cslicense.

When you receive your license file, save it onto your application computer. You can save this file to any folder; the license wizard will move it to the correct location when you activate your license; see section 2.7.6.

2.7.6 Activate your license while offline

Applies only if you received a license file from MultiTaction in section 2.7.5.

Follow these steps:

1. When the license wizard starts, select Offline: Activate license. Then click Next.
2. In the next wizard screen, select the license file that you received from MultiTaction. Then click Next.
3. Wait while your MT Canvus license is activated. Then click Finish.

   Your MT Canvus installation is now licensed and activated.
4. MT Canvus now starts automatically.

   Tip: *If you installed MT Canvus in desktop mode, it automatically opens in Full Screen mode. To toggle out of Full Screen mode and into Windows mode, press F11.*

2.7.7 Renew your license before it expires

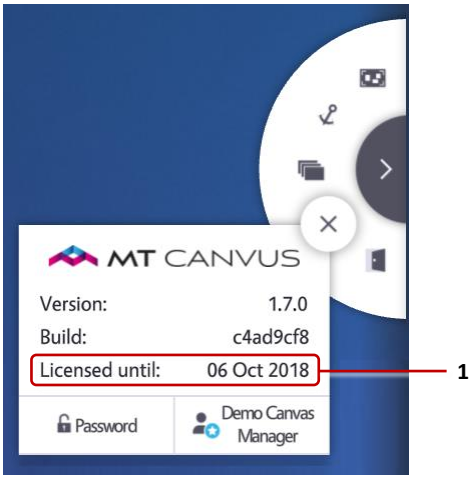
Your MT Canvus license is valid until midnight on the expiry date. However, if your MT Canvus license will shortly expire, you can renew the license now.

Note: *The license renewal procedure described below will require you to temporarily rename your existing, still valid license.*

Follow these steps:

1. Check the expiry date for your license.

   The About dialog shows your license expiry date. To see the About dialog, tap the ⓘ button in the System menu.



About dialog. 1 *License expiry date. The license is valid until midnight on this date.*

2. If you need to renew your license, obtain a new license activation key; see section 2.7.1.

3. Temporarily rename your current MT Canvus license.

   Note: *This step is necessary to allow the license wizard to launch in step 4.*

   a. Locate your current license; see section 2.7.8.

   b. Change the extension of your license file. For example, change MT Canvus.cslicense to MT-Canvus.cslicense.TMP.

4. Launch the license wizard; see section 2.7.2.

5. Create a license request and activate your new license. Do one of the following:

   - If your application computer is *not* connected to the internet, follow the instructions in steps 6 through 11.
   - If your application computer is connected to the internet, you can create and activate a new license automatically. Follow the instructions in section 2.7.3.

     This completes your license renewal; go directly to step 11.

6. Manually create a *license request file*; see section 2.7.4.

7. Send the license request file to MultiTaction Support; see section 2.7.5.

8. *(Optional)* If you want to continue using MT Canvus while you wait for your new license file, you must temporarily change your license file back to its original name. That is, undo the file name change in step 3.

9. When you receive your new *license file*, if you reverted your license file back to its original name in the previous step, you must now change its extension for the final time. That is, you must repeat step 3.

   Note: *This step is necessary to allow the license wizard to launch in step 10.*

10. Activate the new license; see section 2.7.6.

    Your MT Canvus installation is now re-licensed.

11. MT Canvus now starts automatically.

    Tip: *If you installed MT Canvus in desktop mode, it automatically opens in Full Screen mode. To toggle out of Full Screen mode and into Windows mode, press F11.*

2.7.8 Where is my license?

The installed license location depends on the application computer's operating system and the version of MT Canvus. To maintain backward compatibility, recent versions of MT Canvus search multiple locations for the license file.

- Ubuntu application computers
  - MT Canvus 1.7.0 or 1.7.1

    The file is in the ~/.MultiTouch/Licenses folder, where ~/ refers to the home folder of the MT Canvus runtime user.

    If the user logged on while MT Canvus runs is 'multi', the expanded path is: /home/multi/.MultiTouch/Licenses/
  - MT Canvus 1.7.2 or later

    The file is in the ~/MultiTaction/Licenses folder, where ~/ refers to the home folder of the MT Canvus runtime user.

    If the user logged on while MT Canvus runs is 'multi', the expanded path is: /home/multi/MultiTaction/Licenses/

    When searching for a license, MT Canvus *always* looks in these three folders:
    ~/ MultiTaction/Licenses/
    /etc/MultiTaction/Licenses
    ~/.MultiTouch/Licenses
- Windows application computers
  - MT Canvus 1.7.0 or 1.7.1

    The file is in the MT Canvus runtime user's profile: %APPDATA%\MultiTouch\Licenses.

    If the user logged on while MT Canvus runs is 'multi', the expanded path is: C:\Users\multi\AppData\Roaming\MultiTouch\Licenses
  - MT Canvus 1.7.2 or later

    The file is in the MT Canvus runtime user's profile: %LOCALAPPDATA%\MultiTaction\Licenses

    If the user logged on while MT Canvus runs is 'multi', the expanded path is: C:\Users\multi\AppData\Local\MultiTaction\Licenses

    When searching for a license, MT Canvus *always* looks in these three folders:
    %LOCALAPPDATA%\MultiTaction\Licenses
    %PROGRAMDATA%\MultiTaction\Licenses
    %APPDATA%\MultiTouch\Licenses

2.8 Using a proxy server

If your office uses a proxy server for internet connections, you must configure MT Canvus and, optionally, OpenVPN and apt to use the proxy server.

Important! *If your office uses a proxy server, image searches (section 9) will not work until you have set up a proxy connection for the application computer; see next section.*

2.8.1 Set up a proxy connection for MT Canvus

Follow these steps on the application computer.

- **Ubuntu application computers**
  a. Access the desktop; see section 5.1.1.
  b. Right-click the desktop and launch a terminal emulator.
  c. Edit the /etc/environment configuration file using an editor such as nano or vim. For example:
  `$ sudo vim /etc/environment`
  d. Append the following lines to this file:

```
http_proxy=http://<proxy_name>:<proxy_port>
https_proxy=https://<proxy_name>:<proxy_port>
```

  Where:
  `<proxy_name>` is the name or IP address of your proxy server
  `<proxy_port>` is the port for the proxy server.
  e. Save the file and exit the editor.
  f. Restart the application computer.

- **Windows application computers**
  a. Go to the Network & Internet applet in Windows Settings.
  b. Go to the Proxy page. Then go to the *Manual proxy setup* section.
  c. Set 'Use a proxy server' to On.
  d. Save the new settings and close Windows Settings.

2.8.2 Set up a proxy connection for OpenVPN

(Supported on Ubuntu application computers only)

MultiTaction support staff use OpenVPN to remotely to remotely collect diagnostic data (log files, crash dumps, and so on) if issues arise on your MT Canvus installation. From the OpenVPN article on Wikipedia:

> "OpenVPN is an open-source software application that implements virtual private network (VPN) techniques for creating secure point-to-point or site-to-site connections in routed or bridged configurations and remote access facilities."

We recommend that you enable remote access for OpenVPN (see step 1 below). This will allow MultiTaction support staff to remotely access your application computer. If your office uses a proxy server for internet connections, you must also configure OpenVPN to use the proxy server (see steps 2 and 3).

Follow these steps on the application computer:

1. Run this mt-canvus-setup command to enable remote access:
   `$ sudo mt-canvus-setup --enable-remote-access`

   Notes
   - *If you installed MT Canvus from a pre-configured disk image, OpenVPN is already installed and configured on your application computer. This command will simply enable remote access.*
   - *If you installed MT Canvus manually, this command will automatically install and configure OpenVPN and then enable remote access.*
   - *If you want to install and configure OpenVPN without enabling remote access, run:*
     `$ sudo mt-canvus-setup --setup-remote-access`
     (For example, you may want to do this while preparing an application computer in your IT lab before shipping it to its ultimate location.)
   - *If you subsequently want to disable remote access, run:*
     `$ sudo mt-canvus-setup --disable-remote-access`

2. Locate the OpenVPN configuration file:
   /etc/openvpn/mt-canvus.conf.available

3. Now configure OpenVPN to use the proxy server. Using your preferred editor, edit mt-canvus.conf.available:

   a. Delete the following lines:

   ```
   remote nexus.multitouch.fi 443
   resolv-retry infinite
   nobind
   ```

   b. Add the following lines, including the <connection> tags:

   ```
   <connection>
   remote nexus.multitouch.fi 443
   nobind
   </connection>

   <connection>
   remote nexus.multitouch.fi 443 tcp
   http-proxy <proxy name> <proxy port>
   http-proxy-retry
   nobind
   </connection>
   ```

   Where:
   <proxy_name> is the name or IP address of your proxy server
   <proxy_port> is the port for the proxy server. (This is typically 2138.)

   Tip: *The OpenVPN <connection> tag defines a client connection profile ie, a group of options that collectively define a connection to a specific OpenVPN server. If an OpenVPN configuration file contains multiple connection profiles, an OpenVPN client will try each profile sequentially until it successfully connects to a server. Full details are in the OpenVPN 2.4 manual:*
   https://community.openvpn.net/openvpn/wiki/Openvpn24ManPage

4. Do one of the following:
   - Run this command to restart Open VPN:
     ```
     $ sudo service openvpn restart
     ```
   - Run these commands to re-enable remote access:
     ```
     $ sudo mt-canvus-setup --disable-remote-access
     $ sudo mt-canvus-setup --enable-remote-access
     ```

2.8.3 Set up a proxy connection for apt

(Supported on Ubuntu application computers only)

To permanently configure apt to use a proxy server, we recommend specifying the proxy server in a separate file under /etc/apt/apt.conf.d/ ie, we do not recommend specifying the proxy server in apt.conf.

Follow these steps on the application computer.

1. Access the desktop; see section 5.1.1.
2. Right-click the desktop and launch a terminal emulator.
3. Create the /etc/apt/apt.conf.d/30proxy configuration file using an editor such as nano or vim. For example:
   ```
   $ sudo vim /etc/apt/apt.conf.d/30proxy
   ```
4. Add the following line to this file:
   ```
   Acquire::http::Proxy "http://[<user>:<password>@]<proxy_name>:<proxy_port>/";
   ```
   Where:

   `[<user>:<password>@]` specify the name and password of a valid user account for accessing the proxy server. If your proxy server does not require authentication, you can omit these details

   `<proxy_name>` is the name of your proxy server

   `<proxy_port>` is the port for the proxy server. For example, 8080.

   For example:
   ```
   Acquire::http::Proxy "http://srimmel:ad3jk8z6@proxy.unipraxis.com:8080/";
   ```
5. Save the file and exit the editor.
6. Restart the application computer.

3 Administration commands: mt-canvus-setup

(Available on Ubuntu application computers only)

Meeting Room packages include mt-canvus-setup, a command line admin tool. You can use this tool to perform various maintenance and configuration tasks.

To see the full list of available commands, run either of the following:

```
mt-canvus-setup --help
mt-canvus-setup -h
```

The following commands are available:

- **Version commands:** Meeting Room packages can have multiple versions of MT Canvus software installed concurrently. You can run commands to:
  - List the installed versions.
  - Display the *active version* ie, the version that starts automatically.
  - Select the active version.
  - Display the version of the mt-canvus-setup tool.
- **Software update commands:** You can run commands to:
  - List the available MT Canvus software updates.
  - Download and install a specific version
  - Automatically update to the latest version and make this the active version
  - Uninstall a specific version.

  Note: *These commands require an internet connection.*
- **Remote access commands:** Remote access to the application computer is disabled by default, but you can run commands to:
  - Enable remote access.
  - Set up remote access using OpenVPN and ssh.
  - Disable remote access via OpenVPN and ssh.
  - Display the host id of the application computer.
  - Automatically assign a unique hostname to the application computer based on its host id.

  Note: *When remote access is enabled, password authentication is disabled by default, but public key authentication can be used. MultiTaction Limited stores the public and private keys.*

4 Start or stop MT Canvus

This section describes how to start or stop MT Canvus.

Some operations require you to use a keyboard connected to the application computer; for convenience, you may prefer to attach a wireless keyboard.

Note: *See also instructions for:*

- *Accessing the desktop; see section 5.1.*
- *Enabling restart options for the Close button; see section 5.9.2.*

4.1 Start MT Canvus

4.1.1 Ubuntu application computers

Do one of the following:

- *(Applies only if MT Launcher is running; see section 4.1.3)* Tap the MT Canvus tile.
- *(Applies only if you installed a preconfigured MT Canvus image)* Right-click the desktop and choose 'MT Canvus (auto-restart)' from the pop-up menu.
- Right-click the desktop and launch a terminal emulator. Then run:
  ```
  $ mt-canvus.sh
  ```

4.1.2 Windows application computers

Do one of the following:

- *(Applies only if MT Launcher is running; see section 4.1.3)* Tap the MT Canvus tile.
- Double-click the MT Canvus desktop shortcut:

4.1.3 About MT Launcher

MT Launcher is designed to run on video walls and provide end-users with a simple method for launching applications such as MT Canvus or MT Canvus. For details about setting up MT Launcher, see the *MT Launcher Installation Manual*. Registered users can download this manual from https://cornerstone.multitouch.fi/mt-launcher.

*Example MT Launcher with MT Canvus tile (**1**).*

4.2 Stop MT Canvus

4.2.1 Ubuntu application computers

To shut down MT Canvus and access the desktop or return to MT Launcher (if applicable), do one of the following:

- If you installed a preconfigured MT Canvus image, press Ctrl+Alt+Esc. This method prevents MT Canvus from restarting automatically.
- If you installed MT Canvus manually, follow these steps to prevent MT Canvus from restarting automatically:
  a. Press Ctrl+Q to close the MT Canvus application.
  b. *(Skip this step if MT launcher is running)* Click the terminal emulator and press Ctrl+C to cancel the mt-canvus.sh launch script.
- If the Pause or Exit logout options are enabled (section 5.9.2), you can tap the Close dialog in the System menu, and then tap the Restart option. Then:
  - MT Canvus will exit to MT Launcher (if running), or
  - It will exit to the mt-canvus.bat launch script. You will then need to click the terminal emulator and press Ctrl+C to cancel the script.
- Quit from MT Canvus remotely using SSH; see section 4.3.

4.2.2 Windows application computers

To shut down MT Canvus and access the desktop or return to MT Launcher (if applicable), don one of the following:

- Follow these steps:
  a. Press Ctrl+Q to close the MT Canvus application.
  b. *(Skip this step if MT launcher is running)* Click the Command Prompt and press Ctrl+C to cancel the mt-canvus.bat launch script. Cancelling the launch script prevents MT Canvus from restarting automatically.
- If the Pause or Exit logout options are enabled (section 5.9.2), you can tap the Close dialog in the System menu, and then tap the Restart option. Then:
  - MT Canvus will exit to MT Launcher (if running), or
  - It will exit to the mt-canvus.bat launch script. You will then need to click the terminal emulator and press Ctrl+C to cancel the launch script. Cancelling the launch script prevents MT Canvus from restarting automatically.

4.3 Use SSH to stop and start MT Canvus remotely

(This section covers remote operations on Ubuntu application computers only)

To start MT Canvus remotely:

- Use your preferred SSH method to connect to the application computer and send the following command:

  ```
  DISPLAY=:0 mt-canvus.sh
  ```

To subsequently shut down MT Canvus remotely:

- Use your preferred SSH method to connect to the application computer and send the following commands:

  ```
  killall mt-canvus.sh
  killall mt-canvus-app
  killall mt-canvus-daemon
  ```

  This process stops MT Canvus and prevents it from restarting automatically.

5 Customize the setup

You can customize various MT Canvus features to suit your needs. For example, you can set the time zone or change the inactivity timeout.

5.1 Desktop access

This section describes how to access the MT Canvus desktop. Some customization tasks in the following sections will require you to access the desktop.

Note: *Instructions for starting and stopping MT Canvus are in section 4.*

5.1.1 Access the desktop

From the MT Canvus desktop on the application computer, you can launch an editor to update mt-canvas.ini. On Ubuntu application computers, you can also launch a terminal emulator to run command line operations and edit the network settings.

Follow these steps:

1. Do one of the following:
   - *(Ubuntu application computers only)* If you installed a preconfigured MT Canvus image, press Ctrl+Alt+Esc to shut down MT Canvus.
   - If you installed MT Canvus manually, press Ctrl+Q to shut down MT Canvus.

   MT Canvus now exits and returns you to the desktop or MT Launcher (see section 4.1.3).
2. If you started MT Canvus from:
   - **MT Launcher:** Press Ctrl+Q to exit MT Launcher and access the desktop.
   - **A launch script:** Press Ctrl+C to cancel the mt-canvus.sh launch script. This prevents MT Canvus restarting automatically.
   - **The desktop pop-up menu:** Press Ctrl+Alt+Esc to cancel the launch script. (The script runs in the background and is not visible in a command window.)

5.1.2 Relaunch MT Canvus directly

Do one of the following:

- **Ubuntu application computers:** Right-click the desktop and choose 'MT Canvus (auto-restart)' from the pop-up menu.
- **Windows application computers:** Double-click the MT Canvus desktop shortcut:

5.1.3 Relaunch MT Canvus from MT Launcher

If MT Launcher is running on the application computer (see section 4.1.3), follow these steps:

1. Restart MT Launcher:

   Ubuntu application computers: Do one of the following:

   - Right-click the desktop and click MT Launcher in the menu.
   - Right-click the desktop and launch a terminal emulator. Then run this command:
     ```
     $ mt-launcher
     ```

   Windows application computers: Double-click the MT Launcher desktop shortcut:

2. When MT Launcher restarts, tap the MT Canvus tile.

5.2 Configuration file: mt-canvus.ini

MT Canvus reads settings from a configuration file, mt-canvus.ini. Most customization tasks in the following sections will require you to edit this file.

5.2.1 Example versions and working versions of mt-canvus.ini

There are two versions of mt-canvus.ini on each MT Canvus application computer:

- An **example version** of mt-canvus.ini is provided for reference purposes only. It contains all configuration settings currently supported by MT Canvus. If you upgrade MT Canvus, the existing example version is overwritten by a new example version.
- A **working version** of mt-canvus.ini is used to configure MT Canvus operations. *When you configure MT Canvus, you must always edit the working version!*

  Note that the working version is retained if you upgrade MT Canvus. After upgrading, you will need to manually add any new settings to the existing working version of mt-canvus.ini (or you can copy them from the new example version). For upgrade instructions, see section 24.

5.2.2 Where is mt-canvus.ini on Ubuntu computers?

- **Default locations**

  Find an *example version* of mt-canvus.ini here:
  /opt/mt-canvus-<version>/Examples/

  A *working version* of mt-canvus.ini is *not* created automatically. If you manually create a working version of mt-canvus.ini, note that MT Canvus will automatically search for it in the following default locations:

  #1 ~/MultiTaction/canvus/mt-canvus.ini

  #2 /etc/MultiTaction/canvus/mt-canvus.ini

  Notes

  - *MT Canvus only searches folder #2 if it fails to find mt-canvus.ini in folder #1.*
  - *~/ refers to the home folder of the MT Canvus runtime user ie, the user logged on while MT Canvus runs.*

  If it fails to find a working version of mt-canvus.ini in folder #1 or #2, MT Canvus instead uses hard-coded default settings.

  If you create a working version of mt-canvus.ini in a different folder (ie, in a custom location), see below.

- **Custom locations**

  You can move the *working version* of mt-canvus.ini to a custom location. For example, you may want to save it in a folder that is regularly backed up. If you do move mt-canvus.ini to a custom location, you must pass this location to MT Canvus at runtime; see section 5.2.4.

5.2.3 Where is mt-canvus.ini on Windows computers?

- **Default locations**

  Find an *example version* of mt-canvus.ini here:
  C:\Program Files\MT Canvus\Examples

  A *working version* of mt-canvus.ini is *not* created automatically. If you manually create a working version of mt-canvus.ini, note that MT Canvus will automatically search for it in the following default locations:

  #1 %APPDATA%\MultiTaction\canvus\mt-canvus.ini
  Example: C:\Users\multi\AppData\Roaming\MultiTaction\canvus\mt-canvus.ini

  #2 %PROGRAMDATA%\MultiTaction\canvus\mt-canvus.ini
  Example: C:\ProgramData\MultiTaction\canvus\mt-canvus.ini

  Notes

  - *MT Canvus only searches folder #2 if it fails to find mt-canvus.ini in folder #1.*
  - *%APPDATA% refers to the user profile of the runtime user ie, the user logged on while MT Canvus runs.*

  If it fails to find a working version of mt-canvus.ini in folder #1 or #2, MT Canvus instead uses hard-coded default settings.

  If you create a working version of mt-canvus.ini in a different folder (ie, in a custom location), see below.

- **Custom locations**
  You can move the *working version* of mt-canvus.ini to a custom location. For example, you may want to save it in a folder that is regularly backed up.

  If you do move mt-canvus.ini to a custom location, you must pass this location to MT Canvus at runtime; see section 5.2.4.

5.2.4 Pass mt-canvus.ini to MT Canvus

(Applies only if the working version of mt-canvus.ini is in a custom location.)

If your working version of mt-canvus.ini is installed to its default location, it is passed to MT Canvus automatically. You can therefore skip this section.

However, if you moved mt-canvus.ini to a custom location after installation, you must manually pass it to MT Canvus. Follow these steps:

On Ubuntu application computers

1. Access the desktop: see section 5.1.1.
2. Right-click the desktop and launch a terminal emulator.
3. Run the following command:
   `$ mt-canvus.sh --mt-canvus-config <file location>`

   Where `<file location>` specifies the working version of mt-canvas.ini.
   For example:
   `$ mt-canvus.sh --mt-canvus-config /home/custom/mt-canvus.ini`

On Windows application computers

1. Access the desktop: see section 5.1.1.
2. ***Either*** edit the MT Canvus desktop shortcut (see section 4.1.2) to run following command ***or*** run the command directly:
   `mt-canvus.bat --mt-canvus-config <file location>`

   Where `<file location>` specifies the working version of mt-canvas.ini.
   For example:
   ```
   mt-canvus.bat --mt-canvus-config "C:\Program Files
     \MT Canvus\Custom\mt-canvus.ini"
   ```

If launching MT Canvus from MT Launcher

If you want users to launch MT Canvus from MT Launcher (see section 4.1.3) but mt-canvus.ini is in a custom location, you must the edit the pipeline configuration file for MT Canvus. Specifically, you must add `--mt-canvus-config,<file location>` to the arguments lists. Full details are in the *MT Launcher Installation Manual*. Registered users can download this manual from https://cornerstone.multitouch.fi/mt-launcher.

5.2.5 Backslashes in mt-canvus.ini

Applies to Windows application computers only.

On Windows computers, the \ backslash character is interpreted as an escape character in system configuration files. Consequently, any backslashes in mt-canvus.ini require special handling.

If you must include literal backslashes when you edit a setting, you must *either* replace backslashes with / forward slashes *or* prefix each backslash with another backslash ie, use \\ double backslashes. This particularly affects settings that specify a file path.

For example, the `root` setting specifies the folder that contains MT Canvus data: C:\Users\multi\AppData\Roaming\mt-canvus

If you want to specify this root folder in mt-canvus.ini, you must add either of the following entries:

- **Using / forward slashes**

```
[content]
root=C:/Users/multi/AppData/Roaming/mt-canvus
```

- **Using \\ double backslashes**

```
[content]
root=C:\\Users\\multi\\AppData\\Roaming\\mt-canvus
```

Which settings are affected?

Special handling for backslashes potentially affects the following settings:

```
[canvas]
background-init=<value>
```

```
[content]
root=<value>
plugin-folders=<value>
```

```
[local-share]
shared-folder=<value>
```

```
[remote-mount]
mount-folder=<value>
```

Exception

There is one exception to this requirement. The `admin-info` defines the administrator contact details that appear in the 'forgotten password' advisory (see section 7.4). This setting accepts `\n` as a line break code, which does *not* require special handling. For example, this is a legitimate entry:

```
[system]
admin-info=Spencer Rimmel\nExt. 321654\nspencer@unipraxis.com
```

5.3 Set an inactivity timeout for MT Canvus

You can set an inactivity timeout for MT Canvus. If users do not interact with an open canvas before the timeout expires, the canvas closes and the MT Canvus start screen appears. Any user can reopen the canvas from the start screen.

Follow these steps:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Edit the following setting in the `[system]` section.
   (Manually add this setting to mt-canvus.ini if it does not already exist.)

   ```
   [system]
   inactive-timeout=<n>
   ```

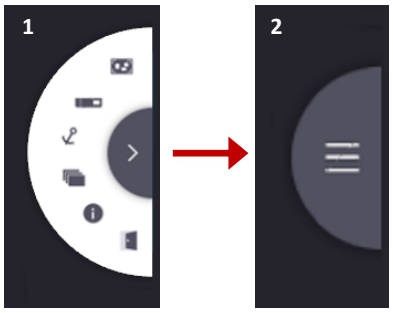
   Where `<n>` is the timeout (in seconds) for MT Canvus. For example:

   - `inactive-timeout=600`
     An idle or unattended canvas times out after 10 minutes (600 seconds).
   - `inactive-timeout=0`
     An open canvas never times out (unless it is password-protected and governed by a separate timeout; see section 7.2).
3. Restart MT Canvus on the application computer; see section 4.

MT Canvus start screen

5.4 Set an inactivity timeout for canvas menus

By default, MT Canvus canvas menus along the edge or bottom of the screen close automatically after 10 seconds of inactivity. If users do not interact with an open menu before the timeout expires, the menu closes. But you can change or cancel the timeout.



*Inactive open menus (**1**) close automatically (**2**) when the menu timeout expires.*

To change or cancel the inactivity timeout, follow these steps:

1. Edit the working version of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Edit the following setting in the `[canvas]` section.
   (Manually add this section and setting to mt-canvus.ini if they do not already exist.)

   ```
   [system]
   menu-timeout=<n>
   ```

   Where `<n>` is the menu timeout (in seconds). The default timeout is 10 seconds.
   For example:

   - `menu-timeout=60`
     An idle menu close automatically after 1 minute (60 seconds).
   - `menu-timeout=0`
     An idle menu never times out. That is, it remains open and never closes automatically.

5.5 Configure default pin and display settings

You can configure default pin and display settings for when a canvas opens.

For example, you can specify that all canvases are pinned when they open. Or you can specify that a canvas's previous pin state is re-applied when it next opens. You can also specify whether to: display labels for anchors; zoom a canvas to achieve a 'best fit'; and initially display an anchor area.

Follow these steps:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Edit the following settings in the `[canvas]` section.
   (Manually add this section and settings to mt-canvus.ini if they do not already exist.)

```
[canvas]
show-anchors=<true or false>
persist-show-anchors=<true or false>
pin-canvas=<true or false>
persist-pin-canvas=<true or false>
zoom-viewport=<true or false>
anchor-viewport=<true or false>
```

Where:

- `show-anchors` determines whether anchor labels are displayed when any canvas is opened. These labels help users locate and identify the anchors. Defaults to true.

  If `true`, anchor labels *are* displayed when any canvas opens. If `false`, anchor labels are hidden.

  Note: *This setting is superseded if:*
  - `persist-show-anchors` *is true. See below.*
  - *Users manually hide or re-display labels by tapping the*  *button in the Anchor List widget.*

- `persist-show-anchors` determines whether a canvas's anchor labels are displayed or hidden when it is next opened *based on the labels' previous display state*. Defaults to true.

  If `true`, the previous display state is re-applied. If anchor labels were previously hidden, they are still hidden when the canvas next opens. If anchor labels were previously displayed, they are still displayed when the canvas next opens.

  If `false`, the display state for anchor labels is determined solely by the `show-anchors` setting.

- `pin-canvas` determines whether a canvas is pinned when it opens. The Pin feature locks the visible area of canvas so that it cannot be moved or resized. Defaults to false.

  If `true`, *all canvases* are initially pinned when they are opened. If a canvas is split into multiple workspaces *and* the restore workspace feature is enabled (see section 5.9.1), each workspace is pinned.

If `false`, canvases are unpinned when they are opened.

Notes

- *This setting is superseded if* `persist-pin-canvas=true`*. See below.*
- *This setting is superseded if users manually pin or unpin a canvas.*
- *You can also configure canvases to be pinned automatically after a period of inactivity; see section 5.6.*

- `persist-pin-canvas` determines whether a canvas is pinned or unpinned when it next opens *based on its previous pin state*. Defaults to true.

  If `true`, the canvas's previous pin state is re-applied. That is, if a canvas was previously pinned, it is still pinned when it next opens. If it was previously unpinned, the canvas is still unpinned when it next opens.

  If `false`, a canvas's initial pin state is determined by the `pin-canvas` setting.

- `zoom-viewport` determines whether a canvus is zoomed to achieve a 'best fit' when it opens. Defaults to false.

  If `true`, *all canvases* are initially zoomed so that all content is visible on the screen. This option is equivalent to tapping the  Fit to Screen button in the System menu.

  If `false`, canvases are not zoomed when they are opened. Instead, the viewport is shrunk to focus on the 'middle third' of the canvas.

  Notes

  - *This setting is superseded if* `anchor-viewport` *is true. See below.*
  - *This setting is superseded if fixed workspace settings* `view-location` *or* `view-scale` *are defined; see section 16.3.*

- `anchor-viewport` determines whether a canvas jumps to the first anchor when it opens. Here, 'first anchor' is the first anchor listed in the Anchor List widget.

  If `true`, the canvas automatically displays the first anchor area when the canvas is opened. This option supersedes the `zoom-viewport` setting; see above.

  If `false`, the initial canvas display is determined by the `zoom-viewport` setting; see above.

  Notes

  - *This setting is ignored if no anchors have been defined.*
  - *This setting is superseded if fixed workspace settings* `view-location` *or* `view-scale` *are defined; see section 16.3.*
  - *To change the sequence of anchors in the Anchor List widget, simply drag the anchors into the order you want.*

3. Restart MT Canvus on the application computer; see section 4.

5.6 Pin inactive widgets and canvases automatically

Note: *This feature is also called 'auto-pin'.*

Canvases and widgets are pinned automatically after a period of inactivity. This is useful for users giving a canvas presentation. In previous versions of MT Canvas, a presenter could sometimes forget to pin the canvas or they might forget to pin a browser or PDF. This resulted in the presenter accidentally moving or resizing screen items, causing a delay in the presentation while they reset the screen.

To remedy this, MT Canvus now pins canvases and widgets automatically after 5 seconds of inactivity. But you change or disable this timeout. Follow these steps:

1. Edit the working version of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Edit the following setting in the `[canvas]` and `[widget]` sections respectively. (Manually add this setting to mt-canvus.ini if does not already exist.)

```
[canvas]
auto-pin-after=<n>

[widget]
auto-pin-after=<n>
```

Where:

- `auto-pin-after` sets a timeout for automatically pinning a canvas or widgets. If no widgets are moved or resized, or the canvas is not moved or resized, before the timeout expires, they are pinned automatically. The default timeout is 5 seconds.

  Set `<n>` to the timeout you want, in seconds. To disable this feature (canvases or widgets are never pinned automatically), set `<n>` zero.

- In the `[canvas]` section, the auto-pin timeout is a *workspace-specific* canvas timeout. If the canvas is not moved or resized before the timeout expires, the canvas is pinned automatically.

  If two or more workspaces are open *for the same canvas*, the timeout operates independently for each workspace. For example, if users are interacting with one workspace while another workspace is unattended, only the unattended workspace is pinned automatically when the timeout expires.

  Note: *The canvas timeout is not affected by users moving or resizing widgets.*

- In the `[widget]` section, the auto-pin timeout applies to all unpinned widgets on a canvas. If no widgets are moved or resized before the timeout expires, all unpinned widgets on the canvas are pinned automatically.

  If two canvases (A and B) are open in separate workspaces, the widget auto-pin timeout operates independently for each canvas. For example, if users are continuously interacting with widgets on canvas A while canvas B is unattended, the widget timeout only expires on canvas B. Therefore, only the widgets on canvas B are pinned automatically.

Note: *You can also configure canvases to be pinned automatically as soon as they open; see the* `pin-canvas` *setting in section 5.5.*

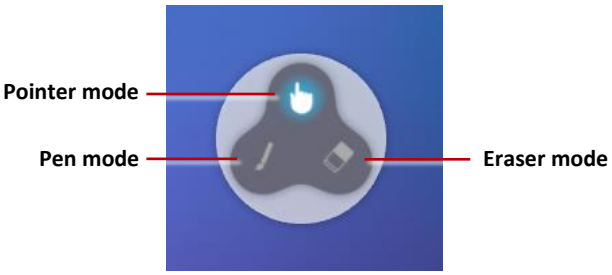
5.7 Enable the touch selector

Notes

- *The touch selector is normally used when MT Canvus runs on a video wall of touch screen overlays by third party manufacturers, not on a video wall of MultiTaction Cells.*
- *The touch selector is only enabled if* `third-party-touch=true` *in mt-canvus.ini. For details, see section 22.4.*

The touch selector enables MT Canvus users to quickly change touch mode. When enabled, the touch selector is permanently visible on the screen and includes three 'touch mode' buttons:

- **Pointer mode:** Users can use a finger like a mouse pointer. For example, you can move or resize widgets, tap buttons, and browse web pages or PDF documents.
- **Pen mode:** Users can use a finger to draw annotations on the screen.
- **Eraser mode:** Users can use a finger to erase annotations.



Touch selector with touch mode buttons

By default, the home location of the touch selector is the bottom-right corner of the workspace. If a video wall has multiple workspaces, each workspace displays a touch selector. When the touch selector is enabled, the info panel also displays a touch mode button (see section 5.7.1).

To enable the touch selector:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Set `third-party-touch=true` in the `[hardware]` section; see section 22.4.
3. Edit the following settings in the `[touch-mode-selector]` section.
   (Manually add this section and settings to mt-canvus.ini if they do not already exist. If they do already exist, you can uncomment them by deleting the semi-colons.)

```
[touch-mode-selector]
;timeout=10
;home-x-percent=90
;home-y-percent=90
;home-radius=500
```

   Where:

   - `timeout` sets an inactivity timeout, in seconds. If the touch selector is in *pointer mode* and not used before the timeout expires, the selector reappears in

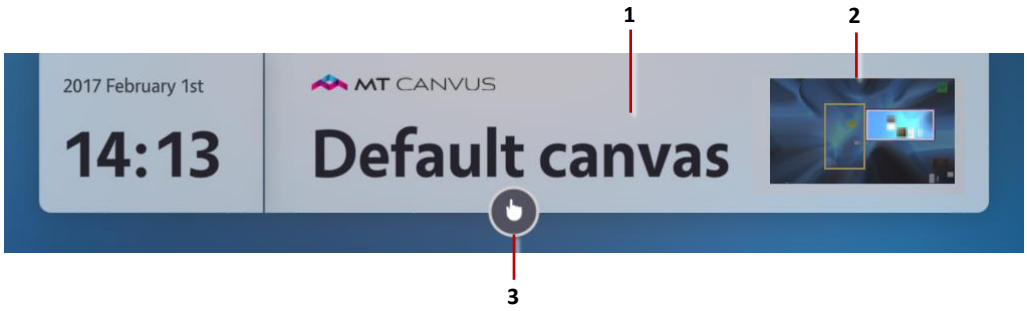
its home location on the screen. Note the inactivity timeout does not apply while the selector is in *pen or eraser mode*.

- `home-x-percent` sets the x coordinate of the touch selector's home location. Specify the x coordinate as a percentage of the *workspace's* total width.
- `home-y-percent` sets the y coordinate of the touch selector's home location. Specify the y coordinate as a percentage of the *video wall's* total height. Note that 0 (zero) specifies the top and 100 specifies the bottom of the video wall.
- `home-radius` is the maximum distance (in pixels) the selector can move before it automatically reappears in its home location. Note that it only returns to its home location if the inactivity timeout expires.

4. Restart MT Canvus on the application computer; see section 4.

5.7.1 About the Info Panel touch selector

Each workspace has an info panel and canvas viewer at the top of the screen. When the touch selector is enabled, the info panel includes a touch mode button. Users can tap the button to cycle through pointer, pen and eraser mode.



Info panel. **1** *Canvas name.* **2** *Canvas viewer, showing a small scale view of the total canvas.* **3** *Touch mode button.*

5.8 Configure the eraser

MT Canvus users can erase annotations with a pen, mouse or eraser card. An eraser card uses special Codice eraser codes. You can change or add Codice eraser codes, as required. You can also disable or reconfigure the mouse eraser mode.

Note: *There are three types of Codice card: erasers; personal markers; and Demo Canvas Manager Codice cards. Personal markers are described in the MT Canvus User Manual. Demo Canvas Manager Codice cards are described in section 8.2.1.*

5.8.1 Define additional Codice eraser codes

By default, Codice codes 612 and 614 are defined as *Codice eraser codes*, but you can change these codes or add additional eraser codes. Follow these steps:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.

2. Edit the following setting in the `[annotation]` section.
   (Manually add this section and setting to mt-canvus.ini if they do not already exist.)

```
[annotation]
eraser-marker-codes=612, 614, 615
```

   Where `eraser-marker-codes` specifies the eraser codes. You can assign a new value or add a comma-separated list of values. In the example above, eraser codes 612, 614 and 615 are all designated as eraser codes.

3. Restart MT Canvus on the application computer; see section 4.

Note: *Codice eraser codes are separate from the mouse eraser code in section 5.8.2.*

5.8.2 Reconfigure the mouse eraser mode

In *eraser mode*, the mouse pointer behaves exactly like an eraser card. Users can hold down the left mouse button and drag a rectangular eraser to delete annotations drawn with an infrared pen.

Eraser mode is enabled by default. It is configured in mt-canvus.ini. It is very unlikely that you will ever need to re-configure this feature. However, if you need to disable eraser mode or if MultiTaction technical staff instruct you to change the *mouse eraser code*, follow these steps:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Edit the following setting in the `[annotation]` section.
   (Manually add this section and setting to mt-canvus.ini if they do not already exist.)

```
[annotation]
mouse-eraser-marker-code=42
```

3. To change the eraser code, set `mouse-eraser-marker-code` to the new value specified by MultiTaction support staff. (By default, this setting has a value of 42.)
4. To disable eraser mode, add a semi-colon before `mouse-eraser-marker-code` to comment out this line:

```
[annotation]
;mouse-eraser-marker-code=42
```

5. Restart MT Canvus on the application computer; see section 4.

Note: *The mouse eraser code is separate from the Codice eraser codes in section 5.8.1.*

5.9 Configure the restart options

You can specify which canvas (or canvases) are opened automatically when MT Canvus is restarted. You can also allow users to restart MT Canvus when they tap the Close button on the System menu.

5.9.1 Restore the current workspace(s)

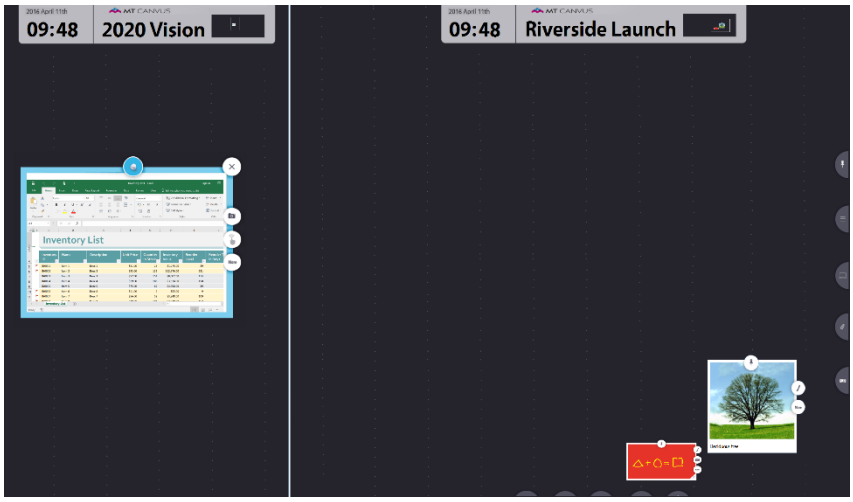
By default, if you restart MT Canvus, it closes the current canvas or canvases and—when it starts up again—automatically opens the *default canvas* (ie, the oldest canvas in the current installation) and displays this canvas in a *single workspace*. If multiple workspaces were in use before the restart, these are discarded.

However, you can configure MT Canvus to instead reopen *the current canvas* (or canvases) and restore any workspaces that were in use before the restart:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Go to the `[system]` section and set `restore-workspaces` to `true`.
   (Manually add this setting to mt-canvus.ini if it does not already exist.)

```
[system]
restore-workspaces=true
```

3. Restart MT Canvus on the application computer.



Example screen split into two-workspaces, each displaying a different canvas

Notes

- *If the `zoom-viewport` setting is enabled, the canvas's previous zoom and focus are not restored when the canvas next opens. Instead, the canvas is initially zoomed to achieve a 'best fit'; see section 5.5.*
- *The combined physical screen area of the Cells represents a viewport that shows the visible portion of a canvas. Workspaces enable you to split the viewport into separate sections so that two or more users can work independently on the screen. For further details about these concepts, see the MT Canvus User Guide.*

5.9.2 Enable Pause or Exit logout options

By default, when users tap Close button on the System menu, MT Canvus saves the canvas and quits to the start screen (see section 5.3). MT Canvus keeps running in the background and any user can tap the *Touch to begin* hotspot to quickly return to their canvas.

However, you can reconfigure the Close button to present users with two options for maintenance or troubleshooting reasons:

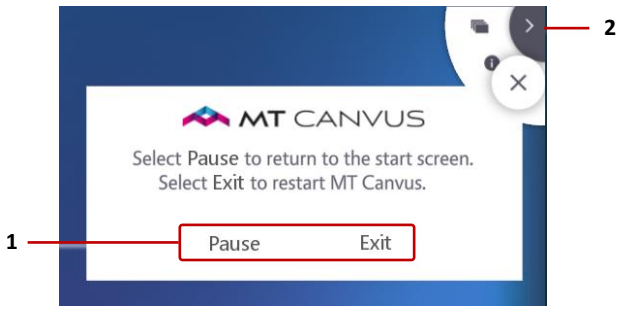
- **Pause:** This option saves and closes the current canvas and displays the MT Canvus start screen, as normal. In effect, MT Canvus is paused until a user taps the *Touch to begin* hotspot to return to their canvas.
- **Exit:** This option saves the current canvas and exits MT Canvus. If MT Canvus was launched from:
  - MT Launcher, the Exit option saves the current canvas, closes MT Canvus and returns you to MT Launcher. Note that MT Canvus is *not* restarted.
  - A launch script, the Exit option effectively restarts MT Canvus. In practice, the current canvas is saved, MT Canvus closes, and the launch script reruns.

To enable the Pause or Exit logout options:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Go to the `[system]` section and set `show-logout-options` to `true`. (Manually add this setting to mt-canvus.ini if it does not already exist.)

```
[system]
show-logout-options=true
```

3. Restart MT Canvus on the application computer; see section 4.



*Pause or Exit options (**1**) display after tapping the Close button in the System menu (**2**).*

Note: *Instructions for starting and stopping MT Canvus are in section 4.*

5.10 Display the Storage menu in video wall mode

Available only on Windows application computers.

The Storage menu lists all internal drives and mapped drives on the application computer.

By default, the Storage menu is only shown when MT Canvus runs in desktop mode. When MT Canvus runs in video wall mode, the Storage menu is replaced by the USB menu, which lists all USB memory devices attached to the application computer.

However, you can configure MT Showcase to instead display the Storage menu in video wall mode. With this setup, the Storage menu lists all internal drives and mapped drives on the application computer connected to your video wall.

Follow these steps:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Edit the following setting in the `[system]` section.
   (Manually add this setting to mt-canvus.ini if it does not already exist.)

   ```
   [system]
   show-volumes=<drives>
   ```

   Where `show-volumes` specifies a comma-separated list of drive letters. When MT Canvus runs in video wall mode:

   - If `show-volumes` is set to a list of one or more drive letters, the Storage menu *is* shown and the USB menu is hidden.
     The ':' is optional when specifying drive letters. For example, to specify three drives, C, X, Z, add either of the following lines to mt-canvus.ini:

     ```
     show-volumes=C,X,Z
     show-volumes=C:,X:,Z:
     ```

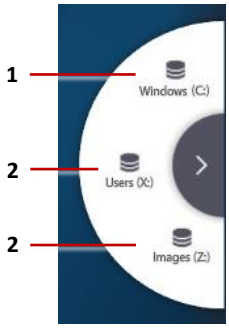
   - If `show-volumes` is null (no drives are assigned), the Storage menu is shown but the menu is empty and displays a 'No drives connected' advisory. For example:

     ```
     show-volumes=
     ```

   - If `show-volumes` is absent or commented out, the USB menu is shown and the Storage menu is hidden. For example:

     ```
     ;show-volumes=C,X,Z
     ```

3. Restart MT Canvus on the application computer; see section 4.

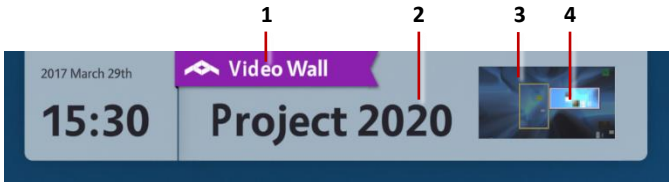


Storage menu. 1 *Local drive.* 2 *Mapped drives.*

5.11 Hide the info panel

Each workspace has an info panel and canvas viewer at the top of the screen. By default, users can manually hide or re-display the info panel by tapping the Show info panel button in the System menu.

But you can automatically hide the info panel if a user resizes a workspace so it becomes too narrow. You can also permanently hide the info panel in a fixed workspace.



Workspace info panel. 1 *Workspace identifier. Present only when multiple workspaces are defined.* 2 *Canvas name.* 3 *Canvas viewer, showing the total canvas.* 4 *Current size and location of viewport, showing the area of canvas that is currently visible on-screen.*

5.11.1 Permanently hide the info panel

Applies only to fixed workspaces. You cannot permanently hide the info panel in workspaces created manually by users.

If required, you can configure the info panel *in a fixed workspace* so it is always hidden. To do this, you must set `enable-info-panel` to false in mt-canvus.ini (see section 16). For example:

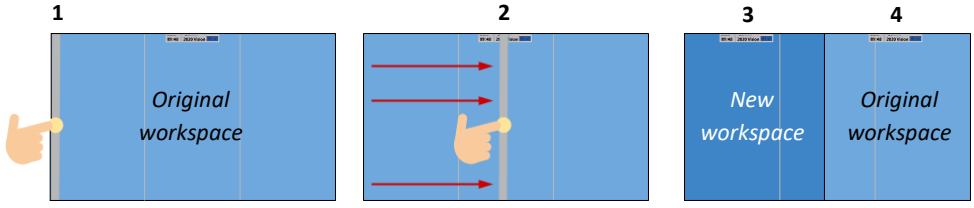
```
[fixed-workspace:1]
enable-info-panel=false
```

Note: *If you do disable the info panel, the Show info panel button is not available to users in the System menu.*

5.11.2 Automatically hide the info panel in narrow workspaces

Applies only to workspaces created manually by users. You cannot auto-hide the info panel in fixed workspaces.

Users can split a canvas into separate workspaces by dragging a vertical split line from the left edge or right edge of the screen. The position of the split line determines the widths of the original workspace and the new workspace. A user can resize a workspace by dragging the split line left or right.



Creating a new workspace. The user taps the screen edge (1) *and drags the vertical split line* (2). *The new workspace fills the area between the split line* (3) *and screen edge and the existing workspace shrinks to fill remaining area* (4).

You can configure the info panel so it is automatically hidden if a user makes a workspace too narrow. Follow these steps:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Edit the following setting in the `[system]` section.

   (Manually add this setting to mt-canvus.ini if it does not already exist.)

```
[system]
min-workspace-width-for-info-panel=<width>
```

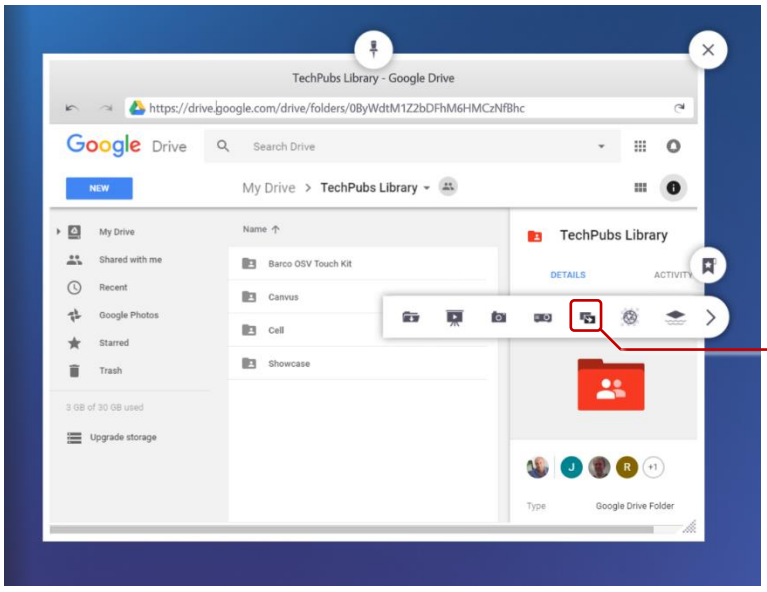
   Where `<width>` specifies the minimum workspace width in pixels. If a user resizes the workspace to be narrower than this width, the info panel is automatically hidden. Note also:

   - If `min-workspace-width-for-info-panel` is set to 0 (zero), the info panel is never hidden.
   - `min-workspace-width-for-info-panel` is only effective if you assign a value higher than 600. This is because workspaces have a minimum width of 600 pixels ie, users cannot resize them to be smaller than this.

     Note: *The minimum workspace width is approximately half the width of a Cell in portrait mode.*

5.12 Retain cached browser data to streamline web site logins

The Duplicate feature allows users to quickly open multiple instances of a browser widget. If the user had logged into a web site in the parent widget, they are logged in automatically in the duplicate widget ie, *the user does not need to re-enter their login credentials*. This is useful if a user wants to open multiple web-based documents stored on sites such as Google Drive or the company intranet.



Example browser widget. This web site requires users to log in.
1 *Duplicate button in widget submenu.*

MT Canvus manages this by storing cookies and session data for each open browser in a cache. If a user *duplicates* any browser widget (by tapping the duplicate button), the duplicated widget inherits the cookies and session data from the parent widget, including user login details.

By default, cached browser data is only retained while the current canvas is open. If a user closes the canvas (for example, to work on a different canvas) and then reopens the original canvas, they will need to re-enter their browser login credentials.

However, you can streamline this login process by *persisting* cached browser data. When this feature is enabled, cached browser data is retained when a canvas is closed and is available when the canvas is next opened. Consequently, when a user reopens the canvas they are automatically logged back in to any web sites they were visiting previously.

Follow these steps:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Edit the following settings in the `[browser]` section.

   (Manually add this section and settings to mt-canvus.ini if they do not already exist.)

   ```
   [browser]
   max-memory-caches=100
   persist-between-sessions=<true or false>
   ```

   Where:

   - `max-memory-caches` sets the maximum number of 'new browser' caches, across all canvases, that can be stored in memory. If your users find that, unexpectedly, they are having to re-enter login credentials in browser widgets, this cache limit may need adjusting. *Do not edit this setting unless instructed to do so by MultiTaction technical staff.*
   - `persist-between-sessions` determines whether cached browser data *for the current canvas* is retained when a user closes the canvas. (Cached browser data for other canvases is retained until those canvases are also closed.)

     If `true`, the cached browser data *is* retained when a user closes the canvas (for example, to work on a different canvas). When the user next reopens the original canvas, they *will not* need to re-enter their browser login credentials.

     If `false`, cached browser data is not retained when a user closes the canvas. When the user next reopens the canvas, they *will* need to re-enter their login credentials.

     Note: *If MT Canvus itself is restarted, all browser caches are cleared and users will need to re-enter their login credentials when the canvas is next opened.*

3. Restart MT Canvus on the application computer; see section 4.

5.13 Customize the MT Canvus background

By default, MT Canvus has a plain gray background but you can specify a custom background. For example, you can choose one of the three 'Awesome Blue' background variants installed with MT Canvus.

5.13.1 Example backgrounds included with MT Canvus

An 'Awesome Blue' example background is installed automatically with your MT Canvus client. This background is available in three variants:

- AwesomeBlueBackground: The original blue background.
- MTCanvusBackground: A drifting background of *high saturation* blue and magenta clouds, similar in effect to the Aurora Borealis.
- MTCanvusBackground2: A darker, slower version of MTCanvusBackground, with less color saturation. This background variant does not visually respond to touches.

This example background is implemented as a JavaScript file.

- On Ubuntu computers, find the file here: /opt/mt-canvus-<version>/Examples/ experience-canvas-background.javascript
- On Windows computers, find the file here: C:\Program Files\MT Canvus\Examples\experience-canvas-background.javascript

5.13.2 Replace the default background with the example background

Follow these steps:

1. Copy the example JavaScript background file (see previous section) into the same folder as the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. *(Optional)* Rename the background file. For example, MyBackground.js.
3. In the working version of mt-canvus.ini, go to the `[canvas]` section and edit the `background-init` setting. (Manually add this setting if it does not already exist.)

   ```
   [canvas]
   background-init=<JavaScript>
   ```

   Where `<JavaScript>` specifies the full path to the JavaScript background file. The examples below specify MyBackground.js.

   Ubuntu example

   ```
   background-init=/home/multi/MyBackground.js
   ```

   Windows example

   ```
   background-init=C:\\ProgramData\\MultiTaction\\canvus\\MyBackground.js
   ```

   Note: *Single backslashes are not supported in mt-canvus.ini on Windows computers. You must use forward slashes or double backslashes; see section 5.2.5.*
4. If you have finished editing mt-canvus.ini, restart MT Canvus on the application computer; see section 4.

5.13.3 Change the Awesome Blue background variant

Follow these steps:

1. Edit the JavaScript background file you referenced in section 5.13.2.

   (We recommended that you copy this file into the same folder as the working version of mt-canvus.ini.)

2. Locate the following lines in your JavaScript background file:

   ```
   var bg = MultiWidgets.createPlugin("cornerstone.AwesomeBlue");
   bg.addCSSClass("<option>");
   bg;
   ```

   Where `<option>` is one of the background variants supported by the Awesome Blue plugin; see section 5.13.1.

3. Edit the `bg.addCSSClass` line to specify the variant you want. For example:

   ```
   bg.addCSSClass("MTCanvusBackground");
   ```

   ```
   bg.addCSSClass("MTCanvusBackground2");
   ```

   ```
   bg.addCSSClass("AwesomeBlueBackground ");
   ```

4. When you have finished editing your JavaScript background file, restart MT Canvus on the application computer; see section 4.

5.14 Set the time zone

Follow these steps:

- **Ubuntu application computers**
  a. Access the desktop: see section 5.1.1.
  b. Right-click the desktop and launch a terminal emulator.
  c. Run the following command to specify which time zone the MT Canvus application computer will use:
     `$ sudo dpkg-reconfigure tzdata`

- **Windows application computers**

  Use the Date and Time applet in Windows Settings to set the time zone.

6 Positional audio

Note: *This feature is also called 'audio panning'.*

You can configure MT Canvus to support *positional audio*. This means that canvas sounds (for example, a movie or video stream) are directed to the nearest speaker. To set up positional audio, you must create an audio configuration file and pass this file to MT Canvus at runtime.

6.1 Audio sources

MT Canvus can play sounds from several audio sources:

- Movie files: If a user drags an MP4 file onto the canvas, it automatically displays in a movie widget. This widget is a simple video player that allows users to play, pause, and mute the movie, but it has no volume control; volume levels for the movie's audio track are controlled using your speakers or application computer.
- Video streams: Users can stream video (and accompanying audio) on the canvas, including webcam streams and videos running on an external computer. The video stream widget has no volume control; volume levels are controlled using your speakers or application computer.
- Shared screens (and audio sharing): Users can display the screen of their laptop on the canvas. When a user shares their screen, audio output is shared along with video output. This is important for remote users sharing their screen, allowing them to attend online meetings or video conferences, with their contributions displayed and heard on the MT Canvus video wall.

  The shared screen widget has no volume control; volume levels are controlled using your speakers or application computer.
- Browsers: Browser sounds include any audio output generated by the browser content. This typically means the audio track for a video running in the browser. The browser widget has no volume control; volume levels are controlled using your speakers or application computer.

For details about which sound sources support positional audio, see section 6.2.1.

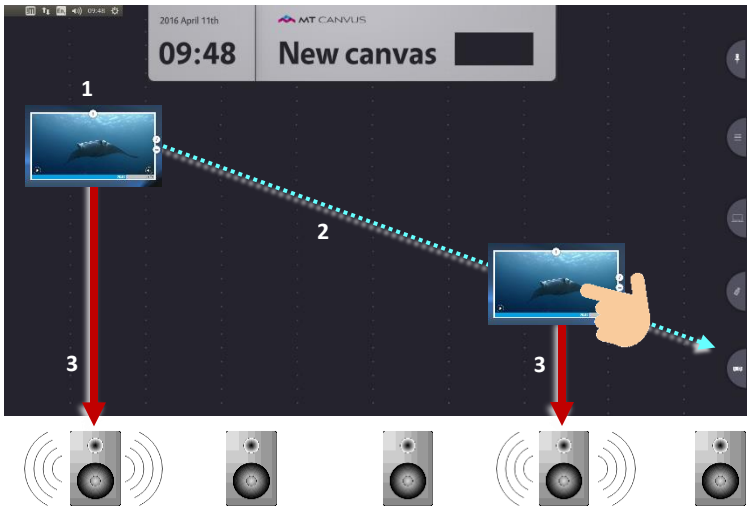
6.2 About positional audio

By default, MT Canvus directs sounds equally to all speakers attached to your video wall, even if the sound source is not visible on-screen. This can happen if, for example, the viewport is zoomed in on a corner of the total canvas.

But you can configure MT Canvus to support positional audio. When positional audio is enabled on your application computer, sounds are directed to the nearest speaker. This is useful on large video walls. If the sound source moves away from one speaker towards an adjacent speaker (for example, if a user drags a movie widget), audio output smoothly shifts from the first speaker to the second.

For example, consider a long video wall with five evenly spaced speakers. A video playing in the center of the wall outputs audio to the central speaker, but a video playing on the left side of the wall outputs audio to the leftmost speaker. Similarly, if a user drags a video across the screen from left to right, its audio output follows the video, panning across the speakers from left to right.

For positional audio setup instructions, see section 6.7.



*Positional audio example. When a movie widget (**1**) is dragged across the screen from left to right (**2**), audio output smoothly transitions through the channels from left to right (**3**). For users, the sound appears to follow the widget's movement across the screen.*

6.2.1 Which audio sources support positional audio?

Movie widgets, video stream widgets and shared screen widgets all support positional audio, if it enabled on your application computer.

Browser widgets do *not* support positional audio. Even if positional audio is enabled, browser sounds are always directed to all available speakers, regardless of the browser widget's screen position.

6.3 Audio requirements

6.3.1 Sound card

We do not currently recommend any specific sound cards. To set up audio panning, your application computer simply needs a multi-channel sound card that supports speaker configurations such as 5.1 surround sound.

6.3.2 Channel index numbers

You need to know the channel index for each speaker. You will reference these index numbers when you create an audio configuration file. For advice on how to obtain channel index numbers, see step 1 in section 6.7.

For example, a 5.1 surround sound system typically uses these channel index numbers:

Front Left	0
Front Right	1
Front Center	2
Rear Left	3
Rear Right	4

Notes

- *Left and Right mean the user's left and right when they face the screen.*
- *The subwoofer has no channel index and can be ignored when setting up positional audio for MT Canvus*.

6.4 Audio configuration files

You configure positional audio in an XML audio configuration file that is passed to MT Canvus at runtime. The audio configuration defines:

- *Speaker zones* on your video screen. Each zone is rectangular and has two audio channels, on its left and right edges. The size, location and number of speaker zones matches the position and number of speakers attached to your video wall.
- *Fade borders* at the edges of each speaker zone. If the sound source (such as a video widget) moves out of a speaker zone and into a fade border, audio output smoothly attenuates to zero.
- *Stereo panning* within each speaker zone. This controls audio attenuation on a zone's left and right channels. For example, as the sound source moves away from the left speaker towards the right speaker, audio output falls on the left channel and rises on the right channel.

6.4.1 Audio configuration elements

An audio configuration contains the following elements:

```
<!DOCTYPE mtdoc>
<pan2d>
  <mode>1</mode>
  <rectangles>

    <SoundRectangle>
      <left-channel>n</left-channel>
      <right-channel>n+1</right-channel>
      <location>x y</location>
      <size>w h</size>
      <stereo-pan>sp</stereo-pan>
      <fade-width>w</fade-width>
    </SoundRectangle>

    <!-- Insert extra sound rectangles here -->

  </rectangles>
</pan2d>
```

Where:

- `mode` specifies the type of positional audio. Always set this to `1` for rectangular speaker zones.
- `SoundRectangle` defines a single rectangular speaker zone. Its child elements define the zone's size and location, and the speakers assigned to the zone's left and right channels.

  You must add a separate `SoundRectangle` element for each speaker zone in your audio configuration. Typically, you need `s`-1 speaker zones, where `s` is the number of speakers attached to your video wall.
- `left-channel` sets the channel index for the speaker on the left edge of the speaker zone; `n` is the channel index.
- `right-channel` sets the channel index for the speaker on the right edge of the speaker zone; `n` is the channel index.

- `location` defines the screen location of the speaker zone; `x y` define the horizontal and vertical coordinates of the zone's top-left corner, in pixels.
- `size` defines the size of the speaker zone; `w h` define the width and height of the zone, in pixels.
- `stereo-pan` controls audio attenuation on the zone's left and right channels. Audio output changes on each channel dynamically as the sound source moves. Permitted values range from 0 to 1.

  The default is 0.3, meaning that when the sound source is fully on the right, audio output on the left channel falls by 30%. (That is, when the right channel audio is 100%, the left channel is 70%. Likewise, when the left channel audio is 100%, the right channel is 70%.)

  For more about stereo panning, see section 6.5.
- `fade-width` defines the width, in pixels, of the fade borders. These lie outside the left and right edges of the speaker zone. Within the fade border, audio output falls to 0% or rises to 100%, depending on whether the sound source is leaving or entering a speaker zone.

  For more about fade borders, see section 6.6.

Example audio configuration files are shown in section 6.8.

6.4.2 Where do I save my audio configuration?

We recommend you save your audio configuration file in the same folder as the MultiTaction Cornerstone configuration files, screen.xml and config.txt. By default, these files are saved in the following locations:

- **Ubuntu application computers:** The files are in the ~/.MultiTouch folder, where ~/ refers to the home folder of the MT Canvus *runtime user*.

  If the user logged on while MT Canvus runs is 'multi', the expanded path is: /home/multi/.MultiTouch/
- **Windows application computers:** The files are saved in the MT Canvus *runtime user's* profile: %APPDATA%\MultiTouch

  If the user logged on while MT Canvus runs is 'multi', the expanded path is: C:\Users\multi\AppData\Roaming\MultiTouch\screen.xml

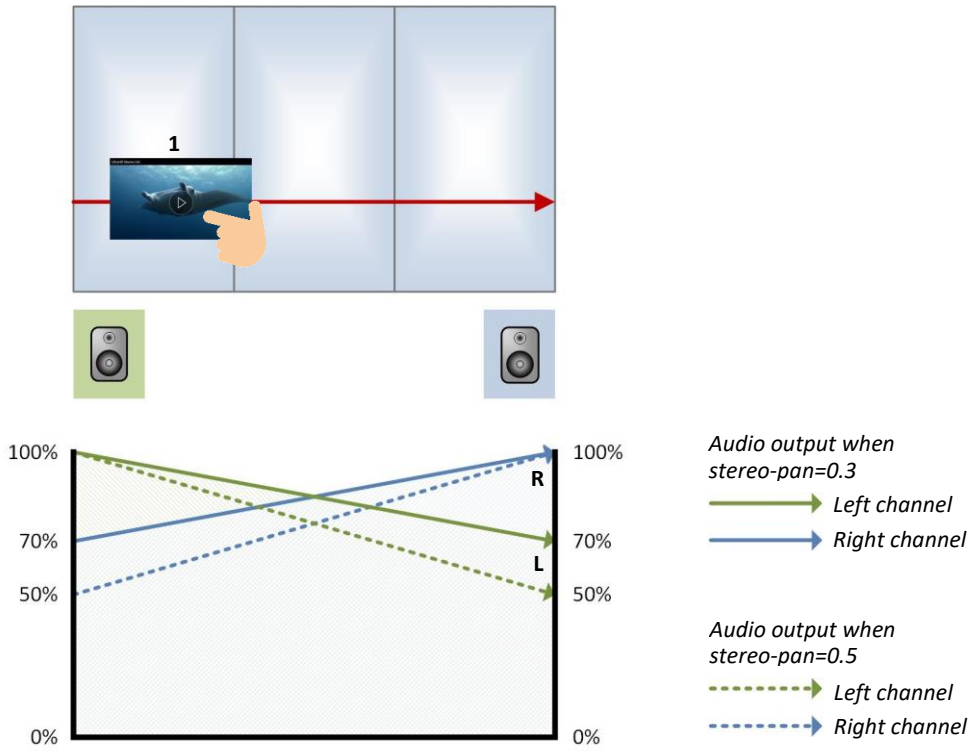
Instructions for passing the audio configuration to MT Canvus are in section 6.7.

6.5 Stereo panning

Stereo panning is best illustrated in a simple two-speaker stereo setup. In the example below, video wall has two speakers, with a single speaker zone extending across the entire screen. The left and right edges of the speaker zone correspond to the left and right audio channels. As the sound source (such as a movie widget) is moved left to right across the screen, audio output also pans left to right, fading from the left channel and gaining on the right channel.

You use the `stereo-pan` setting to control the level of attenuation. Permitted values range from 0 to 1. The default is 0.3, meaning that when the sound source is fully on the right, audio output on the left channel falls by 30%. (That is, when the right channel audio is 100%, the left channel is 70%.)

Audio attenuation is linear. For example, if `stereo-pan` is 0.3, then output on both the left and right channels falls by 15% when the sound source is in the center of the speaker zone ie, midway between the left and right edges.



*Stereo panning example. A single speaker zone extends across the entire screen. As the sound source (**1**) moves from the left edge of the speaker zone to the right edge of the speaker zone:*

- *If `stereo-pan=0.3`, audio output on the left channel (**L**) falls from 100% to 70%, while audio output on the right channel (**R**) rises from 70% to 100%.*
- *If `stereo-pan=0.5`, audio output on the left channel (**L**) falls from 100% to 50%, while audio output on the right channel (**R**) rises from 50% to 100%.*

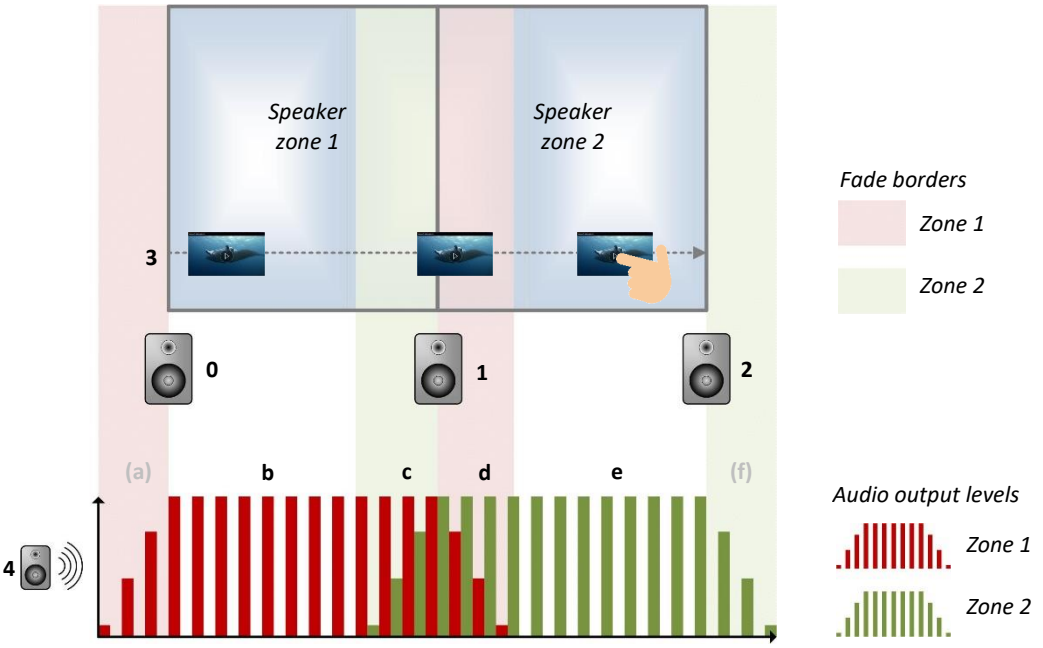
Note: *Stereo panning is more noticeable with wider speaker zones. If you have very narrow speaker zones (one Cell width or less), your users are unlikely to notice the stereo panning effect.*

6.6 Fade borders

Fade borders enable you to configure smooth audio transitions from one speaker to the next. Fade borders are vertical strips of screen space either side of a speaker zone.

When a sound source (such as a movie widget) approaches a speaker zone, it first passes through the *entry fade border* and its audio output rises from zero to 100%. When it leaves a speaker zone, it passes through the *exit fade border* and its audio output fades from 100% to zero.

By default, fade borders are 100 pixels wide and automatically configured outside the left and right edges of a speaker zone. For smoother audio transitions, try experimenting with wider fade borders (say, 200 or 300 pixels)



This example video wall has a three-speaker setup (0-2), with two speaker zones. The sound source is a movie widget (3), being moved left to right across the screen. Total audio output (4) remains constant, switching smoothly from channels 0 and 1 to channels 1 and 2.

a *The entry fade border for zone 1 is off-screen and has no effect on audio output.*

b *While the sound source is in zone 1, zone 1 audio output is 100%.*

c *As the sound source enters the entry fade border for zone 2, zone 2 audio output rises from zero to 100%.*

d *As the sound source exits zone enters the exit fade border for zone 1, zone 1 audio output falls from 100% to zero.*

e *While the sound source is in zone 2, zone 2 audio output is 100%.*

f *The exit fade border for zone 2 is off-screen and has no effect on audio output.*

Note: *For simplicity, this diagram does not show the effect of stereo panning within each speaker zone.*

6.7 Set up positional audio

Follow these steps:

1. Confirm that the speakers are connected to the application computer and recognized by operating system. Also, note the channel index for each speaker.

   - **Ubuntu application computers:** Run the `pavucontrol` command to launch the PulseAudio Volume Control app. In the app's Configuration tab, select the setup that most closely matches the speaker configuration on the application computer. Then obtain the channel index numbers from the Playback tab; this tab lists the satellite speakers in speaker *in index order*. So the first speaker is channel 0, the second is channel 1, and so on.

     (PulseAudio is a Linux sound server included with Ubuntu distributions.)

   - **Windows application computers:** Use the Sound applet to select your speakers from the list of playback devices.

     Then use the Speaker Setup wizard (launched from the Sounds applet) to select and test the setup that most closely matches the speaker configuration on the application computer. When you test the setup, the Speaker Setup wizard test plays output on each satellite speaker *in index order*. So the first speaker is channel 0, the second is channel 1, and so on.

2. Using your preferred XML editor, create an audio configuration file. For example, MyAudioSetup.xml.

   For syntax details, see section 6.4.

   For examples, see section 6.8.

3. Run one of the following commands to pass the audio configuration file to the MT Canvus client at runtime:

   - **Ubuntu application computers**
     ```
     $ mt-canvus.sh --audio-config <config file>
     ```
   - **Windows application computers**
     ```
     mt-canvus.bat --audio-config <config file>
     ```

   Where `<config file>` is the XML file you created in step 2.

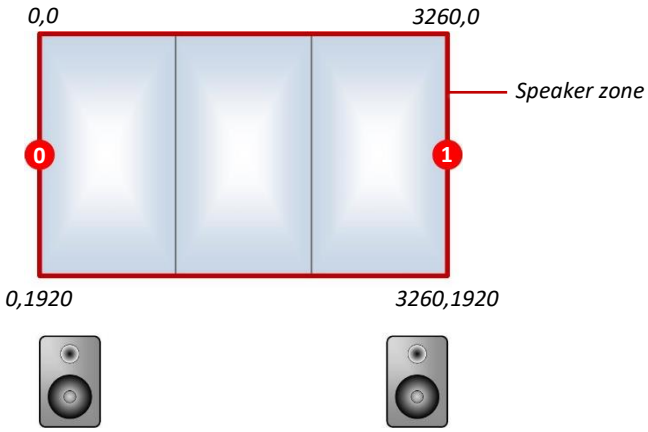
   For more about starting the MT Canvus client, see section 4.1.

6.8 Example audio configuration files

6.8.1 Two speakers and a single speaker zone

Here, the video wall comprises three MultiTaction Cells in portrait mode with two speakers (one at each end of the video wall). The wall is approximately 2m wide, with a total display area of 3260 x 1080 pixels, where 3260 is three Cell widths (3 x 1080) plus two 10 pixel bezels.

The audio configuration defines a single speaker zone, with a left and right channel. Default stereo panning is enabled and fade borders are not relevant (because only one speaker zone is defined.) The left channel index is 0 and the right channel index is 1.



Single speaker zone with stereo speakers. Pixel coordinates are shown above.
0 *Left channel.* 1 *Right channel.*

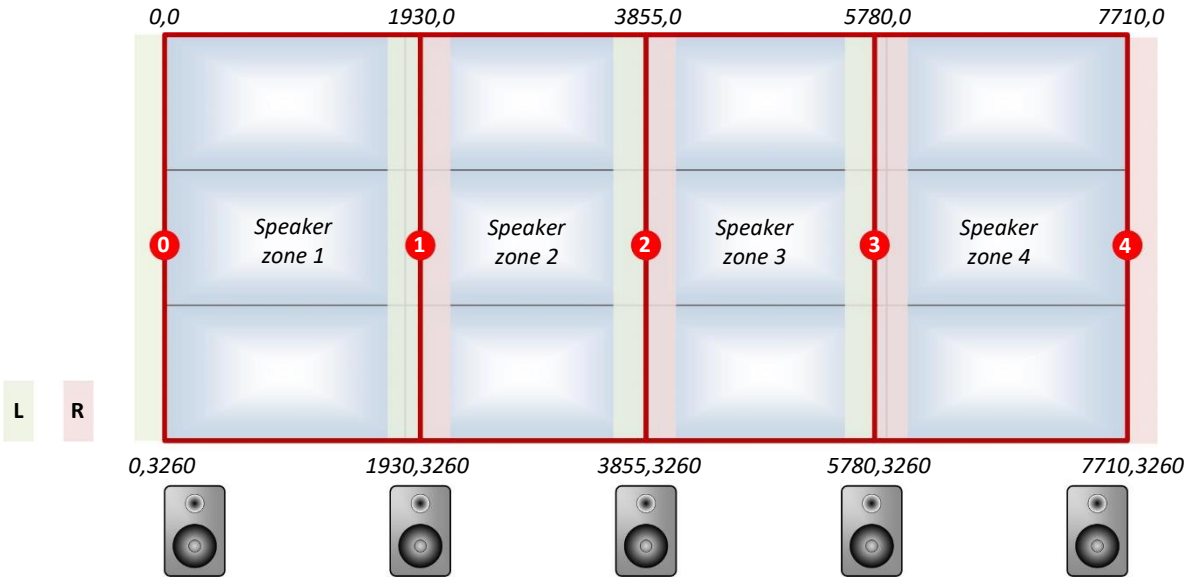
This setup requires the following XML audio configuration:

```
<!DOCTYPE mtdoc>
<pan2d>
  <mode>1</mode>
  <rectangles>
    <SoundRectangle>
      <left-channel>0</left-channel>
      <right-channel>1</right-channel>
      <location>0 0</location>
      <size>3260 1080</size>
      <stereo-pan>0.3</stereo-pan>
      <!-- fade-width is not relevant in this setup -->
    </SoundRectangle>
  </rectangles>
</pan2d>
```

6.8.2 Five speakers and four speaker zones

Here, the video wall comprises 4x3 MultiTaction Cells in landscape with five speakers arranged evenly along the wall. The wall is approximately 4.8m wide, with a total display area of 7710 x 3260 pixels, where 7710 is four Cell widths (4 x 1920) plus three 10 pixel bezels.

The audio configuration defines four speaker zones, each with a left and right channel. Adjoining zones 'share' a speaker. Default stereo panning and default fade borders are both enabled. From left to right, channel index numbers are 0 through 4.



Four speaker zones with five speakers. Speaker zone coordinates are shown above. Note that outer zones 1 and 4 are 1930 pixels wide; inner zones 2 and 3 are 1925 pixels wide.

0 *Left channel.* **1** *Inner left channel.* **2** *Center channel.* **3** *Inner right channel.* **4** *Right channel.*

L *Left fade border of speaker zone.* **R** *Right fade border of speaker zone*

This setup requires the following XML audio configuration:

```
<!DOCTYPE mtdoc>
<pan2d>
  <mode>1</mode>
  <rectangles>

    <!-- Speaker Zone 1 -->
    <SoundRectangle>
      <left-channel>0</left-channel>
      <right-channel>1</right-channel>
      <location>0 0</location>
      <size>1930 3260</size>
      <stereo-pan>0.3</stereo-pan>
      <fade-width>100</fade-width>
    </SoundRectangle>
```

Audio configuration continues on the next page.

Audio configuration continued from the previous page.

```
    <!-- Speaker Zone 2 -->
    <SoundRectangle>
      <left-channel>1</left-channel>
      <right-channel>2</right-channel>
      <location>1930 0</location>
      <size>1925 3260</size>
      <stereo-pan>0.3</stereo-pan>
      <fade-width>100</fade-width>
    </SoundRectangle>

    <!-- Speaker Zone 3 -->
    <SoundRectangle>
      <left-channel>2</left-channel>
      <right-channel>3</right-channel>
      <location>3855 0</location>
      <size>1925 3260</size>
      <stereo-pan>0.3</stereo-pan>
      <fade-width>100</fade-width>
    </SoundRectangle>

    <!-- Speaker Zone 4 -->
    <SoundRectangle>
      <left-channel>3</left-channel>
      <right-channel>4</right-channel>
      <location>5780 0</location>
      <size>1930 3260</size>
      <stereo-pan>0.3</stereo-pan>
      <fade-width>100</fade-width>
    </SoundRectangle>

  </rectangles>
</pan2d>
```

7 Password protection for canvases

A user can password protect their canvas to prevent unauthorized changes. When a canvas is protected, any user who wants to open the canvas must enter the password.

The following administrative features are available to support password protection:

- **Enforcing password protection:** By default, password protection is optional. Users can choose whether to protect their canvases or not.

  But if required, you can make password protection mandatory. That is, when a user creates a new canvas, they *must* protect it with a password. To enforce password protection, see section 7.1.

- **Inactivity timeout for protected canvases:** You can define an inactivity timeout for password protected canvases. If users do not interact with the canvas for, say, 90 seconds, the timeout expires and the canvas is locked. They will then need to re-enter the password to resume using the canvas. To set an inactivity timeout, see section 7.2.

- **Password complexity rules:** You can define rules that specify how complex a canvas password must be. For example, you can specify that passwords must be a minimum length and contain a combination of uppercase and lowercase letters, digits and symbols. To define password complexity rules, see section 7.3.

- **Forgotten password advisory:** If a user forgets a canvas password, MT Canvus displays an advisory. This advisory includes contact details for an MT Canvus administrator. To define these contact details, see section 7.4.

7.1 Enforce password protection

By default, users can choose whether to protect their canvases or not. But you can make password protection mandatory for new canvases.

Follow these steps:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Go to the `[system]` section and set `enforce-protected-canvas` to `true`.
   (Manually add this setting to mt-canvus.ini if it does not already exist.)

   ```
   [system]
   enforce-protected-canvas=true
   ```

3. Restart MT Canvus on the application computer; see section 4.

7.2 Inactivity timeout for protected canvases

You can define an inactivity timeout for password protected canvases. If users do not interact with the canvas before the timeout expires, the canvas is locked and users must re-enter the password to resume using the canvas.

Follow these steps:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Edit the `protected-canvas-timeout-seconds` setting in the `[system]` section.
   (Manually add this setting to mt-canvus.ini if it does not already exist.)

   ```
   [system]
   protected-canvas-timeout-seconds=<n>
   ```

   Where `<n>` is the timeout (in seconds) for password protected canvases. For example:

   - `protected-canvas-timeout-seconds=60`
     An idle or unattended canvas times out after 60 seconds.
   - `protected-canvas-timeout-seconds=0`
     No restriction. When the timeout is zero, a protected canvas never times out.

   Important! *Password protected canvases are also affected by the general inactivity setting for MT Canvus ie,* `inactive-timeout` *(see section 5.2.4). If you use* `protected-canvas-timeout-seconds`*, you must ensure that its timeout is shorter than* `inactive-timeout`*.*
3. Restart MT Canvus on the application computer; see section 4.

7.3 Password complexity rules

You can define rules that specify how complex a canvas password must be.

By default, passwords must contain at least 4 characters, but you can specify any minimum length. You can also mandate that passwords contain a combination of upper and lower case letters, numerals and symbols. Finally, you can specify the password rules for sequences of character and repeated characters.

Follow these steps:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Edit the following settings in the `[password security]` section.
   (Manually add this section and settings to mt-canvus.ini if they do not already exist.)

   ```
   [password security]
   min-length=<n>
   min-lowercase=<n>
   min-uppercase=<n>
   min-numeric=<n>
   min-symbol=<n>
   max-repeats=<n>
   max-sequence=<n>
   ```

   See next page for settings descriptions.
3. Restart MT Canvus on the application computer; see section 4.

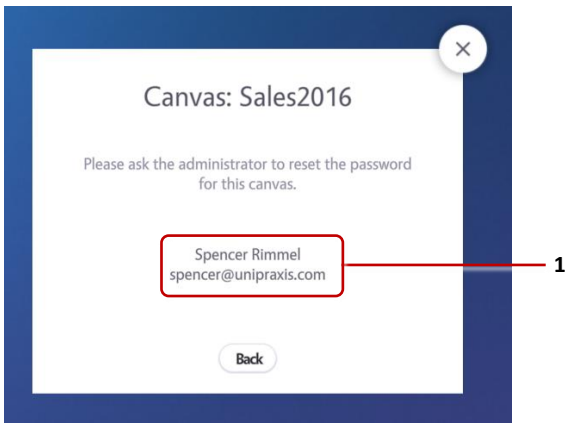
Where:

- `min-length` sets the minimum number of characters in a password. For example:
  - `min-length=8` Passwords must be 8 characters or longer.
  - `min-length=0` No restriction. Passwords can be any length.
- `min-lowercase` sets the minimum number of lower case letters. For example:
  - `min-lowercase=1` Passwords must include at least 1 lower case letter.
  - `min-lowercase=0` No restriction. No lower case letters are required.
- `min-uppercase` sets the minimum number of upper case letters. For example:
  - `min-uppercase=1` Passwords must include at least 1 upper case letter.
  - `min-uppercase=0` No restriction. No upper case letters are required.
- `min-numeric` sets the minimum number of numerals (0-9). For example:
  - `min-numeric=2` Passwords must include at least 2 numerals.
  - `min-numeric=0` No restriction. No numerals are required.
- `min-symbol` sets the minimum number of symbols (such as ~ ! @ # $ % ^ & *). For example:
  - `min-symbol=1` Passwords must include at least 1 symbol.
  - `min-symbol=0` No restriction. No symbols are required.
- `max-repeats` sets the maximum number of repeated characters that are permitted in a password. In the examples below, repeated characters are highlighted in `red`. For example:
  - `max-repeats=2` Passwords cannot have more than 2 repeated identical characters, so `MTacb99!` is permitted but `MTacb999!` is not.
  - `max-repeats=1` No repeated characters are allowed.
  - `max-repeats=0` No restriction. Any number of repeated characters is allowed.

  Note: *This setting only applies to identical characters, so* `aAa` and `aáa` *do not count as repeated characters, but* `aaa` *and* `AAA` *do*.
- `max-sequence` sets the maximum number of sequential characters that are permitted in a password. A character sequence can be ascending or descending. In the examples below, character sequences are highlighted in `red`. For example:
  - `max-sequence=2` Passwords cannot include a sequence longer than 2 characters, so the following passwords are permitted:
    `MTabd739!` `MTbad739!` `MTadb124!` `MTadb421!`
    But these passwords are not permitted:
    `MTabc739!` `MTcba739!` `MTbca123!` `MTbca321!`
  - `max-sequence=1` No character sequence is allowed.
  - `max-sequence=0` No restriction. Any character sequence is allowed.

7.4 Forgotten password advisory

If a user forgets a canvas password, MT Canvus displays an advisory. This advisory instructs the user to request a password reset from their MT Canvus administrator (see section 7.5) and typically includes contact details for the administrator. You can define these contact details in mt-canvus.ini.



Forgotten password advisory. **1** *Contact details for MT Canvus administrator.*

Follow these steps:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Edit the `admin-info` setting in the `[system]` section.

   (Manually add this setting to mt-canvus.ini if it does not already exist.)

   ```
   [system]
   admin-info=<contact details>
   ```

   Where `<contact details>` is the contact details that appear in the advisory. You do not need to enclose the text in double quotes. To add a line break, use `\n`.

   For example:

   - To include the administrator's contact details, as shown in the screenshot above:

     ```
     admin-info=Spencer Rimmel\nspencer@unipraxis.com
     ```

   - To add a phone number:

     ```
     admin-info=Spencer Rimmel\nExt. 321654\nspencer@unipraxis.com
     ```

3. Restart MT Canvus on the application computer; see section 4.

7.5 Unlock a canvas

If a user forgets a canvas password, you can unlock the canvas (ie, remove the password) using a password reset tool, mt-canvus-unlock.py.

This tool is installed with MT Canvus. It lists the protected canvases on the application computer and allows you to unprotect selected canvases ie, remove their passwords.

- **Ubuntu application computers**
  mt-canvus-unlock.py is added to the PATH after installing MT Canvus.
  For useful commands, see section 7.5.1.
- **Windows application computers**
  Before you run the password reset tool, you must ensure that a supported version of Python 2 is installed on the application computer. Currently, mt-canvus-unlock.py requires **Python 2.x.x**. Python releases for Windows are available here: https://www.python.org/downloads/windows/

  Find mt-canvus-unlock.py in C:\Program Files\MT Canvus\bin.
  For useful commands, see section 7.5.2.

7.5.1 Useful unlock commands on Ubuntu application computers

mt-canvus-unlock.py is a command line tool. This section lists some useful commands for managing for managing canvas passwords on an Ubuntu application computer.

- Get help about mt-canvus-unlock.py parameters:
  ```
  $ mt-canvus-unlock.py --help
  ```
- List all canvases on the application computer.
  ```
  $ mt-canvus-unlock.py
  ```
  This command lists the index number and name of each canvas.
- List all canvases on the application computer.
  ```
  $ mt-canvus-unlock.py --verbose
  ```
  This command lists the index number and full path of each canvas. This command is useful if you need to know where the data for a specific canvas is stored on the application computer.
- Filter the canvas list by canvas name:
  ```
  $ mt-canvus-unlock.py --match "Sales"
  ```
  This command lists all canvases with names such as “Sales”, “Quarterly Sales” and “2017 Sales Projections”.
- Unlock a canvas by name:
  ```
  $ mt-canvus-unlock.py --match "Sales" --unlock-matching
  ```
  This command removes the password from all canvases with names such as “Sales”, “Quarterly Sales” and “2017 Sales Projections”.

- Unlock a canvas by index:
  ```
  $ mt-canvus-unlock.py --unlock-index <n>
  ```
  Where <n> is the canvas index number. This command removes the password from the canvas with the specified index number.

7.5.2 Useful unlock commands on Windows application computers

mt-canvus-unlock.py is a command line tool. This section lists some useful commands for managing for managing canvas passwords on a Windows application computer.

Note: *You must specify the location of the MT Canvus data folder when you run an unlock command. We recommend you use the APPDATA variable.*

- For convenience, we recommend that you open a command prompt and browse to the \bin folder containing mt-canvus-unlock.py before running any unlock commands:
  ```
  cd C:\Program Files\MT Canvus\bin
  ```
- Get help about mt-canvus-unlock.py parameters:
  ```
  python mt-canvus-unlock.py --help
  ```
- List all canvases on the application computer.
  ```
  python mt-canvus-unlock.py --data-folder %appdata%\mt-canvus
  ```
  This command lists the index number and name of each canvas.
- List all canvases on the application computer.
  ```
  python mt-canvus-unlock.py --data-folder %appdata%\mt-canvus
    --verbose
  ```
  This command lists the index number and full path of each canvas. This command is useful if you need to know where the data for a specific canvas is stored on the application computer.
- Filter the canvas list by canvas name:
  ```
  python mt-canvus-unlock.py --data-folder %appdata%\mt-canvus
    --match "Sales"
  ```
  This command lists all canvases with names such as “Sales”, “Quarterly Sales” and “2017 Sales Projections”.
- Unlock a canvas by name:
  ```
  python mt-canvus-unlock.py --data-folder %appdata%\mt-canvus
    --match "Sales" --unlock-matching
  ```
  This command removes the password from all canvases with names such as “Sales”, “Quarterly Sales” and “2017 Sales Projections”.
- Unlock a canvas by index:
  ```
  python mt-canvus-unlock.py --data-folder %appdata%\mt-canvus
    --unlock-index <n>
  ```
  Where <n> is the canvas index number. This command removes the password from the canvas with the specified index number.

8 Demo canvases

This section introduces demo canvases and the Demo Canvas Manager.

8.1 What is a demo canvas?

A *demo canvas* is a special type of interactive canvas. They are typically used for demonstration or training purposes.

Normally, any changes made to a canvas are automatically saved when a session ends (ie, when users switch to a different canvas or quit from MT Canvus). When a user next opens the canvas, they are presented with an updated version of the canvas that includes any changes from the previous session.

Conversely, a demo canvas is automatically restored to its original state when the session ends, unlike a normal canvas. Any changes that users have made to the demo canvas are discarded, leaving the demo canvas restored and ready for the next session. For example, annotations are erased, deleted widgets are recovered, and widgets that were moved or resized are reset to their original location and size.

The official MT Canvus tutorial canvas is an example of a demo canvas. The tutorial canvas encourages users (or trainees) to practice using the touch screen and explore the available features. At the end of the session, the tutorial canvas is automatically restored to its original state, leaving it ready for the next group of trainees.

Note: *The official MT Canvus tutorial canvas is available on request. Please contact your MultiTaction representative for details.*

Any canvas can be converted to a demo canvas. Likewise, any demo canvas can be converted back to a normal canvas. To convert a canvas, use the Demo Canvas Manager.

8.2 Demo Canvas Manager

Demo Canvas Manager enables administrators to:

- Convert any existing canvas to a demo canvas.
- Update a demo canvas to retain the latest changes.
- Convert a demo canvas back to a normal canvas.

Users—typically administrators—can access these features in two ways: they can enter a password (see section 8.2.3) or they can present a special Codice card (see section 8.2.1).

8.2.1 Demo Canvas Manager Codice cards

A Codice is a user ID in the form of a 2D barcode (or marker). A Codice card is simply a Codice printed on paper or card.

A Demo Canvas Manager Codice card is a special card supplied with MT Canvus that functions as a shortcut for accessing Demo Canvas Manager features. The user simply presents the card ie, holds it against the screen, to launch the Demo Canvas Manager. *No password is required!*

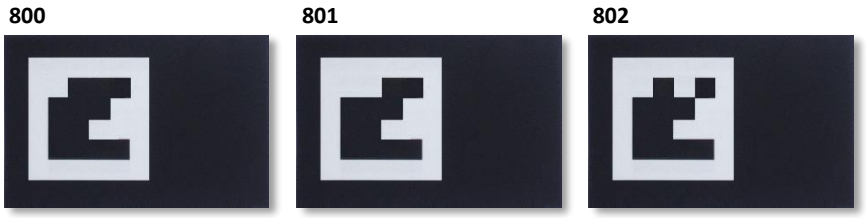
To set the Codice code for the Demo Canvas Manager Codice card, follow these steps:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Edit the following setting in the `[system]` section.
   (Manually add this setting to mt-canvus.ini if it does not already exist.)

   ```
   [system]
   admin-marker-code=800,801,802
   ```

   Where `admin-marker-codes` defines the Demo Canvas Manager Codice codes. You can assign a new value or a comma-separated list of values. In the example above, 800, 801 and 802 are all set as Demo Canvas Manager Codice codes.
3. Restart MT Canvus on the application computer; see section 4.

Note: *There are three types of Codice card: personal markers; erasers; and Demo Canvas Manager Codice cards. Personal markers and erasers are described in the MT Canvus User Manual.*



Codice cards, codes 800, 801 and 801 in 4x4 marker size.
Note that 3x3 and 5x5 marker sizes are also supported. 'Marker size' refers to the number of rows and columns in the 2D barcode, not the length and width of the physical marker.

8.2.2 Set a password for Demo Canvas Manager

Administrators can launch the Demo Canvas Manager by entering the Demo Canvas Manager password (also called the *admin password*). You define this password in mt-canvus.ini.

Follow these steps:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Go to the `[system]` section and set `admin-password` to the password you want. In the example below, the password is set to MT55sr.

   (Manually add this setting to mt-canvus.ini if it does not already exist.)

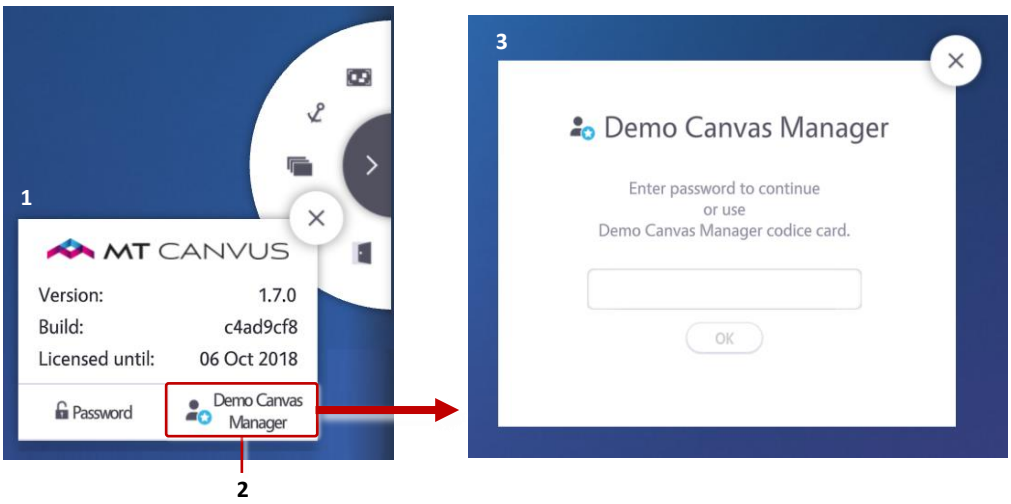
   ```
   [system]
   admin-password=MT55sr
   ```

3. Restart MT Canvus on the application computer; see section 4.

8.2.3 Launch the Demo Canvas Manager

Open MT Canvus. Then do one of the following:

- **Either** launch Demo Canvas Manager directly by presenting the Demo Canvas Manager Codice card; see section 8.2.1.
- **Or** launch Demo Canvas Manager from the About dialog:
  a. Tap the About button in the System menu.
  b. In the About dialog, tap the Demo Canvas Manager button.
  c. In the next dialog, enter a password and tap OK.
  Enter the Demo Canvas Manager password or, if the current canvas is password protected, enter the canvas password.



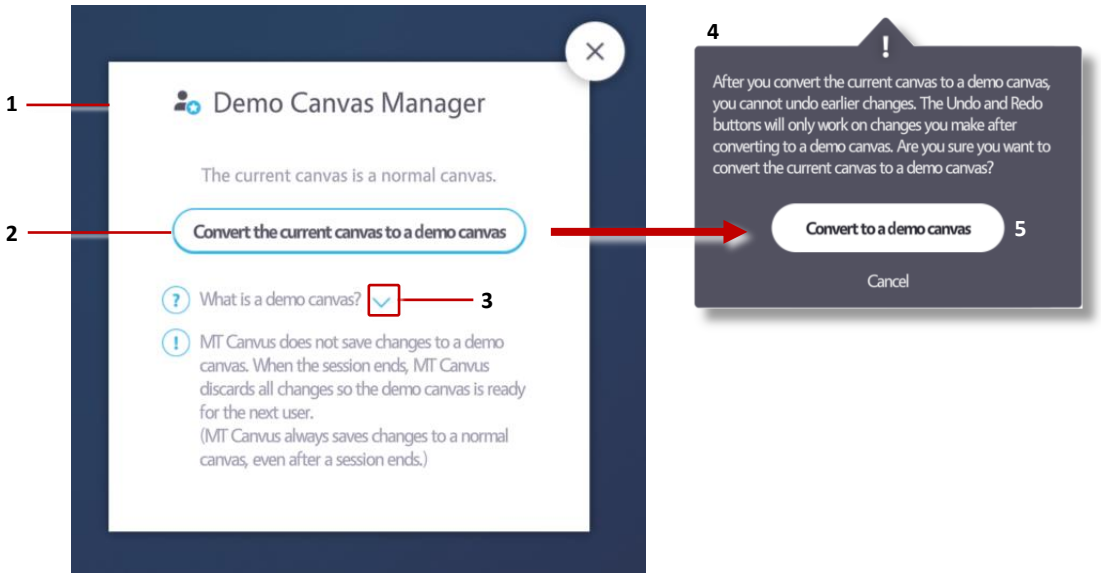
1 *About dialog.* 2 *Demo Canvas Manager button.* 3 *Password dialog.*

8.3 Convert a normal canvas to a demo canvas

Follow these steps:

1. Launch the Demo Canvas Manager; see section 8.2.3.
2. In the next dialog, tap the **Convert the current canvas to a demo canvas** button.
3. When the conversion advisory displays, confirm that you want to convert the canvas.

Note: *A demo canvas keeps its demo status when exported. If the canvas is subsequently re-imported, it will still be a demo canvas.*



Demo Canvas Manager. **1** *Convert to demo canvas dialog.* **2** *Click this button to convert the normal canvas to a demo canvas.* **3** *More hyperlink. Click to see a demo canvas definition.* **4** *Conversion advisory.* **5** *Click this button to confirm the conversion.*

8.4 Update a demo canvas to include the latest changes

A demo canvas is automatically restored to its original state when the session ends. But if required, you can manually update a demo canvas to include changes made during the current session.

Follow these steps:

1. Launch the Demo Canvas Manager; see section 8.2.3.
2. In the next dialog, tap the **Update this demo canvas to include the current content** button; see the screenshot in section 8.4.
3. When the conversion advisory displays, confirm that you want to update the canvas.

8.5 Manually reset a demo canvas

A demo canvas is automatically restored to its original state when the session ends. But if required, you can manually restore a demo canvas midway through a session.

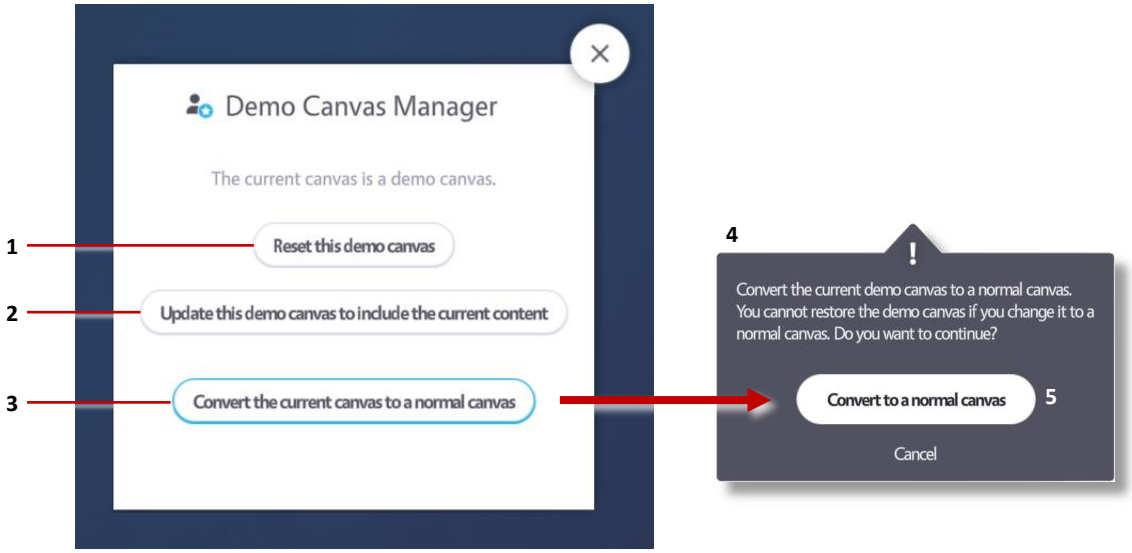
Follow these steps:

1. Launch the Demo Canvas Manager; see section 8.2.3.
2. In the next dialog, tap the **Reset this demo canvas** button; see the screenshot in section 8.4.
3. When the conversion advisory displays, confirm that you want to reset the canvas.

8.6 Convert a demo canvas back to a normal canvas

Follow these steps:

1. Launch the Demo Canvas Manager; see section 8.2.3.
2. In the next dialog, tap the **Convert the current canvas to a normal canvas** button.
3. When the conversion advisory displays, confirm that you want to convert the canvas.



Demo Canvas Manager, Demo canvas dialog.

1 ***Reset this demo canvas*** *button. Click here to manually reset a demo canvas.*

2 ***Update this demo canvas to include the current content*** *button. Click here to update the canvas to include recent changes.*

3 ***Convert the current canvas to a normal canvas*** *button. Click here to convert the demo canvas to a normal canvas.*

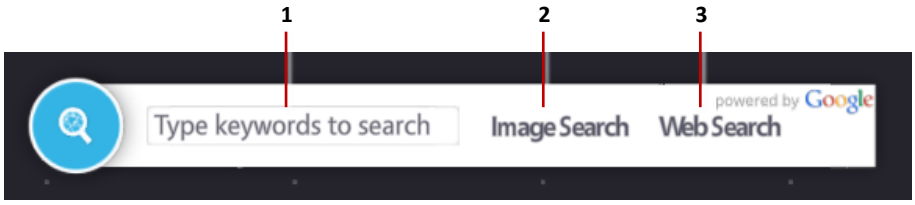
4 *Conversion advisory.*

5 *Click this button to confirm the conversion.*

9 Image searches

MT Canvus supports Google-based internet searches. Users run these searches by launching the Search widget from the Finger menu. The Search widget allows users to quickly enter the search terms and drag any resulting images onto the canvas.

Important! *If your office uses a proxy server, image searches will not work until you have set up a proxy connection for the application computer; see section 2.8.1.*



*Search widget. **1** Type the search terms here. **2** Image Search hotspot. **3** Web search hotspot.*

9.1 Configure MT Canvus to use a custom search engine

(This task is optional)

Image searches are enabled by default. But if required, you can use a custom search engine. First, you must enable the Google Custom Search API and get an API key for MT Canvus. Then you need to create a custom search engine.

Note: *For details about Google custom searches, see the Google Developers web site:*
https://developers.google.com/custom-search/docs/overview#what_is_custom_search
https://developers.google.com/custom-search/docs/overview

To configure MT Canvus to use a custom search engine, follow these steps:

Follow these steps:

1. To use the Custom Search API, you need an *API key*. In turn, you need a *project* to enable an API key. Therefore, you must:
   a. Go to the Google API Manager:
      https://console.developers.google.com/apis/library
   b. Create a project.
   c. Enable the API.
   d. Create your API key (do this on the Credentials page of the API Manager). An example key is shown below:
      AIzaSyDOVaSQGJVi8XbK5ggz9jPRTE6Z44eTXAs
   e. Make a note of the API key.

   Note: *Google limits the number of free searches per application per day. You must therefore create your own API key for MT Canvus and set up a billing plan if you need to run additional searches.*

2. Browse to the following URL and create a custom search engine based on the source URLs you want.
   http://cse.google.com/manage/all
3. While still on your Google Custom Search page, go to the control panel for your new search engine. Then:
   a. Enable Image Search.
   b. Make a note of the search engine ID. An example ID is shown below:
      006952931205789975933:vlaia71xrbi
   c. If required, you can add search engine keywords and modify the list of sites to search for images.
   d. Make any other changes you require. For example, you can add a name and description for your search engine.
   e. Click Update to save the changes to your custom search engine.
4. Configure MT Canvus to use your API key and search engine ID:
   a. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
   b. Edit the `api-key` setting in the `[image-search]` section.

   (Manually add this section and setting to mt-canvus.ini if they do not already exist.)

```
[image-search]
api-key=AIzaSyDOVaSQGJVi8XbK5ggz9jPRTE6Z44eTXAs
engine-id=006952931205789975933:vlaia71xrbi
```

10 Enable screen sharing

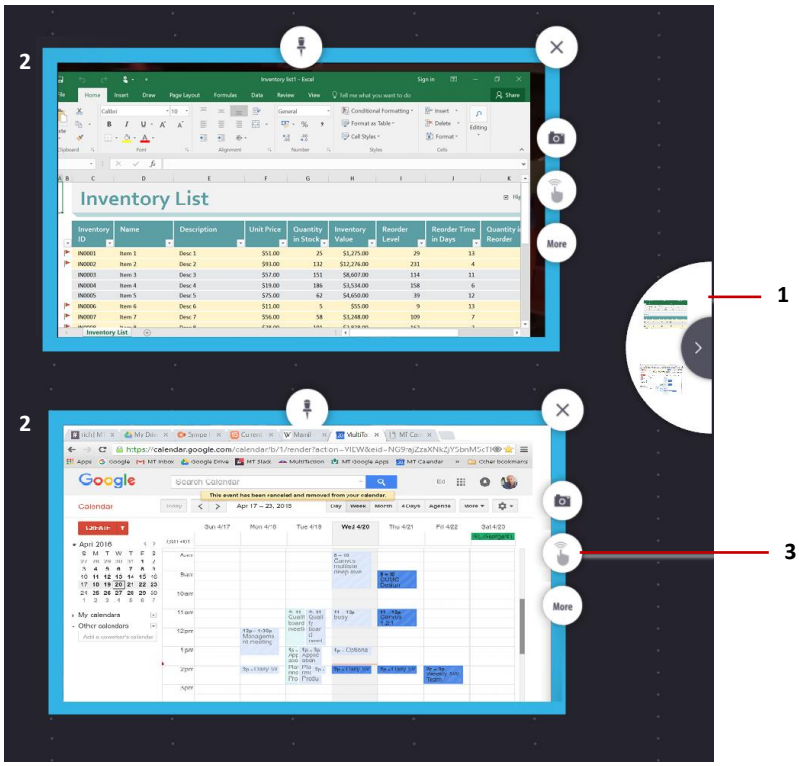
The screen sharing feature enables users to display the screen of their laptop on the canvas. This section describes how to set up screen sharing in MT Canvus. For full details about screen sharing, see the *MT Canvus User Guide.*

10.1 Share your laptop screen with MT Canvus

Terminology: *For simplicity, the instructions below refer to 'your laptop' when describing the external device that shares its screen on the canvas. Although this external device is generally a laptop, screen sharing is supported from any compatible device including desktop computers, tablets, and cell phones.*

Follow these steps:

5. Establish a video connection between your laptop and MT Canvus:
   a. Connect your laptop to the application computer, using either a wired or wireless connection; see section 10.1.1.
   b. Canvus automatically detects the incoming video stream and adds the laptop to the list of available screens in the Screen Share menu.
6. In MT Canvus, tap the Screen Share menu.
7. The menu lists the available shared screens. Tap the option for your laptop.



Screen sharing. 1 *Screen Share menu, showing two available shared screens.* 2 *Shared screen widget.* 3 *Remote Control Info button; see section 11.3.*

10.1.1 Screen share connection methods

You can use wired and wireless connections between your laptop and the video capture card installed on the MT Canvus application computer. For details about the recommended capture card, see section 10.2.

- **Cable connection:** Use a suitable cable and, if required, adapter to connect the video output on your laptop to the video input on the capture card.

  Note: *The capture card recommended by MultiTaction has two DVI inputs. If your laptop has, for example, an HDMI or DisplayPort video output, you will need to use a suitable adapter or converter cable.*

- **Wireless connection:** Use a Barco ClickShare device for one-click screen sharing. Briefly, the setup steps are:

  a. Connect the ClickShare base unit to a video input on the capture card.

  Note: *Depending on the model, the base unit typically has VGA and HDMI video outputs. Because the recommended capture card recommended has two DVI inputs, you will need to use a suitable adapter or converter cable.*

  (Applies only if you chose a VGA video connection in the previous step) If you require an audio connection from your laptop to the canvas, you will need to connect a separate 3.5mm audio cable to the capture card.

  Note: *You do not need a separate audio cable if you chose an HDMI video connection in the previous step.*

  b. Connect a ClickShare button to a USB port on your laptop.

  c. Click the ClickShare button to share your laptop screen with MT Canvus.

*Example Barco ClickShare base unit (**1**) and two ClickShare buttons (**2**)*

For full setup details, please refer to your Barco ClickShare documentation, available to download on www.barco.com.

10.2 Datapath capture cards

The screen sharing feature uses a *video capture card* installed on the MT Canvus application computer. This section briefly introduces the recommended capture card.

We currently recommend using one of the following Datapath capture cards. The actual model will depend on your requirements:

Recommended Datapath video capture cards
1 *VisionAV-HD with dual channel DVI-I inputs.* **2** *VisionSC-HD4+ with quad DVI inputs.*

Note: *VisionSC-HD4+ cards are supplied with a pair of DVI splitter cables. For full details, see https://www.datapath.co.uk/video-capture-cards.*

Datapath capture cards are supplied with a Windows driver, but require a specific driver for Linux. This Linux driver is pre-installed in the preconfigured MT Canvus images (such as the image for the Meeting Room package).

However, if you manually installed the MT Canvus installation package (see section 2.5), you must manually install the correct driver. Follow these steps:

- **Ubuntu application computers:** Run the following command:
  ```
  $ sudo apt-get install vision
  ```
  Where `vision` is the apt package containing the necessary driver.
  Note: *If you subsequently upgrade the Linux kernel after installing the capture card driver, the driver is recompiled and re-installed automatically. No further setup is required.*
- **Windows application computers:** Install the driver supplied with the capture card, or download the driver from the Support page on www.datapath.co.uk.

11 Enable remote touch

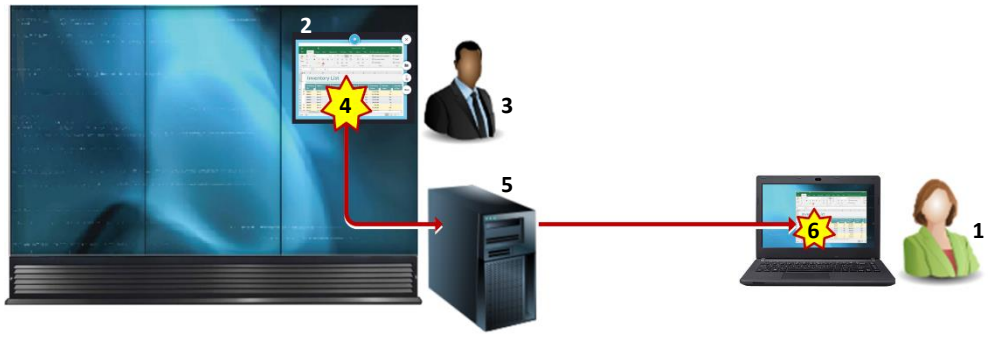
The remote touch feature allows touch operation of applications running on Windows computers that are sharing their screen with MT Canvus.

For example, a team is using MT Canvus to plan a new product. A team member is running a touch-enabled spreadsheet on her Windows laptop and shares her screen with MT Canvus. The team leader stands in front of the video wall and can update the spreadsheet directly from MT Canvus by using hand gestures.

Briefly, the Remote Touch setup procedure includes the following steps:

1. Specify the network interface and port numbers used by Remote Touch.
2. Install the Cornerstone software on the user's laptop.
3. Confirm that the MT Canvus application computer and user's computer are on the same network.
4. Share the user's computer screen with MT Canvus.
5. Obtain the Remote Touch port number assigned to the user's computer.
6. Configure the user's computer to receive touch data from MT Canvus.
7. Pin the Shared Screen widget in MT Canvus.

These steps are described in the following sections.



*Remote Touch example. A team member (**1**) shares the spreadsheet on her Windows laptop with MT Canvus (**2**). The team leader (**3**) uses hand gestures to update the spreadsheet while it is displayed on the canvas (**4**). MT Canvus, running on the application computer (**5**), applies the update to the spreadsheet running on the laptop (**6**).*

Terminology: *In the following sections, instructions refer to the user's 'laptop' when describing the external computer that shares its screen on the canvas. Although this external computer is generally a laptop, screen sharing is supported from any compatible Windows device including tablets and desktop computers.*

11.1 Specify the network connection for screen-sharing devices

Note: *If you installed MT Canvus from a preconfigured disk image (see section 2.3), the correct network interface and port are already configured in mt-canvus.ini. You can therefore skip this task.*

Touch data is sent from MT Canvus to the screen-sharing computer over the network.

To enable this data transfer on Ubuntu application computers, you must open a remote touch server for a specific network interface and port. On Windows application computers, you must specify the port for screen-sharing devices and the IP address of the relevant network interface card (NIC).

You only need to specify these network details once for each screen-sharing device, on the MT Canvus application computer. You do not need to re-specify these details each time a new user shares their screen with MT Canvus.

Follow these steps:

1. If MT Canvus is running, access the desktop (see section 5.1.1).
2. *(Ubuntu application computers only)* Right-click the desktop and launch a terminal emulator.
3. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
4. Edit settings for the network interface or NIC IP address and the port number in the `[remote-touch]` section.

   (Manually add this section and settings to mt-canvus.ini if they do not already exist. If they do already exist, you can uncomment them by deleting the semi-colons.)

   Ubuntu application computers

   ```
   [remote-touch]
   interface=<interface ID>
   port=<port number>
   ```

   Windows application computers

   ```
   [remote-touch]
   server-ip=<NIC IP address>
   port=<port number>
   ```

   Where:

   - `interface` specifies the name or ID of the external network interface on the Ubuntu application computer.

     For an application computer in the Meeting Room package, the default interface for an external network is *em1*; see section 2.3.2.

     Notes

     - `interface` *is only needed for Ubuntu application computers. You can omit this setting on Windows application computers.*
     - *Run the* `ifconfig` *Linux command to identify the network interface IDs on the application computer*

- `server-ip` specifies the IP address of the NIC card on the application computer that is connected to the subnet that the screen-sharing computer will use.

  Most MT Canvus application computers have dual NIC cards. For example, one NIC connects to the office LAN while the other NIC connects to the meeting room Wi-Fi. Typically, you assign `server-ip` to the Wi-Fi NIC because this allows screen-sharing devices to use Wi-Fi to connect to MT Canvus.

  Notes

  - `server-ip` *is only needed for Windows application computers. You can omit this setting on Ubuntu application computers.*
  - *If the application computer has only one NIC, you can omit* `server-ip`.

- `port` specifies the initial port number for screen-sharing devices. The default port is 5010.

  The remote touch feature uses a different port for each screen-sharing computer. For each additional computer, MT Canvus automatically increments the port number by 1 and assigns that port to the additional computer. For example, if there are two computers sharing their screens with MT Canvus, the second screen-sharing computer is assigned to port 5011. *However, you only need to specify the initial port number in mt-canvus.ini!*

  Note: *An application computer in the standard Meeting Room package has a capture card with two inputs, enabling two screen-sharing computers to connect to MT Canvus at the same time.*

11.1.1 Example mt-canvus.ini settings

- Ubuntu application computers

```
[remote-touch]
interface=em1
port=5010
```

- Windows application computers

```
[remote-touch]
port=5010
server-ip=10.36.0.70
```

11.2 Install Cornerstone software on the user's computer

Each user who wants to share their screen with MT Canvus must install the following items on their Windows computer or laptop:

- The Windows Cornerstone runtime.
- The 'MultiTouch Cell' driver.

  To enable support for native Windows multi-touch functionality, the Cornerstone runtime package includes the MultiTouch Cell driver, a native Windows multi-touch driver. This driver must be installed separately.

Instructions for installing these items are included in the *MultiTaction Cell User Manual*.

11.3 Confirm the network connection

Confirm that the MT Canvus application computer and the user's computer are connected to the same network.

11.4 Share the user's computer screen with MT Canvus

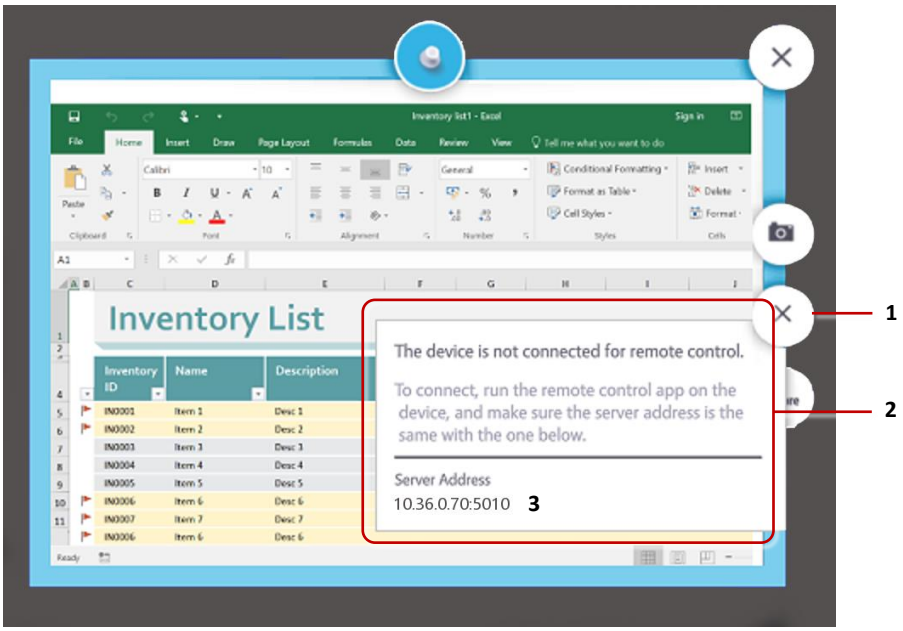
The user must now share their computer screen with MT Canvus. Instructions for using the screen share feature are in section 10.1.

11.5 Discover the Remote Touch port number assigned to the user's computer

To enable Remote Touch, MT Canvus assigns a unique port number on the application computer to each screen-sharing instance. You must now discover which port has been assigned to the user's laptop. Follow these steps:

1. In MT Canvus, open the Screen Share menu and tap the shared screen.
2. In the Screen Share widget, tap the Remote Control Info button; see the screenshot in section 11.7.

   A message box appears, showing the IP address of the application computer and the port number assigned to this screen-sharing instance.



Shared Screen widget. **1** *Remote Control Info button.* **2** *Remote Control Info message box.* **3** *IP address of application computer and port number assigned to this screen-sharing instance.*

3. Make a note of the IP address and port number. You will need to enter these details in config.txt in section 11.6.1.

   In the example above, the IP address and port are 10.36.0.70 and 5010. (Note that 5010 is the default port number.)

11.6 Configure the user's computer to receive touch data from MT Canvus

Now configure the user's Windows computer to recognize touch data received from MT Canvus. First, you must edit config.txt. Then ensure that WindowsTouchProxy.exe is running.

11.6.1 Create config.txt

Config.txt is not installed automatically with the Cornerstone runtime (see section 11.2). Instead, you must trigger its creation by running a Cornerstone application.

The easiest way to create a config.txt file is to run the Cornerstone demo application, Twinkle. To start Twinkle, do one of the following:

- Double-click the Twinkle icon in the file manager.
- Run the following commands:
  ```
  cd C:\\Cornerstone-x.y.z\\bin
  Twinkle.exe
  ```

Where <x.y.z> refers to your Cornerstone version such as 2.4.0.

11.6.2 Where is config.txt saved on the user's computer?

On Windows computers, config.txt is saved in the *installation user's* profile.
Using the APPDATA variable, the location of this folder is:
%APPDATA%\MultiTouch

If Cornerstone was installed by user Joe, the expanded path is:
C:\Users\Joe\AppData\Roaming\MultiTouch\config.txt

For full details about config.txt, see the *MultiTaction Cell User Manual*.

11.6.3 Edit config.txt to specify the assigned port number

To recognize touch data received from MT Canvus, you must configure Cornerstone on the user's Windows computer to identify the application computer and the port number assigned to the user's screen-sharing instance.

Follow these steps:

1. Locate config.txt on the user's computer or laptop; see section 11.6.2.
2. Edit config.txt to include a `NetBridge` block that will connect to the application computer.

   For example, if the IP address of the application computer is 10.36.0.70 and the port assigned to this screen-sharing instance is 5010, add the following to config.txt:

```
NetBridge {
  host = "10.36.0.70"
  port = "5010"}
```

11.6.4 Start the WindowsTouchProxy.exe program

On the user's Windows computer, start the WindowsTouchProxy.exe program. While WindowsTouchProxy.exe is running, any application on the user's computer that supports Windows Touch can use the touch data received from MT Canvus.

Important: *You must start WindowsTouchProxy.exe **after** specifying the network interface and port (see section 11.1).*

Note: *WindowsTouchProxy.exe is included with the Cornerstone runtime. You may prefer to add WindowsTouchProxy.exe to the list of Startup programs. This ensures that it is always running when it is needed by an application that supports Windows Touch.*

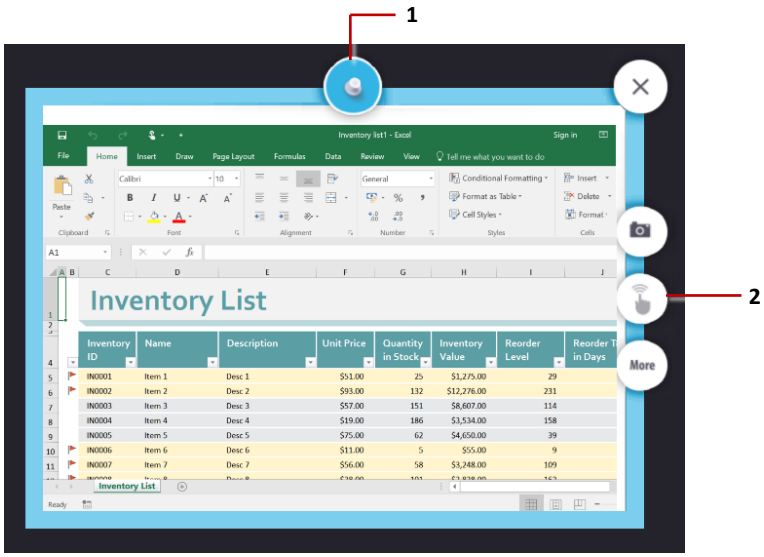
11.7 Pin the Shared Screen widget

In MT Canvus, wait for the Remote Control Info button to turn blue, confirming that Remote Touch is enabled on the auxiliary computer. This can take up to a minute.

Remote Control Info button

Then pin the Shared Screen widget. This ensures that touch data is transmitted to the receiving application on the user's computer. See the screenshot on page 85.

Note: *Pinning a widget enables MT Canvus to correctly interpret a user's hand and finger gestures as inputs to the application running in the widget instead of attempts to move or resize widget.*



Shared screen widget. 1 *Widget is pinned to allow application to receive touch input.*
2 *Remote Control Info button.*

11.8 Troubleshooting

Problem: A user is unable to share their screen with MT Canvus despite being able to do so in a previous screen-sharing session.

Solution: This problem can arise if a different port number has been assigned to the user's computer in the current screen-sharing session.

When users share their computer screens, MT Canvus automatically assigns a unique port number to each screen-sharing device. An administrator must then specify the correct port number in config.txt on each device. If MT Canvus assigns a different port number to a computer in a subsequent screen-sharing session, config.txt must be updated accordingly. Follow these steps:

1. Re-discover the Remote Touch port number assigned to the user's computer. Follow the instructions in section 11.5.
2. On the user's device, update the NetBridge block in config.txt with the new port number. Follow the instructions in section 11.6.3.
3. Restart WindowsTouchProxy.exe on the user's computer. Follow the instructions in section 11.6.4.
4. In MT Canvus, pin the Shared Screen widget. Follow the instructions in section 11.7.

12 Enable video output

MT Canvus allows users to stream content from the canvas to an external monitor or projector, or to a virtual webcam. This feature is useful for reaching audiences who cannot see the screens. For example, a user may want to output screen content to a projector so that people sitting at the back of the conference hall, or in a different room, can see their presentation.

The video output feature must be set up in advance before it can be used in MT Canvus. This section describes how to set up video output. (Instructions for using the video output feature are included in the *MT Canvus User Manual*.)

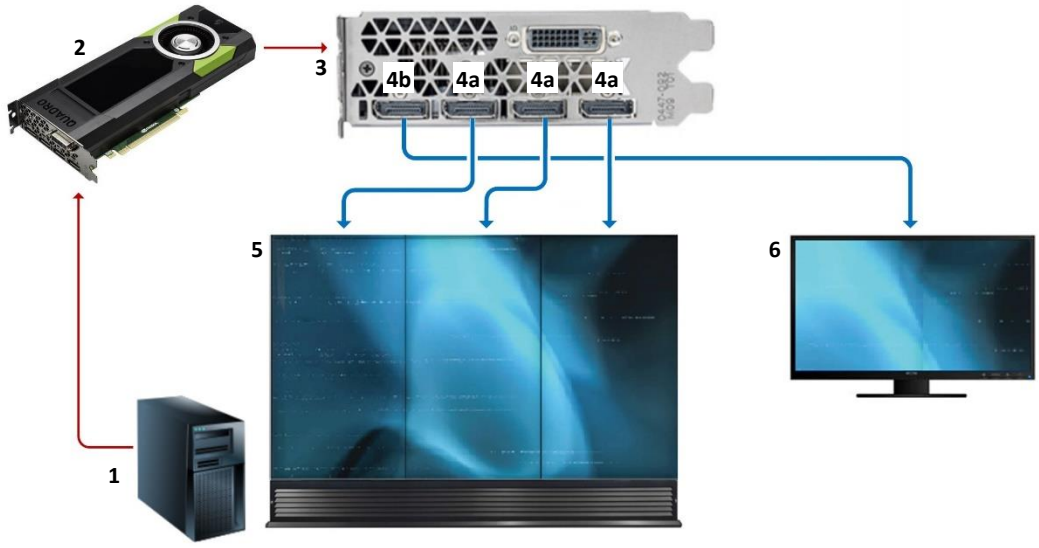
Terminology: *For simplicity, the instructions below refer to an 'external monitor' when describing the target device for video output. In practice, video output from MT Canvus can be streamed to any suitable device, including monitors, projectors, and virtual webcams.*

12.1 Graphics card requirement: spare video output

The video output feature requires a spare video output on the graphics card in the MT Canvus application computer. The external monitor (or projector or virtual webcam) connects to the spare video output.

For example, the MultiTaction Meeting Room package includes three Cells and an NVIDIA P5000 graphics card. This is a quad head graphics card ie, it has four video outputs. Three of the video outputs connect to the Cells; the fourth output is spare and can be used to stream video output to an external monitor.

(If you are deploying the MultiTaction Meeting Room package, you must *connect the video connections exactly as shown below.*)



Video output example setup. 1 *Application computer.* 2 *NVIDIA P5000 graphics card.* 3 *I/O bracket.* 4a *DisplayPort video outputs to Cells.* 4b *DisplayPort video output to external monitor.* 5 *Three Cells in portrait mode.* 6 *External monitor in landscape mode. Connects to spare DisplayPort.*

12.2 Configure the OS display settings with the external monitor layout

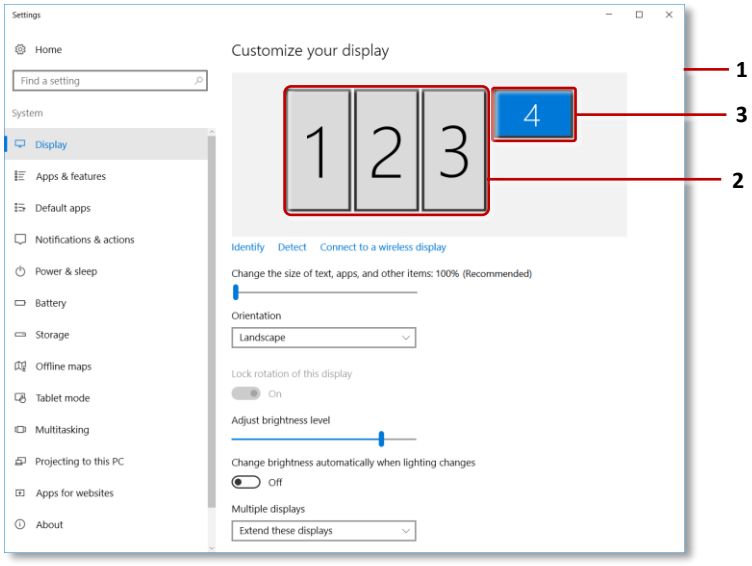
When enabling video output, you need to update the display configuration on the MT Canvus application computer with details of the external monitor. On Windows application computers, we recommend that you use the Display applet. On Ubuntu application computers, you must configure X11.

Note: *General instructions for configuring the display topology, including how to provide the operating system with details about the position and orientation of your Cells, are included in the MultiTaction Cell User Manual.*

12.2.1 Update the Display applet on Windows application computers

You can use the Display applet in Windows Settings to configure multiple monitor topologies and other display settings.

After connecting the external monitor to the graphics card on the application computer, use the Display applet to specify the layout of the Cells (order and rotation) *plus* the size, rotation and logical position of the external monitor.



Display applet in Windows Settings. This example shows the MultiTaction Meeting Room package.
1 *Display applet.* **2** *Three Cells in portrait mode.* **3** *External monitor.*

Notes

- *In previous versions of Windows, the Display applet was variously called Display Properties or Display Settings. However, the configuration options available in the applet have generally remained constant over the Windows releases.*
- *Alternatively, you can use NVIDIA® Mosaic™ technology to configure display settings for the Cells and external monitor. You can set up Mosaic in the NVIDIA Control Panel.*

12.2.2 Update X11 on Ubuntu application computers

Applies to Ubuntu application computers only.

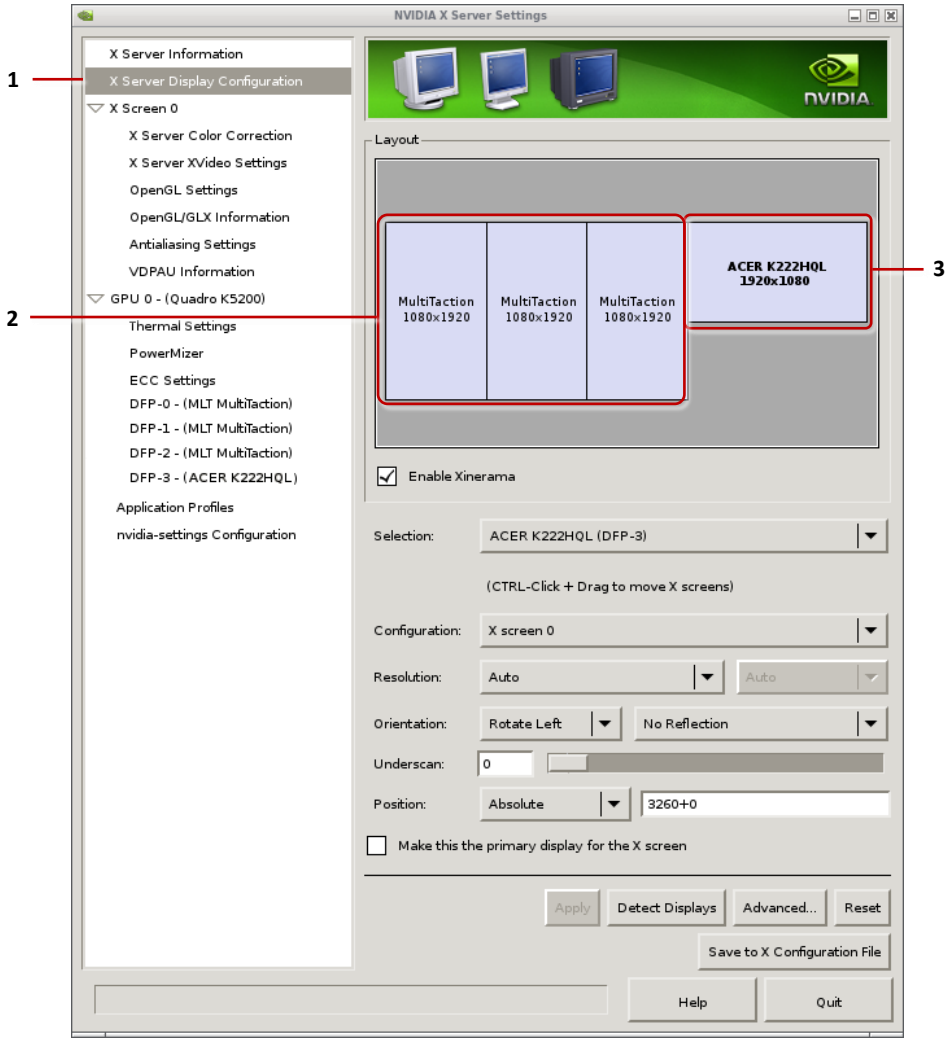
When enabling video output, you must first configure the X11 windowing system on the MT Canvus application computer. X11 needs to recognize both the Cells in the video wall and the external monitor. To do this, you must update the X configuration file, /etc/X11/xorg.conf, with details of the external monitor.

On application computers with an NVIDIA GPU, use the Display Configuration screen of the X Server Settings tool to specify the actual layout of the Cells (order and rotation) *plus* the size, rotation and logical position of the external monitor. Ensure the external monitor does not overlap the Cells.

Run these commands to install and launch the X Server Settings tool:

```
$ sudo apt-get install nvidia-settings
$ sudo nvidia-settings
```

For usage instructions, please refer to your NVIDIA documentation.



NVIDIA X Server Settings dialog. This example shows the MultiTaction Meeting Room package. **1** *Display Configuration screen.* **2** *Three Cells in portrait mode.* **3** *External monitor. This example shows the external monitor in landscape mode.*

12.3 Specify the display coordinates for video output

Now you need to update Cornerstone with display coordinates for the external monitor. To do this, you edit the screen.xml configuration file. Screen.xml maps the video output onto the external monitor's physical screen area.

12.3.1 Where is screen.xml?

Screen.xml is installed as part of the Cornerstone runtime; see section 2.5.1. The file location depends on the operating system of the application computer:

- **Ubuntu application computers:** The file is saved in the ~/.MultiTouch folder, where ~/ refers to the home folder of the *installation user*.

  If Cornerstone was installed by user 'multi', the expanded path is: /home/multi/.MultiTouch/screen.xml

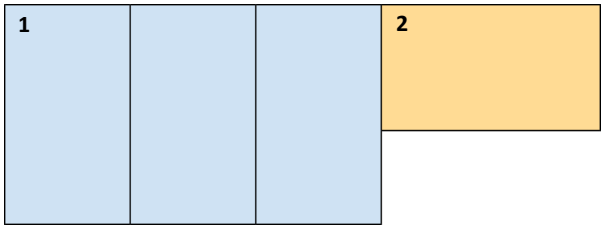
- **Windows application computers:** The file is saved in the *installation user's* profile. Using the USERPROFILE and APPDATA variables, the location of this folder is: %USERPROFILE%\%APPDATA%\MultiTouch

  If Cornerstone was installed by user 'multi', the expanded path is: C:\Users\multi\AppData\Roaming\MultiTouch\screen.xml

12.3.2 Configuration for a single external monitor

This section how describes how to edit screen.xml to support a single external monitor. This section also assumes that a single graphics card is sufficient to drive the video wall Cells and the external monitor. (For example, a graphics card with four video outputs can drive three Cells and one external monitor.)

The examples below are based on the MultiTaction Meeting Room package plus a single external monitor. The Meeting Room video wall comprises three 1080 x 1920 Cells in portrait mode with a 10 pixel vertical bezel between each Cell. The external monitor is in landscape mode.



Logical layout of Meeting Room package plus single external monitor.
1 *Video wall comprising three Cells in portrait mode.* **2** *External monitor in landscape mode.*

Follow these steps:

1. Locate screen.xml on the application computer; see section 12.3.1.
2. Specify the total display area for MT Canvus *excluding the external monitor*.

   To do this, add a `<layer-size>` element in screen.xml. The `<layer-size>` value must match the total display area of the video wall.

The Meeting Room package requires the following `<layer-size>` element:

```
<MultiHead type="">
   <layer-size type="">3260 1920</layer-size>
```

Where:

- The 3260 width is three portrait Cell widths plus two 10 pixel bezels ie, 1080 + 10 + 1080 + 10 +1080 pixels.
- The 1920 height is one portrait Cell height ie, 1920 pixels.

3. Define a drawable region available for displaying the streamed video output.

   To do this, you need a `window` element in screen.xml that incorporates the external monitor. The `window` location and size must match the total display area of the video wall *plus* the external monitor's size, rotation and logical location as specified in xorg.conf in section 12.2.

   For example, the Meeting Room package with a single external monitor requires the following elements in screen.xml:

```
<!DOCTYPE mtdoc>
<MultiHead type="">

  <layer-size type="">3260 1920</layer-size>

  <GPU_1 type="window">
    <location type="">0 0</location>
    <size type="">5180 1920</size>

    <Area1 type="area">
      <location type="">0 0</location>
      <size type="">5180 1920</size>
      <graphicslocation type="">0 0</graphicslocation>
      <graphicssize type="">5180 1920</graphicssize>
     </Area1>

  </GPU_1>

</MultiHead>
```

   Where:

   - The `window` is named 'GPU_1' to reflect the fact that the MT Canvus application computer only has a single graphics card.
   - The `window` size is 5180 x 1920 pixels, where the 5180 width is three portrait Cells with two 10 pixel bezels, plus a landscape external monitor ie 1080 + 10 + 1080 + 10 + 1080 + 1920 pixels.
   - The `area` size is 5180 x 1920 pixels.
   - The `graphicssize` size is 5180 x 1920 pixels.
   - For each element, its location is the standard 0,0.

   Note: *A detailed explanation of screen coordinates in screen.xml is included in the MultiTaction Cell User Manual, available to download from the MultiTaction web site:* https://cornerstone.multitouch.fi/multitaction-cells.

12.3.3 Configuration for two external monitors

This section how describes how to edit screen.xml to support two external monitors. It also assumes that two quad-head GPUs are needed to drive the six video wall Cells and two external monitors.

The examples below are based on the MultiTaction Board Room package plus two external monitors. The Board Room video wall comprises six 1920 x 1080 Cells in landscape mode with a 10 pixel vertical bezel between each Cell. The external monitors are in landscape mode. One GPU drives the three Cells and external monitor in the top row; a second GPU drives the three Cells and external monitor in the bottom row.

Logical layout of Board Room package plus two external monitors.
1 *Video wall comprising six Cells in landscape mode.* **2** *External monitors in landscape mode.*

Follow these steps:

1. Locate screen.xml on the application computer; see section 12.3.1.
2. Specify the total display area for MT Canvus *excluding the external monitors*.

   To do this, add a `<layer-size>` element in screen.xml. The `<layer-size>` value must match the total display area of the video wall.

   The Meeting Room package requires the following `<layer-size>` element:

   ```
   <MultiHead type="">
      <layer-size type="">5780 2170 </layer-size>
   ```

   Where:

   - The 5780 width is three landscape Cell widths plus two 10 pixel bezels ie, 1920 + 10 + 1920 + 10 +1920 pixels.
   - The 2170 height is two landscape Cell heights plus a 10 pixel bezel ie, 1080 + 10 + 1080.
3. Define a drawable region available for displaying the streamed video output.

   To do this, you need two `window` elements in screen.xml (one for each graphics card) that incorporate the external monitors. For each graphics card, the `window` location and size must match the total display area of its Cells *plus* the external monitor's size, rotation and logical location as specified in xorg.conf in section 12.2.

The example setup of a Board Room video wall plus two external monitors requires the following elements in screen.xml:

```
<!DOCTYPE mtdoc>
<MultiHead type="">

  <layer-size type="">5780 2170 </layer-size>

  <GPU_1 type="window">
    <location type="">0 0</location>
    <size type="">7700 1080</size>
    <Area1 type="area">
      <location type="">0 0</location>
      <size type="">7700 1080</size>
      <graphicslocation type="">0 0</graphicslocation>
      <graphicssize type="">7700 1080</graphicssize>
    </Area1>
  </GPU_1>

  <GPU_2 type="window">
    <location type="">0 1080</location>
    <size type="">7700 1080</size>
    <Area1 type="area">
      <location type="">0 1080</location>
      <size type="">7700 1080</size>
      <graphicslocation type="">0 1090</graphicslocation>
      <graphicssize type="">7700 1080</graphicssize>
    </Area1>
  </GPU_2>

</MultiHead>
```

Where:

- The GPU_1 `window` element defines a drawable region for the first GPU, which drives the three Cells and external monitor in the top row of the video wall.
- The GPU_2 `window` element defines a drawable region for the second GPU, which drives the three Cells and external monitor in the bottom row.
- In both cases, the `window` size is 7700 x 1080 pixels, where the 7700 width is three landscape Cells plus two 10 pixel bezels, plus a landscape external monitor ie, 1920 + 10 + 1920 + 10 + 1920 + 1920 pixels.
- The `area` size is 7700 x 1080 pixels.
- The `graphicssize` size is 7700 x 1080 pixels.
- For GPU_1 elements, their location is the standard 0,0.
- For the GPU_2 `window` and `area` elements, their location is 0,1080. For the `graphicslocation` element, its location is 0,1090 ie, 1080 + 10 pixel horizontal bezel.

Note: *A detailed explanation of screen coordinates in screen.xml is included in the MultiTaction Cell User Manual, available to download from the MultiTaction web site:* https://cornerstone.multitouch.fi/multitaction-cells.

12.4 Update MT Canvus with video output options

Now provide MT Canvus with details about the external monitor. You need to specify the external monitor's name, location and size in the mt-canvus.ini configuration file:

1. Access the desktop: see section 5.1.1.
2. Right-click the desktop and launch a terminal emulator.
3. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
4. Edit the following settings in an `[output]` section. If you want to use multiple video outputs, you must add a separate `[output]` section for each external monitor.

   (Manually add these sections to mt-canvus.ini if they do not already exist.)

   ```
   [output: <name>]
   location=<x y>
   size=<width height>
   ```

   Where:

   - `<name>` specifies a unique name for the `[output]` section. These names are listed in the Output menu in MT Canvus. Choose names that help users to identify the target monitor, projector or virtual webcam. Example names include 'Main Hall Projector' and 'Mezzanine Monitor'.
   - `location` and `size` specify the logical location and size of the external monitor(s). These settings must match the `graphicslocation` and `graphicssize` elements in screen.xml.

     For the `location` setting, `<x y>` specifies the x and y coordinates, in pixels, of the top-left corner of the external monitor's logical location.

     For the `size` setting, `<width height>` specifies the height and width, in pixels, of the external monitor.

12.4.1 Example video output specifications

To support the single external monitor specified in screen.xml in section 12.3.2, add the following lines to mt-canvus.ini:

```
[output: Main Hall Projector]
location=3260 0
size=1920 1080
```

To support the two external monitors specified in screen.xml in section 12.3.3, add the following lines to mt-canvus.ini:

```
[output: Main Hall Projector]
location=5780 0
size=1920 1080

[output: Mezzanine Monitor]
location=5780 1090
size=1920 1080
```

13 Set up support for MT Canvus emails

MT Canvus users can send personal items to their registered email address (that is, the email address associated with their personal codice card). This feature provides users with a simple method for exporting screen content out of MT Canvus.

This section describes how to set up this feature.

13.1 Specify the SMTP settings and email properties

Provide MT Canvus with details about the SMTP server and account credentials that you want to use. You must also specify envelope details for emails sent by MT Canvus (the sender account, email subject and so on).

Follow these steps:

1. Access the desktop: see section 5.1.1.
2. Right-click the desktop and launch a terminal emulator.
3. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
4. Edit the following settings in the `[smtp]` section.
   (Manually add these settings to mt-canvus.ini if they do not already exist.)

```
[smtp]
username=<address>
password=<password>
host=<name>
port=<port number>
ignore-proxy=<true or false>
```

`username` — Specify the email account that MT Canvus uses to access the SMTP relay server. For example, noreply@unipraxis.com.

`password` — Specify the password for the email account that MT Canvus uses to access the SMTP server.

`host` — Specify the name of the SMTP server that will forward emails from MT Canvus to your users. Alternatively, specify the SMTP relay service for routing emails through Google (smtp.gmail.com).

`port` — Specify the TCP port for mail submission on your SMTP server. Typically, you use ports 25, 465, or 587:

- 25 For unsecure connections.
- 465 For SSL connections.
- 587 This is the default mail submission port. This port is typically used when the mail server is set up for TLS encryption.

`ignore-proxy` — Specify whether to ignore your proxy server settings when routing emails sent from MT Canvus. By default, this setting is `false` so that emails from MT Canvus *are* routed using the proxy server settings.

See the example mt-canvus.ini in section 13.3.

5. Edit the following settings in the `[mail]` section.

   (Manually add these settings to mt-canvus.ini if they do not already exist.)

```
[mail]
subject=<subject line>
sender=<display name> <email address>
from=<display name> <email address>
reply-to=<display name> <email address>
```

   `subject` Specify the Subject line for emails sent by MT Canvus. This will typically be Content from MultiTaction Canvus.

   `sender` Specify the actual email account (the display name and address) that your organization will use to send the MT Canvus emails to users. Enclose the actual address in <angle brackets>. For example:

   MultiTaction Canvus <noreply@unipraxis.com>

   `from` Specify the email account (the display name and address) that will appear in the From field in MT Canvus emails. This account will generally be the same as the `sender` account. For example:

   MultiTaction Canvus <noreply@unipraxis.com>

   `reply-to` Specify the recipient email account (the display name and address) that is used if a user replies to an MT Canvus email. For example:

   MultiTaction Canvus <noreply@unipraxis.com>

   (In practice, this account will rarely be needed.)

   See the example mt-canvus.ini in section 13.3.

13.2 Set up email encryption

You can specify which encryption protocol is used for the connection between the SMTP server and email client.

Follow these steps:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Edit the `connection-encryption` setting in the `[smtp]` section.

   (Manually add this setting to mt-canvus.ini if it does not already exist.)

```
[smtp]
connection-encryption=<options>
```

   Where `<options>` can be:

   `auto` This option defaults to the encryption protocol used by the `port` number (see the previous section) and the SMTP server.

   Note: *This setting defaults to* `auto` *if no encryption value is specified.*

   `SSL` Use SSL to establish an encrypted email connection.

   `TLS` Use TLS to establish an encrypted email connection.

   `none` The email connection is not encrypted.

3. Restart MT Canvus on the application computer; see section 4.

13.3 Example mt-canvus.ini

In this example mt-canvus.ini file, the Unipraxis organization has set up support for MT Canvus emails as follows:

```
[smtp]
username=noreply@unipraxis.com
password=3dw315n3r
host=smtp.gmail.com
port=587
ignore-proxy=false
connection-encryption=auto

[mail]
subject=Content from MultiTaction Canvus
sender=MultiTaction Canvus <noreply@unipraxis.com>
from=MultiTaction Canvus <noreply@unipraxis.com>
reply-to=MultiTaction Canvus <noreply@unipraxis.com>
```

14 Share files in an external folder

The 'external folder' is a folder on the application computer containing shared files. If enabled, the external folder is listed in the Files widget alongside any folders created by the canvas users.

By default, MT Canvus supports canvas-level external folders; each canvas has its own external folder and files in this folder are only available to users of that canvas. Or you can configure a single external folder, available to all users from any canvas.

The external folder can be: a file system directory on the application computer; a mount point in the local file system that provides access to a remote file system; or a network location identified by a UNC path.

External folders are a convenient method for:

- **Importing or exporting files from MT Canvus:** Because the external folder is a file system directory (either a local folder or a network folder), you can use programs such as File Explorer or Nautilus to copy files into or out of the external folder. For example, to import a video into a canvas, simply drag the MP4 file into the external folder.
- **Copying files between canvases:** If you configure MT Canvus to use a single external folder (ie, you disable canvas-level external folders), any file in this external folder can be opened in any canvas.
- **Displaying existing file collections in MT Canvus:** Here, a file collection is a group of files (such as Office documents) associated with a specific project or team. Typically, this file collection is stored in a share on your network. If you designate this network share as the external folder, MT Canvus automatically gains access to these files, allowing users to display them in a canvas.

  (In previous versions of MT Canvus, users would need to manually import these files before displaying them in a canvas.)

Note: *If you prefer, you can disable external folders so that users can only store items in their personal folder. A user's personal items cannot be accessed by other users.*

14.1 Set up external folders

To set up an external folder, follow these steps:

1. *Applies to Windows computers only.*

   Verify that the *MT Canvus installation user* has the 'Create symbolic links' privilege; see section 2.5.3.

   Note: *This privilege is required because MT Canvus will need to create symbolic links (symlinks) in the external folder.*

2. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.

3. Edit the following settings in the `[external-folder-link]` section.

   (Manually add this section and settings to mt-canvus.ini if they do not already exist.)

```
[external-folder-link]
external-folder=<path to folder>
create-canvas-subfolder=<true or false>
canvas-folder=<display name>
enabled=<true or false>
```

   Where:

   - `external-folder` specifies the path to the root-level external folder. This path can identify:
     - A local folder on the application computer.
     - *(Ubuntu application computers)* A mount point in the local file system that provides access to a remote file system. For instructions, see section 14.1.1.
     - *(Windows application computers)* A UNC path to a network location.

     If canvas-level external folders are enabled, they are implemented as subfolders below the root-level external folder. Each subfolder takes the canvas name as its folder name. For example, if Sales and Engineering canvases are created on your video wall, their respective external folders are:

     - **Ubuntu:** ~/.mt-canvus-external/Sales
       Ubuntu: ~/.mt-canvus-external/Engineering
     - **Windows:** %APPDATA%\mt-canvus-external\Sales
       Windows: %APPDATA%\mt-canvus-external\Engineering

   - `create-canvas-subfolder` determines whether MT Canvus uses canvas-level external folders.

     By default, this setting is `true` so each canvas has its own external folder (actually a subfolder below the root-level external folder). For example, a PDF in the external folder of the 'Sales' canvas is not available in the external folder of the 'Engineering' canvas.

     Important! *If a canvas is deleted, its external folder plus any saved files are also deleted!*

     If this setting is `false`, all canvases share the root-level external folder.

   - `canvas-folder` sets the *display name* for the external folder in the Files widget. This display name is also used for canvas-level external folders ie, each canvas uses the same display name in the Files widget for its own external folder. See the Files widget screenshot on page 103.

     Note: *Do not confuse the external folder's display name in the Files widget with its directory name in the file system. The directory name for the root-level external folder is defined by the* `external-folder` *setting.*

   - `enabled` determines whether the 'external folder' feature is enabled.
     (By default, this setting is `false`.)

4. Restart MT Canvus on the application computer; see section 4.

14.1.1 Mounting a network share on the application computer

Applies to Ubuntu application computers only

This section summarizes the steps for permanently mounting a CIFS share on the application computer. (The CIFS share is hosted on a remote computer.)

Follow these steps:

1. Access the desktop: see section 5.1.1.
2. Right-click the desktop and launch a terminal emulator.
3. Run this command to install CIFS:
   `$ sudo apt-get install cifs-utils`
4. Run this command to create a mount folder on the application computer:
   `$ mkdir <mount_folder>`

   Where `<mount_folder>` is the path to the mount folder.

   We recommend that you specify ~/.mt-canvus-external as the mount folder, where ~/ refers to the home folder of the *installation user*. For example, if you installed MT Canvus while logged in as multi, the expanded path is: /home/multi/.mt-canvus-external
5. Using your preferred editor, create the following credentials file: ~/.smbcredentials

   For example, if you installed MT Canvus while logged in as multi, create the file here: /home/multi/. smbcredentials
6. Add the following entries to the smbcredentials file:
   ```
   username=<windows_username>
   password=<windows_password>
   ```
   Where `<windows_username>` and `<windows_password>` are the credentials that MT Canvus will use to access the CIFS share on the remote computer.

   For security purposes, we recommend that you create a non-administrator account or a service account on the remote computer that is used solely by MT Canvus.
7. Run the following command to set appropriate read and write permissions for the current user of the smbcredentials file:
   `$ chmod 600 ~/.smbcredentials`

8. Using your preferred editor, add the following entry to the /etc/fstab file to create the mount point:

```
\\<remote_host>\<CIFS_share>
   <mount_folder> cifs
   credentials=<credentials_folder>,iocharset=utf8,noperm 0 0
```

Where:

- `<remote_host>` specifies the name or IP address of the remote computer.
- `<CIFS_share>` specifies the path to the CIFS share on the remote computer.
- `<credentials_folder>` specifies the path to the smbcredentials file.

Example:

```
\\10.30.0.10\Sales\Presentations
   /home/multi/.mt-canvus-external cifs
   credentials=/home/multi/.smbcredentials,iocharset=utf8,noperm 0 0
```

Note: *To make it easier to read, the examples above show the entry broken down over multiple lines. In practice, this entry occupies a single line in the /etc/fstab file.*

9. Run this command load all mount points:

```
$ sudo mount -a
```

14.2 Examples

14.2.1 Remote external folder on the application computer

On a Windows application computer, use a UNC path to a remote external folder. On an Ubuntu application computer, specify an existing mount point in the local file system that provides access to a remote file system.

Add the following entries to the mt-canvus.ini file:

Ubuntu application computer

```
[external-folder-link]
external-folder=/home/multi/mt-canvus-external
create-canvas-subfolder=true
canvas-folder=Shared
enabled=true
```

Where `/home/multi/mt-canvus-external` is the path to a mount point.

Windows application computer:

```
[external-folder-link]
external-folder=\\\\10.30.0.10\\Sales\\Presentations
create-canvas-subfolder=true
canvas-folder=Shared
enabled=true
```

Where `\\10.30.0.10\Sales\Presentations` is a remote network share.

In the examples above:

- Canvas-level external folders are enabled ie, each canvas has its own external folder.
- When you open the Files widget, the display name for the external folder is ‘Shared’.
- External folders are enabled.

14.2.2 Local external folder on the application computer

MT Canvus data is generally saved in the *runtime user*'s profile (that is, the user logged in when MT Canvus runs). If you want to use a local folder on the application computer as the root-level external folder, we recommend that you specify these folders:

- **Ubuntu:** ~/.mt-canvus-external
  Where ~/ refers to the home folder of the runtime user.
- **Windows:** %APPDATA%\mt-canvus-external
  Note: *You cannot use the APPDATA variable in mt-canvus.ini; you must use the expanded path. An example path is shown below*.

Add the following entries to the mt-canvus.ini file:

Ubuntu application computer

```
[external-folder-link]
external-folder=/home/multi/mt-canvus-external
create-canvas-subfolder=true
canvas-folder=Shared
enabled=true
```

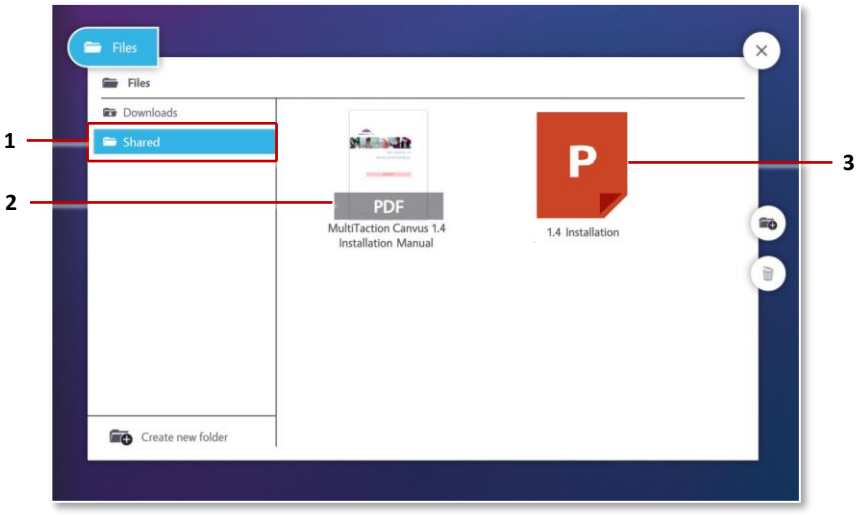
Windows application computer

```
[external-folder-link]
external-folder=C:/Users/multi/AppData/Roaming/mt-canvus-external
create-canvas-subfolder=true
canvas-folder=Shared
enabled=true
```

In the examples above:

- The runtime user is multi.
- Canvas-level external folders are enabled ie, each canvas has its own external folder.
- When you open the Files widget, the display name for the external folder is 'Shared'.
- External folders are enabled.

14.2.3 Example external folder shown in Files widget



Files widget with external folder. In this example, the display name for the external folder is 'Shared' (**1**) *and the external folder contains a PDF* (**2**) *and a PowerPoint file* (**3**).

15 Store personal items on a network share ('Remote Codice')

Note: *This feature is also called 'Remote Codice'.*

Codice cards are user ID cards in the form of a 2D bar code printed on paper or card.

Ordinarily, a user has their own Codice card (their *personal marker*) to access their folder of personal items. This folder is stored on the application computer attached to the local video wall. However, MT Canvus offers considerable flexibility in how personal items are stored and shared. In particular, the Remote Codice feature enables MT Canvus to store personal items on a network share.

The most common implementation of Remote Codice is where multiple MT Canvus installations store users' personal items in folders on the same network share. This solution is ideal for organizations with multiple video walls. For example, a school may have MT Canvus running on a video wall in each classroom. By storing personal items in folders on a network share, you enable staff and students to access their personal items on a video wall in any classroom. From the users' perspective, they still have their own personal folders.

You can also implement Remote Codice in other ways. For example, you may want to have a single, shared folder of personal items that can be accessed from any video wall by any user. Or you may want to arrange folders hierarchically, for example, selectively restricting user access to specific branches of the folder tree.

If you want to enable Remote Codice, we recommend that you do so when you first deploy MT Canvus on your video walls. If you reconfigure an existing MT Canvus installation to use Remote Codice, users will lose their existing personal items.

15.1 FAQs

- Will users notice a difference when they access their personal items?

  From the user's viewpoint, the first difference is that they must enter their domain password after they present their personal Codice card.

  The second difference is that they will be able to access their personal items from any video wall that has Remote Codice enabled!

  Annotated widgets are also handled differently. Normally, if a user drags an annotated widget into their personal items folder, the widget and annotations are saved together. But when Remote Codice is enabled, MT Canvus saves a snapshot of the annotated widget in the user's personal items folder.

  Finally, if you reconfigure an existing MT Canvus installation to use Remote Codice, users will no longer be able to make presentations of personal items or send personal items as email attachments; see section 15.3.

- **Are existing personal items accessible after enabling Remote Codice?**

  No. If your users were previously saving personal items in folders stored locally on the application computer, they will be unable to retrieve these items after you enable Remote Codice.

- **Can I set up a common folder of shared personal items?**

  Yes. You can set up Remote Codice so that all users share a common folder of personal items. This solution is better for a small group of users working collaboratively on multiple canvases.

  For example, a team are preparing two canvases simultaneously. The first canvas is for a full presentation to the board of directors. The second canvas is a summary presentation for the next company-wide meeting. There are videos and images used in both presentations, and these are stored in a shared network folder that is accessible to all members of the team.

  (To set up this implementation, you edit the `#REMOTE_PATH#` setting for each user in users.xml to specify a common personal folder; see section 15.5.4.)

15.2 Requirements

The Remote Codice feature uses the following computers:

- **Application computers:** These are the external computers attached to video walls that run MT Canvus; see section 2.1. Each application computer hosts a local version of:
  - mt-canvas.ini: Includes a `[remote-codice]` section that contains the details necessary to connect to the codice network share on the Codice server
- **Central Codice server:** This hosts a codice network share that contains two files:
  - remote-codice.ini: Contains a `[remote-codice]` section that identifies the users.xml file.
  - users.xml: Contains user domain names (not passwords!) and file location details for all users permitted to access items saved on the file server.

  Note these additional requirements:
  - **User account:** The Codice server hosts a special user account, multitaction, that has Read Only access to the codice network share.
  - **Operating system:** There are no OS restrictions. However, the Codice server must support SMB. For example, the Codice server can be a Windows system, or a Linux system running Samba.
  - **Network access:** The Codice server must be accessible over the network from each application computer that needs to use the Remote Codice feature.

Requirements continue on next page.

- **Central file server:** This hosts a network share containing users' personal items. These items are typically saved in subfolders below the root folder of the network share, with one subfolder for each user. Note these additional requirements:
  - **Operating system:** There are no OS restrictions. However, the file server must support SMB. For example, the file server can be a Windows system, or a Linux system running Samba.
  - **Network access:** The file server must be accessible over the network from each application computer that needs to use the Remote Codice feature.

  For details about personal items, see the *MT Canvus User Manual*.

Note: *A single computer can perform both the Codice server and central file server roles.*

15.3 Personal item presentations and emails are not available

Normally, users can send personal items to their registered email address, providing a simple method of exporting screen content out of MT Canvus. Users can also make a presentation of items in their Personal Items widget.

However, if Remote Codice is implemented, these features are *not* available in the Personal Items widget. Users cannot send personal items to an email address and they cannot make presentations of their personal items.

Instead, users must revert to alternative features:

- Table presentations and anchor presentations are still available. That is, user can make presentations based on the contents of a table or a list of anchor areas in the current canvas.
- Users can export screen content by dragging personal items onto the canvas, and then into the USB folder. They can also export content by uploading personal items to a web site that has an upload capability, such as Google Drive or Dropbox.

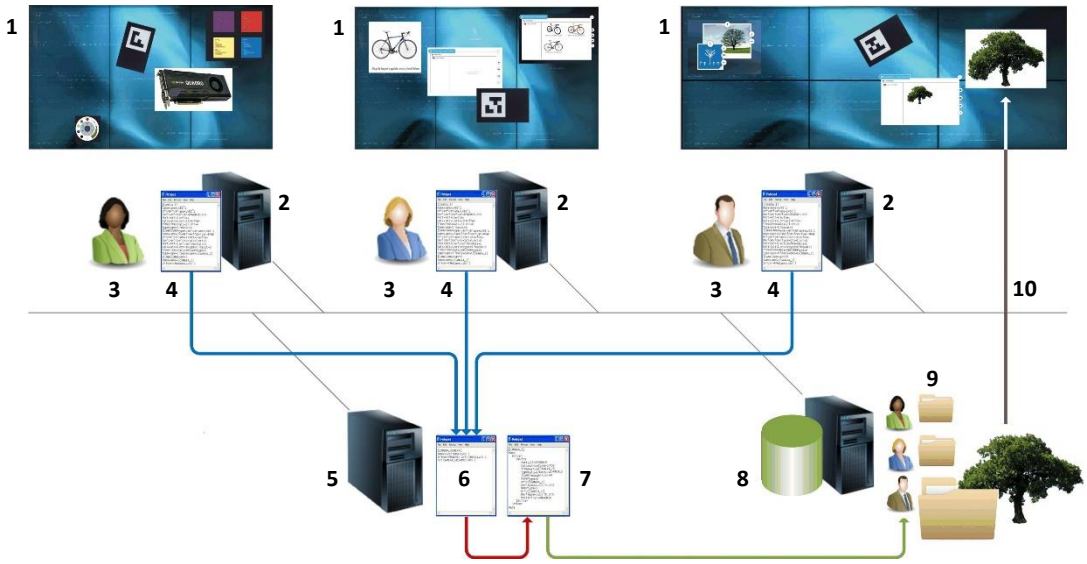
Note: *All features mentioned above—presentations, sending personal items as email attachments, exporting items to a USB memory stick, and uploading items to a web page—are described in the MT Canvus User Manual.*

15.4 Remote Codice architecture

When an MT Canvus user presents their personal Codice card to the video wall:

1. MT Canvus checks the local version of mt-canvus.ini to acquire the location of the central remote-codice.ini file.
2. Using the logon credentials specified in the local mt-canvus.ini, MT Canvus queries the central remote-codice.ini to locate users.xml.
3. Using the Codice code presented by the user, MT Canvus looks up the user in users.xml and obtains their domain name and the location of their personal folder on the file server.
4. MT Canvus prompts the user for their network password. It then uses this password and the user's domain name to log on to the user's personal folder on the file server.

This process is summarized in the diagram below:



Remote Codice example. Here, an organization has three video walls plus a central Codice server and a central file server. Users can present their personal Codice cards on any video wall to retrieve personal items saved on the central file server.

1 *Video wall.* 2 *Application computer.* 3 *MT Canvus user.*

4 *mt-canvus.ini (local versions). These files include a [remote-codice] section that contains the details necessary to connect to the Codice network share on the Codice server* (5).

5 *Codice server. This server hosts the 'codice' network share, which contains the central version of mt-canvus.ini* (6) *and users.xml* (7).

6 *remote-codice.ini. This file contains minimal content. In this file, the [remote-codice] section identifies the file containing user credentials ie, users.xml* (7).

7 *users.xml. This file contains user domain names (not passwords!) and file location details for all users permitted to access items saved on the file server* (8).

8 *File server. This server stores users' personal items.* 9 *Items in users' personal folders. The location of each user's personal folder is added to users.xml* (7).

10 *Example: A user retrieves an item from their personal folder on the remote file server and displays it on the canvas.*

15.5 Set up Remote Codice

This section describes each task required to set up Remote Codice on your network.

15.5.1 Create a network share on the central Codice server

First, create a network share on the central Codice server. This share will contain two files, users.xml and remote-codice.ini. Follow these steps:

1. Create a new Codice subfolder on the computer designated as your central Codice server.

   On a Windows computer, we recommend create the following subfolder in the root of the C: drive:
   C:\MultiTaction\Codice

2. Create a network share:
   a. Set the share's folder path to the new Codice subfolder.
   b. Set the share name to 'codice'.

Now set up a network share on the file server; see section 15.5.2.

15.5.2 Create a network share on the central file server

Confirm that a suitable network share exists on the central file server for storing folders of users' personal items. Typically, each user will have their own personal folder. For example, you may want to use a structure like this:

[host]
+ home
+ fschaeffer
+ lsteel
+ srimmel

Where home is the root folder of the network share. The procedure for setting up this network share is the same as in the previous section. You will reference this network share when you edit users.xml in section 15.5.4.

Now create a user account to access the new share; see section 15.5.3.

15.5.3 Create a user account on the central Codice server

Now create a new 'multitaction' user account on the designated Codice server. Local versions of MT Canvus will use this account to access the new codice network share.

When you create the new user account:

1. Set the user name to 'multitaction'.
2. Assign a password to the new user account. For example, mypassword.

   (You will specify this password in the local versions of mt-canvas.ini. See section 15.5.6.)
3. Give the new account Read Only access to the \Codice subfolder.

Note: *For security purposes, this account only has Read Only access to the network share. You can grant full access to an administrator so they can remotely edit files in this folder.*

Now create remote-codice.ini on the central Codice server; see section 15.5.4.

15.5.4 Create remote-codice.ini on the Codice server

The remote-codice.ini file is saved in the codice network share on the central Codice server. It contains minimal content; its primary purpose is to allow MT Canvus to locate users.xml; see section 15.5.5.

Remote-codice.ini also contains contact details for an administrator (if the user has forgotten their domain password) and a timeout for the user's personal folder.

On the Codice server:

1. Using your preferred text editor, create remote-codice.ini in the \Codice subfolder.
2. In this file, add a new `[remote-codice]` section with the following settings:

```
[remote-codice]
db-file=users.xml
admin-info=<admin contact details>
disconnect-seconds=300
```

   Where

   - `db-file` specifies the users.xml file.

     For convenience, these instructions assume the file is named users.xml and located in the same folder as remote-codice.ini. However, you can change both the file name and file location, if required. If you do change the name or location, you must edit the `db-file` setting accordingly.
   - `admin-info` defines the administrator contact details that appear in the 'forgotten password' advisory.

     When you enter the contact details, you do not need to enclose the text in double quotes. To add a line break, use `\n`. For example:

```
admin-info=Spencer Rimmel\nExt. 321654\nspencer@unipraxis.com
```

Note: *When a user presents their personal Codice card, they are prompted for their domain password. If they subsequently click the Forgot Your Password? hyperlink, MT Canvus displays a 'forgotten password' advisory. This advisory instructs the user to request a password reset from their MT Canvus administrator and includes contact details for the administrator.*

- `disconnect-seconds` specifies the inactivity timeout for the user's personal folder. The default timeout is 300 seconds (5 minutes).

  If a user's personal folder is open on the canvas, the folder is closed automatically if no interaction is detected (for example, no personal items are selected) before the timeout expires. That is, MT Canvus disconnects from the user's personal folder on the remote file server.

3. After updating and saving remote codice.ini, you *must* restart MT Canvus on all application computers.

   However, you do *not* need to restart the Codice server.

Now add user details to users.xml; see section 15.5.5.

15.5.5 Add user details to users.xml

Users.xml is saved in the codice network share on the central Codice server. It contains the user domain names (not passwords!) and file location details for all users permitted to access items saved on the file server.

On your designated Codice server:

1. Using your preferred XML editor, create a new users.xml file in the \Codice subfolder.

```
<!DOCTYPE mtdoc>
<Node type="">
 <user-list>
  <pair>
   <long>#CODICE_ID#</long>
   <Node type="">
    <id type="">#CODICE_ID#</id>
    <user-codice type="">#CODICE_ID#</user-codice>
    <first-name type="">#FIRST_NAME#</first-name>
    <middle-names type=""></middle-names>
    <last-name type="">#LAST_NAME#</last-name>
    <password type=""></password>
    <password-date type="">0</password-date>
    <super-user type="">0</super-user>
    <remote-user type="">1</remote-user>
    <domain-username type="">#DOMAIN_USERNAME#</domain-username>
    <remote-host type="">#REMOTE_HOST_IP#</remote-host>
    <remote-share type="">#REMOTE_SHARE#</remote-share>
    <remote-path type="">#REMOTE_PATH#</remote-path>
    <remote-path-launch type="">#REMOTE_PATH_LAUNCH#</remote-path-launch>
   </Node>
  </pair>

  <!-- INSERT EXTRA USERS HERE -->

 </user-=list>
<Node>
```

2. Add your first user. Go to the existing `<pair>` element and replace the following placeholders with appropriate values:

#CODICE_ID#	The codice code assigned to the user.
#FIRST_NAME#	The user's given name.
#LAST_NAME#	The user's family name.
#DOMAIN_USERNAME#	The user's domain name. MT Canvus will use this name to log on to central file server. (MT Canvus prompts the user for their network password when they present a personal Codice card.)
#REMOTE_HOST_IP#	The IP address of the central file server. **Example 1:** If the full path to the user's personal folder is file://10.30.0.10/home/srimmel, add this line to users.xml: `<remote-host type="">10.30.0.10</remote-host>`
#REMOTE_SHARE#	The network share on the central file server that contains the personal folders for all users. **Example 2:** If the full path to this network share is file://10.30.0.10/home, add this line to users.xml: `<remote-share type="">home</remote-share>`

#REMOTE_PATH#	Identifies the highest folder that the user can access, *relative to the network share*.
	
	If the user can only access their personal folder, this setting specifies the path from the network share to the personal folder. If the user is permitted to view other users' folders, this setting is null (empty).
	
	Example 3: If user srimmel can only access their own folder, file://10.30.0.10/home/srimmel, add this line to users.xml:
	`<remote-path type="">srimmel</remote-path>`
	
	Example 4: If user srimmel can view other users' personal folders ie, any subfolder below file://10.30.0.10/home, add this line to users.xml:
	`<remote-path type=""></remote-path>`

List continues on next page

#REMOTE_PATH_LAUNCH#	The initial folder that opens when the user presents their personal Codice card.
	
	Example 5: If the user srimmel can only access their personal folder ***and*** this personal folder is already defined by #REMOTE_PATH# (see example 3 above), leave this setting as null ie, add this line to users.xml:
	`<remote-path-launch type=""></remote-path>`
	
	Example 6: If the user srimmel is permitted to view any other users' personal folders ***and*** the #REMOTE_PATH# setting is null (see example 4 above) ***but*** you want srimmel's personal folder to be the initial folder that opens, add this line to users.xml:
	`<remote-path-launch type="">srimmel</remote-path>`
	
	Example 7: If the user srimmel is permitted to view any other users' personal folders ***and*** the #REMOTE_PATH# setting is null (see example 4 above), leave this setting as null if you want the #REMOTE_SHARE# folder (see example 2) to be the initial folder that opens:
	`<remote-path-launch type=""></remote-path>`

Note: *Omit all leading and trailing slashes in share names and paths for all #REMOTE# settings above. If necessary, use forward slashes to define a path.*

3. Now add the remaining users. For each new user:
   a. Go to the `<!-- INSERT EXTRA USERS HERE -->` comment.
   b. Insert a new `<pair>` element, including all the sub-elements listed in step 1.
   c. Replace the placeholders with appropriate values, as described in step 2.

Now edit the local versions of mt-canvas.ini on each application computer that needs to use the Remote Codice feature; see section 15.5.6.

15.5.6 Edit the local versions of mt-canvus.ini

You must now edit the MT Canvus configuration file on each application computer to identify the central Codice server and configure the operation to mount the codice network share. Follow these steps on each application computer:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Edit the following settings in the `[remote-codice]` section.

   (Manually add this section and settings to mt-canvus.ini if they do not already exist.)

   ```
   [remote-codice]
   host=<Codice Config IP>
   data-share=codice
   username=multitaction
   password=<password>
   config-file=remote-codice.ini
   enabled=true
   ```

   Where:

   - `host` specifies the IP address of the central Codice server.
   - `data-share` specifies the codice network share that you created in section 15.5.1.
   - `username` and `password` specify the credentials for the multitaction user account that you created in section 15.5.3.
   - `config-file` specifies the remote-codice.ini file created in section 15.5.4.
   - `enabled` enables or disable the Remote Codice feature. Set to true to enable this feature. Set to false to revert to default MT Canvus functionality.

3. *Applies to Windows computers only. For Ubuntu computers, go to step 4.*

   Now configure MT Canvus to connect to users' personal folders on the remote file server. Add a `[remote-mount]` section with the following settings:

   ```
   [remote-mount]
   daemon-port=0
   mount-folder=<symlink folder>
   ```

   Where:

   - `daemon-port` specifies a null value. No mount operation is required on Windows application computers. You must therefore set `daemon-port` to zero to prevent MT Canvus from attempting to communicate with a (non-existent) mount daemon.

List continues on next page.

- `mount-folder` specifies a folder that will contain symbolic links (symlinks) to the codice network share on the Codice server; users' personal folders on the file server; and, if supported, encrypted folders on the auxiliary computer. You can choose any folder on the application computer, but we recommend you use %APPDATA%/mt-canvus-mount.

  For example, if the MT Canvus installation user is multi, set `mount-folder` to: C:\Users\multi\AppData\Roaming\mt-canvus-mount

  Important! *Verify the folder exists on the application computer!*

  Note: *Because this method requires MT Canvus to create symbolic links, the MT Canvus installation user must have the 'Create symbolic links' privilege; see section 2.5.3.*

4. *Applies to Ubuntu computers only. For Windows computers, see step 3.*

   Configure a mount operation to attach remote network folders to the folder tree on the local application computer. These remote network folders include the codice network share on the remote Codice server and users' personal folders on the remote file server.

   Add a `[remote-mount]` section with the following settings:

   ```
   [remote-mount]
   daemon-port=8081
   mount-options=<options, including Samba version>
   mount-folder=/mnt
   ```

   Where:

   - `daemon-port` specifies the port number that MT Canvus uses to communicate with the daemon that manages the mount operation. By default, MT Canvus listens on port 8081, but you can specify a different port if 8081 is already being used by a different process.
   - `mount-options` specifies a comma-separated list of options for the Linux `mount` command. This list includes the Samba version. Add other options if required. For example:

     ```
     mount-options=vers=2.0
     ```

     (MT Canvus uses a daemon to connect to remote network folders. In turn, this daemon runs the `mount` command to attach the codice network share and remote personal folders to the local folder tree.)
   - `mount-folder` specifies the *mount folder*. This must be an empty folder on the application computer that will contain the mount points to the network share on the Codice server and to users' personal folders on the file server.

     By default, the mount folder is /mnt. This folder already exists on Ubuntu computers. If you specify a different mount folder, verify that the new mount folder exists!

5. Restart MT Canvus on each application computer; see section 4.

15.6 How do users access their personal items?

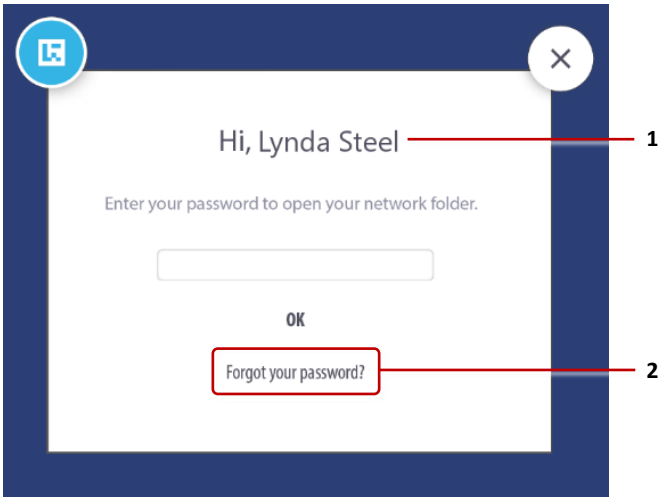
When Remote Codice is enabled, user can access items in their personal folder by presenting their personal codice card and entering their network password.

1. When user presents their personal codice card, MT Canvus looks up the Codice code and user's credentials in users.xml.

2. If the Codice code and user's credentials are *not* in users.xml, MT Canvus displays a 'Card not registered' advisory. The advisory includes contact details for the MT Canvus network administrator. (You defined these contact details in section 15.5.4.)

   If the Codice card and user details *are* registered in users.xml, MT Canvus prompts the user for their network password.

   (MT Canvus has already retrieved the user's domain name from users.xml. It then uses the user's domain name and password to access the user's personal folder on the remote file server.)



Remote Codice network password dialog. 1 *User's name defined in users.xml.*
2 *Forgot your password hyperlink.*

3. The user enters their password and taps OK.
   - If the password is correct, their Personal Folder opens.
   - If they enter the wrong password, they see an Incorrect Password dialog and can re-enter their password.
   - If they click the Forgot Your Password hyperlink, they see a Reset Password advisory that includes contact details for the MT Canvus network administrator.

16 Set up fixed workspaces

Note: *Fixed workspaces are also called 'breakout displays' or 'control displays'.*

Workspaces enable you to split a canvas into separate sections so that two or more users can work independently on the screen without interfering with each other's work. Each workspace extends over a specific section of the screen and presents the user with an independent viewport onto the canvas.

Normally, users can add or remove workspaces while they are working on the video wall. But MT Canvas also supports *fixed workspaces*. These workspaces cannot be resized or removed and are defined in the mt-canvas.ini configuration file.

Why use fixed workspaces? Typically, you would define a fixed workspace on a standalone Cell to remotely manage the main video wall in real time. For example, a presenter defines a fixed workspace on a single Cell that is physically separate from the main video wall. If the single Cell and video wall are both displaying the same canvas, the presenter can remotely demonstrate content on the video wall.

Alternatively, you can use a fixed workspace if you want to precisely control which part of a canvas is visible on screen at startup.

16.1 Set up a fixed workspace

Follow these steps:

1. If you intend to display the fixed workspace on a Cell that is separate from the main video wall, update X11 with the logical layout of the Cells; see section 12.2.
2. Access the desktop: see section 5.1.1.
3. Edit the *working version* of mt-canvas.ini; see section 5.2.2 and section 5.2.3.
4. For each fixed workspace that you want, add a new `[fixed-workspace]` section:

```
[fixed-workspace:<n>]
size=<width> <height>
name=<workspace name>
enable-info-panel=<true or false>
```

   Where:

   - `fixed-workspace:<n>` specifies the index number for the fixed workspace. Index numbers begin at 1.
   - `size` specifies the `width` and `height` of the fixed workspace, in pixels. The size must reflect the logical Cell layout that you specified in step 1. You must separate the width and height values with a single space.
   - `name` specifies the name of the fixed workspace. This name is shown in the info panel. Note that `name` is optional. If this setting is omitted, the info panel displays '*Workspace <n>*', where *<n>* is the index number defined above.

- `enable-info-panel` determines whether to display the info panel. If set to `false`, the info panel is hidden. The Show info panel button is also hidden in the System menu, preventing users from manually displaying the info panel.

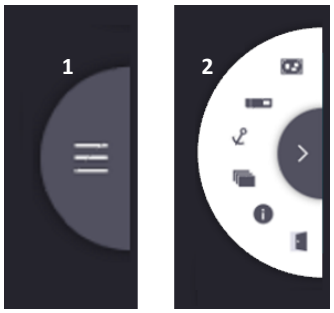
For an example setup, see section 16.3.

5. Restart MT Canvus on the application computer; see section 4.

16.2 Hide menus and workspace outlines

By default, each fixed workspace has its own canvas menus. If its viewport overlaps the viewport of another workspace, it also displays a colored outline of the overlapping workspace plus an identifying label.

You can optionally hide these menus and overlap outlines. For example, you may want to only display the menus and workspace outlines on your control display, but hide them from users on your main video wall.



Example canvas menu, closed (**1**) *and open* (**2**).

Outline of overlapping workspace (**3**) *with identifying label* (**4**).

Follow these steps:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Edit the following settings in the relevant `[fixed-workspace]` section.

```
[fixed-workspace:<n>]
enable-canvas-menu=<true or false>
visualize-other-workspaces=<true or false>
```

Where:

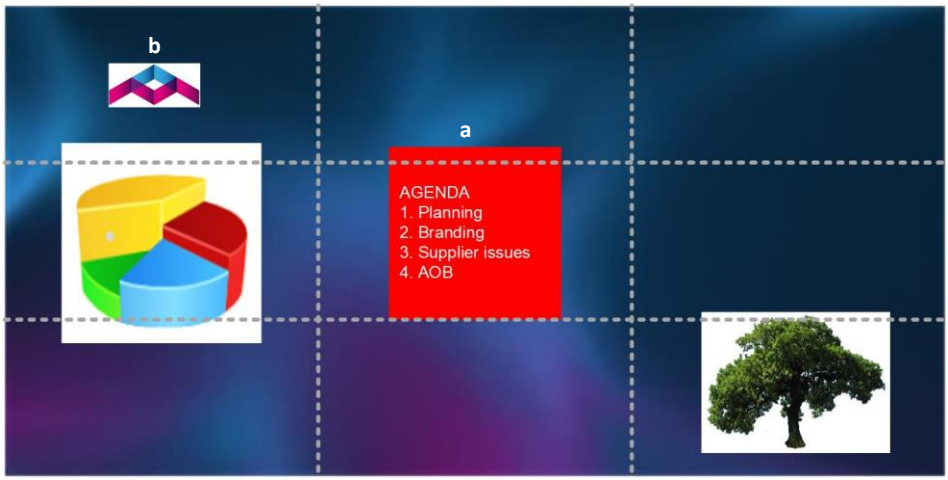
- `fixed-workspace:<n>` specifies the index number for the fixed workspace; see section 16.1.
- `enable-canvas-menu` determines whether to show the canvas menus in the fixed workspace. Set this setting to `false` to hide the menus in the current fixed workspace.
- `visualize-other-workspace` determines whether to show colored outlines of overlapping workspaces plus their identifying labels. Set this setting to `false` to hide these outlines and labels in the current fixed workspace.

3. Restart MT Canvus on the application computer; see section 4.

16.3 Specify which part of the default canvas is visible at startup

When MT Canvus starts up, it always opens the *default canvas* (ie, the oldest canvas in the current installation), normally at the *default zoom* and focused approximately on the central third of the canvas. But you can optionally change which part of the default canvas is visible on startup.

Note: *In the current MT Canvus release, you can only make an existing canvas into the default canvas by removing any canvases created before your chosen canvas.*



*Full canvas, divided into thirds. In this example, a meeting agenda (**a**) occupies the central third of the canvas and a corporate logo (**b**) is in the top left corner of the canvas.*

The image above shows the full content of an example canvas. The image is divided horizontally and vertically into thirds for illustration purposes. The images below show how the same canvas is displayed on the video wall at startup.

Visible part of the canvas at startup, as shown on the video wall:
1 *Default zoom. Only the central third of the canvas is visible on startup.*
2 *Same zoom, but new location. Now only the top left corner of the canvas is visible on startup.*
3 *Fully zoomed out. Now the full canvas is visible on startup.*

Follow these steps:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.

2. Edit the following settings in the relevant `[fixed-workspace]` section.

```
[fixed-workspace:<n>]
view-location=<x> <y>
view-scale=<N>
```

See next page for settings descriptions.

Where:

- `fixed-workspace:<n>` specifies the index number for the fixed workspace; see section 16.1.
- `view-location` defines which part of the default canvas of you want to be visible on startup. `<x>` and `<y>` define the horizontal and vertical coordinates of the top-left corner of the visible part of the canvas, in pixels.

  For example, to focus on the top-left third of the canvas:

  ```
  view-location=10 10
  ```

  Note: *Do not set the location to* `0 0` *(zero zero) to specify on the top-left corner.* `0 0` *is interpreted as a null value; it is used to disable this setting.*

  Alternatively, if your canvas size is 9600 x 4800 pixels, you can focus on the bottom-right third of the canvas with:

  ```
  view-location=6400 3200
  ```

  Tip: *When defining* `<x>` *and* `<y>` *it is helpful to know the overall size of your canvas. You can estimate this by checking the* `size` *setting in the* `[canvas]` *section of mt-canvus.ini. This setting defines the length of the longer canvas edge.*

- `view-scale` defines the zoom for the visible part of the default canvas on startup. `<N>` can be any number from 0.1 to 10, where:

  0.1 is maximum *zoom-out.* That is, the entire canvas is displayed on screen.

  1 is the default zoom, focusing approximately on the central third of the canvas.

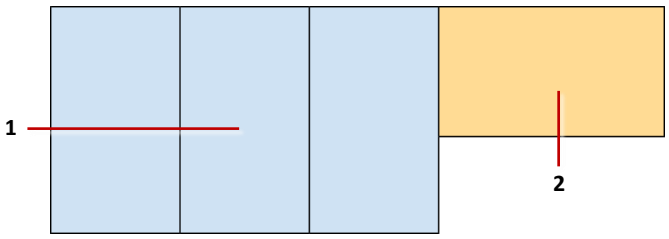
  10 is the maximum *zoom-in*. That is, the viewport is fully zoomed in, displaying a very small part of the canvas in great detail.

3. Confirm that `view-location` and `view-scale` do not have an unintended impact on other mt-canvus.ini settings:
   - Confirm that `restore-workspaces` is `false`; see section 5.9.1.

     The `restore-workspaces` setting must be disabled for the workspace location and scale settings to take effect on startup. If `restore-workspaces` is `true`, then `view-location` and `view-scale` are ignored.
   - Confirm that canvas settings `zoom-viewport` and `anchor-viewport` are not needed. If you define `view-location` and `view-scale`, be aware that `zoom-viewport` and `anchor-viewport` will be ignored; see section 5.5.
4. Restart MT Canvus on the application computer; see section 4.

16.4 Example fixed workspace

To define a fixed workspace on a standalone Cell (in landscape mode) for controlling a Meeting Room video wall, you must add two `[fixed-workspace]` blocks. The first represents the main fixed workspace on the video wall. The second represents the fixed workspace on the standalone Cell (the 'breakout display').



Logical layout of the Cells. **1** *Fixed workspace. This is the main workspace for the Meeting Room video wall.* **2** *Fixed workspace for the breakout display.*

To implement these fixed workspaces, add these entries to mt-canvus.ini:

```
[fixed-workspace:1]
Size=3260 1920
name=Video Wall
enable-info-panel=true

[fixed-workspace:2]
Size=1920 1080
name=Console
enable-info-panel=true
```

Where:

- Fixed workspace 1 is 3260 x 1920 pixels ie, three Cells in portrait mode. The 3260 width is three Cell widths plus two bezels ie, 1080 + 10 + 1080 + 10 + 1080 pixels. Its display name in the info panel is 'Video Wall'.

Info panel for Project 2020 canvas, fixed workspace 1 'Video Wall'

- Fixed workspace 2 is 1920x1080 pixels. This is the standalone Cell (the 'breakout display') in landscape mode. Its display name in the info panel is 'Console'.

Info panel for Project 2020 canvas, fixed workspace 2 'Console'

17 Set up predefined text

To speed up text entry and avoid typing errors, MT Canvus supports predefined text (also called 'keyboard shortcuts'). This feature is designed primarily to streamline demonstrations and presentations.

You often need to type text in MT Canvus, such as when you add text to a Note widget or run an internet search for a web page. When you use an on-screen keyboard to type, you can insert items of predefined text. This is useful when you need to repeatedly enter the same text string such as a web site URL or email address.

To insert items of predefined text, tap the predefined text button on the on-screen keyboard. Then tap the item you want in the pop-up list of predefined text.

On-screen keyboard. 1 *Predefined text button.* 2 *Pop-up list of predefined text items*

17.1 Add global items of predefined text

These items of predefined text are available for any canvas on your application computer. Follow these steps:

1. On the application computer, create a Shortcuts subfolder.

   - **Ubuntu application computers:** Create this subfolder below the ~/.mt canvus folder, where ~/ refers to the home folder of the *installation user*.

     If you installed MT Canvus while logged in as multi, the expanded path is: /home/multi/.mt-canvus/Shortcuts

   - **Windows application computers:** Create this subfolder below \mt-canvus in the *installation user's* profile. Using the APPDATA variable, the location is: %APPDATA%\mt-canvus\Shortcuts

     If you installed MT Canvus while logged as in multi, the expanded path is: C:\Users\multi\AppData\Roaming\mt-canvus\Shortcuts

     Note: *The installation user is the account that you used to install MT Canvus. You created this account in section 2.5.3.*

2. Using your preferred text editor, save one or more files of predefined text in the Shortcuts folder.

   MT Canvus supports three file formats. You can use any combination of file formats. Choose the combination that best suits the needs of your organization:

   - **Single named item:** This simple file contains a single item of predefined text. The filename is the *name* of the predefined text. This name appears in the pop-up list of predefined text. The content of the file is the text you want to insert.

     You can create any number of these files, each containing a separate item of predefined text. However, if you have multiple items of predefined text, you may find the following 'multiple item' file formats easier to maintain.

   - **Multiple unnamed items:** This file contains multiple items of predefined text. These items do *not* have names. The filename must start with an _ underscore character (_).

     Each line in the is a single item of predefined text. Each line appears exactly as written in the pop-up list of predefined text.

   - **Multiple named items:** This file contains multiple items of predefined text. These items *do* have names. The filename must have a .json extension and the file content must adhere to JSON syntax.

     Each entry in the file defines an item of predefined text and its name. These *names* appear in the pop-up list of predefined text.

     If your items of predefined text are lengthy or similar (such as variants of your corporate URL), you may find that short descriptive item *names* are easier to recognize in the pop-up list of predefined text items.

   See the example files in section 17.3.

3. After you create or edit a file of predefined text, you must restart MT Canvus to load the new file(s); see section 4.

17.2 Add predefined text to an individual canvas

These items of predefined text are available only for the designated canvas.

Follow these steps:

1. On the application computer, create a Shortcuts folder below the subfolder for the canvas you want.

   Each canvas has its own subfolder, identified by the canvas ID. Canvas IDs are automatically assigned by MT Canvus when you create a canvas. For example, 24857552374593616.

   - **Ubuntu application computers:** Canvas subfolders are located here: ~/.mt-canvus/Teams/3001/Canvases/<Canvas ID>

     Where ~/ refers to the home folder of the *installation user*. Using the example canvas ID above, the path to the Shortcuts folder is: /home/multi/.mt-canvus/Teams/3001/Canvases/24857552374593616/Shortcuts

     Tip: *To display the names and IDs of all canvases on the application computer, launch a terminal emulator and run this command:*
     `mt-canvus-unlock.py --verbose`

   - **Windows application computers:** Canvas subfolders are in the *installation user's* profile. Using the APPDATA variable, the canvas subfolders are installed here: %APPDATA%\mt-canvus\Teams\3001\Canvases\<Canvas ID>

     Using the example canvas ID above, the path to the Shortcuts folder is: C:\Users\multi\AppData\Roaming\mt-canvus\Teams\3001\Canvases\24857552374593616\Shortcuts

     Note: *The installation user is the account that you used to install MT Canvus. The examples above assume the installation user is 'multi'. You created this account in section 2.5.3.*

2. Using your preferred text editor, save one or more files of predefined text in the Shortcuts folder. See step 2 in section 17.1 for details.

3. Restart MT Canvus to load the new file(s); see section 4.

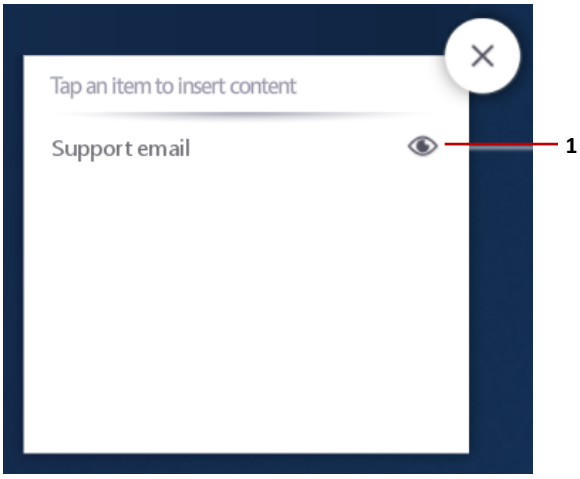
17.3 Examples

Consider three example files of predefined text (shortcuts) in the \Shortcuts folder:

- **File 1: Single item of predefined text**

  We recommend you use descriptive filenames. For example, support mail.
  The file contains a single item of predefined text:

```
support@unipraxis.com
```

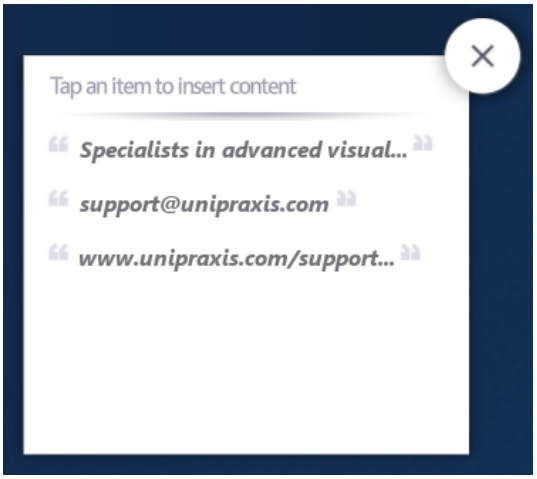


List of predefined text, as generated by the 'support mail' file.
1 *Tap the eye button to see the actual text that will be inserted.*

- **File 2: Unnamed items of predefined text**

  The filename must begin with an underscore character. For example, _shortcuts.
  The file contains *unnamed* items of predefined text:

```
Specialists in advanced visualization
support@unipraxis.com
www.unipraxis.com/support-services
```

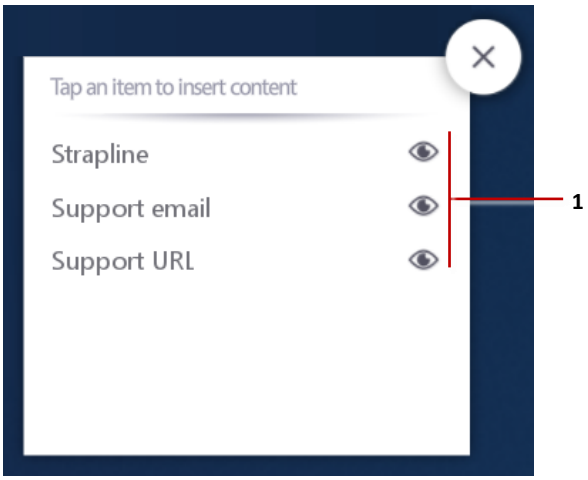


List of predefined text, as generated by the '_shortcuts' file

- **File 3: Named items of predefined text**

  The filename must have a .json extension. For example, shortcuts.json. The file contains *named* items of predefined text:

```
[
  {
    "name": "Strapline",
    "text": "Specialists in advanced visualization"
  },
  {
    "name": "Support email",
    "text": "support@unipraxis.com"
  },
  {
    "name": "Support URL",
    "text": "www.unipraxis.com/support-services "
  }
]
```



List of predefined text, as generated by the 'shortcuts.json' file.
1 *Tap the eye buttons to see the actual text that will be inserted.*

18 Set up an auxiliary computer

This section introduces the MT Canvus auxiliary computer and describes how to set up the auxiliary computer plus the accompanying configuration changes needed on the MT Canvus application computer.

Note: *Despite its formal-sounding name and detailed setup procedure, the auxiliary computer is not as daunting as it seems. In fact, the auxiliary computer is really a specialized version of an external computer set up for Remote Touch (see section 11).*

18.1 What is an auxiliary computer?

An auxiliary computer allows MT Canvus to support the following features that could not be supported through the application computer alone:

- **Support for secure USB memory sticks:** A key point of this feature is that it requires a folder on the auxiliary computer to be mounted into the file tree on the MT Canvus application computer. This requires new software and a bespoke logon account on the auxiliary computer, plus a new network share and new configuration settings on the application computer. For details, see section 19.
- **Support for Microsoft Office documents:** This feature requires a Windows auxiliary computer to run Microsoft Office. The auxiliary computer also provides an external display resource for Office documents, so eliminating the need for complex changes to your video wall's current display setup. For details, see section 20.
- **Support for other file types:** MT Canvus can support third party file types. You simply need to install the relevant program or file viewer on the auxiliary computer and then configure MT Canvus to recognize specific file extensions. For details, see section 21.

18.2 What is the MT Canvus Auxiliary PC software?

The 'MT Canvus Auxiliary PC' software includes three key components for managing MT Canvus operations on the auxiliary computer:

- **MTCanvusAgent.exe:** This component communicates with MT Canvus and performs operations initiated by MT Canvus. For example, MTCanvusAgent.exe will open Microsoft Office documents on the auxiliary computer. Also, if a user inserts a secure USB memory stick into the auxiliary computer, MTCanvusAgent.exe will launch an application to unlock and make the resulting USB drive accessible from the MT Canvus application computer.

  There are always two instances of MTCanvusAgent.exe running. This is because some operations must performed by the user currently logged in, and some can only be performed by an administrator:

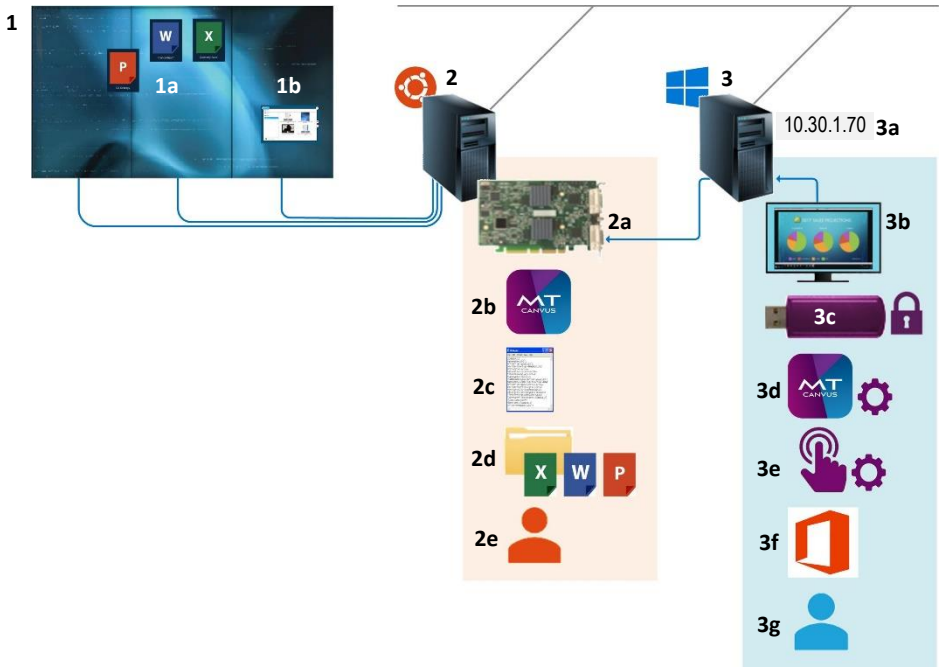
  - For administrator operations, an instance of MTCanvusAgent.exe runs as SYSTEM.
  - For other operations, an instance of MTCanvusAgent.exe runs as the logged in user. In practice, this user is multi, the non-administrator account that you will create in section 18.7.5.

MT Canvus Auxiliary PC software components, continued

- MTCanvusMonitor.exe ensures there is always an instance of MTCanvusAgent.exe running as the logged in user.
- MTCanvusService.exe ensures there is always an instance of MTCanvusAgent.exe running as SYSTEM.

18.3 Deployment architecture

The diagram below summarizes the deployment architecture for the auxiliary computer.



Auxiliary computer deployment architecture

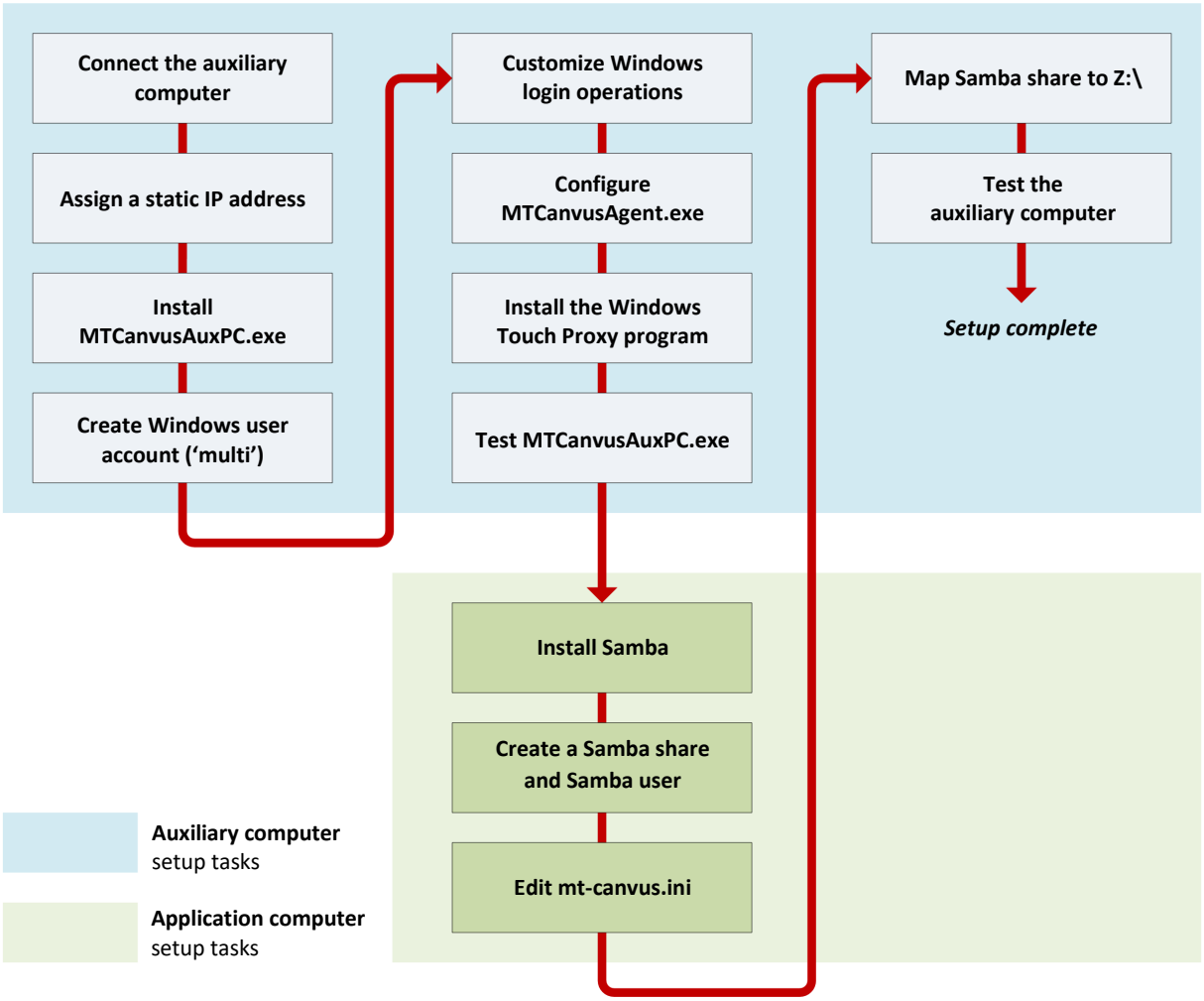
1 *Video wall.* 1a *Microsoft Office placeholder widgets.* 1b *Folder listing contents of secure USB memory stick* (3c).

2 *Application computer. This example shows a computer with an Ubuntu OS.*
2a *Video capture card. Receives video output from auxiliary computer.* 2b *MT Canvus.*
2c *mt-canvus.ini configuration file with auxiliary computer settings.* 2d *&* 2e *Samba share and Samba user. This share temporarily holds Office documents while they are being edited. (On Windows application computers, there is an equivalent shared network holder.)*

3 *Auxiliary computer with Windows OS.*
3a *Static IP address or reserved DHCP IP address.* 3b *Video output. A physical monitor is optional but recommended.* 3c *Secure USB memory stick.* 3d *MT Canvus Auxiliary PC software, includes MTCanvusAgent.exe.* 3e *MT Windows Touch Proxy software.* 3f *Microsoft Office.*
3g *Non-administrator user account, 'multi'.*

18.4 Setup procedure for the auxiliary computer

The flowchart shows the main setup tasks for the auxiliary computer. Note that setup tasks are required on both the auxiliary computer and application computer. Details for individual tasks are provided in section 18.7 through section 18.10.



Setup tasks for the auxiliary computer. Including associated tasks for application computer

18.5 Requirements for the auxiliary computer

Note the following requirements for the auxiliary computer.

18.5.1 Cable connections

The auxiliary computer needs network and video connections to the application computer plus, optionally, a monitor and USB extension cable:

- **Network connection:** An Ethernet cable connects the auxiliary computer to your office network. This allows communication between the auxiliary computer and application computer.
- **Video connection:** A video output on the auxiliary computer connects to a video input on the capture card (a PCIe card installed on the application computer). See also the recommendation below for a temporary monitor.

  Note: *The capture card and an associated driver are also required for the MT Canvus screen sharing feature. See section 10 for details.*
- **Monitor:** The auxiliary computer does not require a monitor. However, you may find it convenient to connect a temporary monitor to the video output while setting up the auxiliary computer.
- **USB extension cable:** If your users will be using secure USB memory sticks with MT Canvus (see section 19), we recommend that you attach a USB extension cable to the auxiliary computer for your users' convenience.

18.5.2 Operating system

The auxiliary computer must be running Windows 10 Professional.

Other operating systems are not currently supported.

18.5.3 Microsoft Office

The auxiliary computer must be running a supported version of Microsoft Office.

MT Canvus support for Microsoft Word, Excel and PowerPoint documents has been tested with Office 365.

Other versions of Microsoft Office have not been tested, although we expect recent versions such as Office 2016 to also work.

18.5.4 MultiTaction Cornerstone

The auxiliary computer must be running the latest Cornerstone runtime. This is available to download from https://cornerstone.multitouch.fi/download.

The Cornerstone runtime includes MultiTaction's WindowsTouchProxy program. This program enables the auxiliary computer to correctly interpret touch data received from the application computer when users interact with Microsoft Office documents on the video wall.

18.5.5 User account

You need an ordinary user account (ie, not an administrator) on the auxiliary computer. The following instructions assume that this account has the user name 'multi'. See section 18.7.5.

18.6 Requirements for the application computer

After you set up the auxiliary computer, you will need to configure some accompanying features on the MT Canvus application computer. Note the following requirements for the application computer:

- **MT Canvus:** To support auxiliary computer-based features, the application computer must be running MT Canvus 1.4.1 or later.
- **Samba:** *Required for Ubuntu application computers only.*

  MT Canvus uses Samba to share Office documents saved on the Linux application computer with Microsoft Office running on the Windows auxiliary computer.

  In technical terms, you use Samba to share a folder on the application computer containing Office documents. (Documents are temporarily moved to this shared folder while users are editing or viewing them on the video wall.) You then use Samba to authenticate the auxiliary computer when it connects to this shared folder.

  For Samba installation instructions, see section 18.8.1.

  From www.samba.org: *"Samba is an important component to seamlessly integrate Linux/Unix Servers and Desktops into Active Directory environments. It can function both as a domain controller or as a regular domain member."*
- **Remote Touch:** To support auxiliary computer-based features, Remote Touch must already be enabled on the application computer. For instructions, see section 11.

18.7 Configure the auxiliary computer

This section describes how to set up the auxiliary computer.

18.7.1 Confirm the software requirements for the auxiliary computer

Confirm that the auxiliary computer is running:

- Windows 10; see section 18.5.2.
- A supported version of Microsoft Office; see section 18.5.3.
- The latest Cornerstone runtime; see section 18.5.4.

18.7.2 Connect the auxiliary computer to the application computer

Set up network and video connections from the auxiliary computer to the application computer. For details, see the requirements in section 18.5.1.

18.7.3 Assign a static IP address or use DHCP reservation

The auxiliary computer requires a fixed, unchanging IP address.

To assign a static IP address, follow these steps:

1. Log on to the auxiliary computer as an administrator.
2. Assign a static IP address.

   Tip: *You need to edit the properties of the network connection. In Windows 10, open the Network and Sharing Center. Then click Change Adapter Settings and edit the properties of the Local Area Connection.*

Alternatively, you can use DHCP reservation. This feature in the DHCP server enables your DHCP administrator to reserve a specific IP address for the auxiliary computer.

You will reference this non-changing IP address (either a static address or a reserved DHCP address) in mt-canvus.ini; see step 2 of section 18.8.4.

18.7.4 Install the 'MT Canvus Auxiliary PC' software

Next, install the 'MT Canvus Auxiliary PC' software on the auxiliary computer. This software includes components for managing MT Canvus operations on the auxiliary computer; see section 18.2.

Follow these steps:

1. Obtain the MTCanvusAuxPC.exe installer from your MultiTaction representative.
2. Run the MTCanvusAuxPC.exe installer on the auxiliary computer.
3. When prompted by the installation wizard, specify the installation folder. By default, this software gets installed to C:\Program Files (x86)\MTCanvus Auxiliary PC.

When the installation is complete, MTCanvusMonitor.exe runs automatically on startup.

18.7.5 Create a Windows user account ('multi')

To allow seamless interaction with the auxiliary computer, MT Canvus requires that a user account is already logged in on the auxiliary computer. For security reasons, we recommend that this account is a non-administrative account. Follow these steps:

1. Create an ordinary user account (ie, not an administrator) on the auxiliary computer.
2. Specify the user name and password. You will add these credentials to mt-canvus.ini in section 18.8.4. Note also:
   - User name: We recommend you use multi. If you use a different user name, remember to reference the new credentials when you edit mt-canvus.ini.
   - Password: Choose any password, but be aware that you will need to include this password in plain text in mt-canvus.ini.

18.7.6 Customize Windows login operations

To prevent unwanted interruptions to MT Canvus operations, we strongly recommend that you configure Windows to skip the log-in screen when it boots up or wakes from sleep. That is, you need to prevent Windows from prompting for a password. We also recommend that you disable the 'double-click to open files' requirement.

1. Configure Windows to skip the log-in screen when the auxiliary computer boots up. To do this, configure the multi user account to automatically sign in:
   a. In Windows 10, sign in as an administrator.
   b. Open the Run command box.
      Tip: *Press the* ⊞ *Windows key + R.*
   c. Type netplwiz and click Enter to open the User Accounts dialog.
      Important! *You must open this dialog by running netplwiz. This dialog is not the same as the User Accounts screen in the Control Panel!*
   d. In the User Accounts dialog, select the multi user.
   e. *After selecting the multi user*, clear the check box labeled 'Users must enter a user name and password to use this computer'.
   f. Click Apply.
   g. In the resulting dialog, supply the password for the multi user.
2. Disable the log-in screen when the computer wakes from sleep:
   a. In Windows 10, sign in as the multi user account.
   b. Open the Power & Sleep page of the Settings applet.
      Tip: *Type 'power & sleep' in the Windows search box.*
   c. Go to the Sleep settings and set them to Never.
3. Finally, disable the 'double-click to open files' requirement. In File Explorer:
   a. Click the File menu.
   b. Click 'Change folder and search options'.
   c. In the Folder Options dialog, select the 'Single click to open an item' option.

18.7.7 Configure MTCanvusAgent.exe

Now you need to configure MTCanvusAgent.exe; see section 18.7.1. First, you can mask out the desktop background on the auxiliary computer. Then you must confirm that network access is enabled for this program. Follow these steps:

1. *(Applies only if you want to use secure USB memory sticks with MT Canvus)*
   If required, you can mask out the desktop background on the auxiliary computer when unlocking a secure USB memory stick. This ensures that only the password dialog is displayed on the canvas when the user inserts a secure USB memory stick into the auxiliary computer.

a. Edit the configuration.txt file as an administrator.

   To do this, type 'notepad' in the Windows search box. When the results display, right-click the Notepad app and choose Run as administrator. Then open configuration.txt from the Notepad file menu.

   By default, this file is installed to C:\Program Files (x86)\MTCanvus Auxiliary PC.

b. Edit the `ScaleX` and `ScaleY` values to apply vertical and horizontal scaling to the Windows desktop.

   These values must correspond to the scaling for the 'Change the size of text, apps and other items' setting in the Windows Display applet.

   Tip: *Type 'display settings' in the Windows search box.*

   For example, if this setting is 150%, set `ScaleX` and `ScaleY` to 1.5:

```
ScaleX=1.5
ScaleY=1.5
```

2. Confirm that network access is enabled for MTCanvusAgent.exe.

   MTCanvusAgent.exe must be able to communicate with the application computer, so you must verify that Windows Firewall is not denying MTCanvusAgent.exe access to the network.

   a. Manually run MTCanvusAgent.exe.
      By default, this file is installed to C:\Program Files (x86)\MTCanvus Auxiliary PC.

   b. If a network security dialog is displayed, select the appropriate option to enable network access for MTCanvusAgent.exe.

18.7.8 Install the Windows Touch Proxy program

MultiTaction's WindowsTouchProxy program enables the auxiliary computer to correctly interpret touch data received from the application computer when users interact with the video wall. To enable Remote Touch support for Microsoft Office documents, you must install WindowsTouchProxy on the auxiliary computer. This program is part of the MultiTaction Cornerstone runtime. Follow these steps:

1. Log on to the auxiliary computer as an administrator.
2. Download and install the latest Cornerstone runtime onto the auxiliary computer. You can download the runtime from:
   https://cornerstone.multitouch.fi/download
3. Run install.bat as an administrator from a command prompt.

   To do this, type 'cmd' in the Windows search box. When the results display, right-click the Command Prompt app and choose Run as administrator. Then run these commands from the command prompt:

```
cd C:\Cornerstone-<version>\Win7Driver
install.bat
```

   Where `<version>` is the Cornerstone version. For example:
   C:\Cornerstone-2.1.2\Win7Driver

4. Add a copy of config.txt to C:\Program Files (x86)\MTCanvus Auxiliary PC.

   Notes

   - *There is no space between 'MT' and 'Canvus' in MTCanvus Auxiliary PC!*
   - *Find a sample version of config.txt in C:\Cornerstone-<version>\data\Configs. Copy this sample version.*

5. Edit config.txt as an administrator.

   a. To do this, type 'notepad' in the Windows search box. When the results display, right-click the Notepad app and choose Run as administrator. Then open config.txt from the Notepad file menu. Find this file in:
   C:\Program Files (x86)\MTCanvus Auxiliary PC

   b. In config.txt, add a `NetBridge` block that will connect to the application computer:

```
NetBridge {
   host = "<application computer IP address>"
   port = "<remote touch port number>"
}
```

   Tip: *Config.txt was originally created in a Linux environment. To preserve the line breaks in config.txt on a Windows system, we recommend that you that edit this file in Notepad++ or a similar application.*

   - Where:
     - `host` is the IP address of the MT Canvus application computer.
     - `port` is the port number that the auxiliary computer listens on for instructions and touch data from the application computer. *This port number must match the* `remote-touch-port` *number specified in mt-canvus.ini on the application computer;* see *step 2 in section 18.8.4.*

   For example, if the application computer's IP address is 10.36.0.70 and the port number is 5020:

```
NetBridge {
   host = "10.36.0.70"
   port = "5020"
}
```

6. In Task Manager, confirm that WindowsTouchProxy.exe is running.

7. Finally, configure the WindowsTouchProxy program to run on startup:

   a. In Windows Explorer, browse to C:\Cornerstone-<version>\bin.

   b. Create a shortcut to WindowsTouchProxy.exe on the desktop.

   c. Edit the shortcut properties

   d. Change the shortcut's Target in the config.txt file you edited in step 5. The full entry in the Target field will be:
   C:\Cornerstone-<version>\bin\WindowsTouchProxy.exe
   --config "C:\Program Files (x86)\MTCanvus Auxiliary PC\config.txt"

   Important! *Take care when specifying the target. There are double hyphens in '--config' and no space between 'MT' and 'Canvus' in MTCanvus Auxiliary PC!*

e. Open the Startup folder in Windows Explorer.

   Tip: *Press the* ⊞ *Windows key + R to open the Run command box. Then run this command to open the Startup folder:*
   shell:common startup

f. Drag the new shortcut to WindowsTouchProxy.exe from the desktop into the Startup folder.

18.7.9 Test the 'MT Canvus Auxiliary PC' software

Follow these steps:

1. Restart the auxiliary computer.
2. Confirm that you are automatically logged in as the multi user, *with no input or intervention required from you.*
3. In Task Manager, confirm the MTCanvusService service is running.
4. Do one of the following:
   - Log out of Windows. Then log back in as an administrator.
   - Quit Task Manager. Then open it again as an administrator.
5. In Task Manager, confirm that two instances of the MTCanvusAgent.exe process are running, one as multi and one as SYSTEM.
   a. End the MTCanvusAgent.exe 'multi' process.
      Then confirm that it starts again.
   b. End the MTCanvusAgent.exe 'SYSTEM' process.
      Confirm that this stops both the 'multi' and 'SYSTEM' instances.
      Then confirm that both instances start again.

18.7.10 Next steps

The auxiliary computer setup is almost complete. However, you cannot complete the final step (mapping a network share to a drive letter; see section 18.9) until you have set up the MT Canvus application computer; continue to section 18.8.

18.8 Configure the application computer

This section describes how to set up the application computer to work with the auxiliary computer.

18.8.1 Create a 'canvas' shared folder

(Applicable to Windows application computers only)

Microsoft Office documents stored in MT Canvus are temporarily moved to a shared network folder while they are being edited by users. MT Canvus will need to access this network share. You must therefore set up a network share on the application computer.

In Windows 10, follow these steps:

1. Create a dedicated folder for MT Canvus to use. For example:
   C:\Program Files (x86)\MTCanvus Auxiliary PC\canvas
2. In File Explorer, right-click this folder and click Properties.
3. In the Properties dialog, go to the Sharing tab and click Advanced Sharing.
4. Select the *Share this folder* checkbox and click the Permissions button.
5. In the Permissions dialog, remove any existing users or groups (such as Everyone) and click the Add button.
6. In the Select Users or Groups dialog, add the Authenticated Users group.
   Tip: Type 'authenticated users' into the object names box and click Check Names.
7. Click OK to return to the Permissions dialog.
8. Finally, grant Full Control to the Authenticated Users group. This will ensure that MT Canvus has the necessary permissions to access this folder.

You will map a drive to this network share on the auxiliary computer; see section 18.9.

18.8.2 Install Samba

(Applicable to Ubuntu application computers only)

MT Canvus uses Samba to share Office documents saved on the Linux application computer with Microsoft Office running on the Windows auxiliary computer.

Run this command to check whether Samba is installed on the application computer:

```
$ sudo smbstatus
```

If Samba is not installed, run:

```
$ sudo apt-get install samba
```

18.8.3 Create a 'canvas' network share on the Samba server

(Applicable to Ubuntu application computers only)

Microsoft Office documents stored in MT Canvus are temporarily moved to a shared network folder while they being viewed by users. This network share is provided by the local Samba server. MT Canvus will need to access this network share.

Follow these steps:

1. Do one of the following:
   - Launch a terminal emulator.
   - Use SSH to connect remotely to the application computer. For details, contact MultiTaction Support; see section 1.1.
2. Create a folder to temporarily hold Office documents while they are being edited. This folder will be shared with the auxiliary computer. We suggest: /home/multi/.mt-canvus-share
3. Create a canvas shared network folder on the Samba server. MT Canvus will need access to the Samba server when reading and writing to these documents.
   a. Edit the smb.conf file. Find this file at:
      $ sudo vim /etc/samba/smb.conf
   b. Add the following lines *to the end* of smb.conf:
      ```
      [canvus]
      comment = Canvus shared files
      path = /home/multi/.mt-canvus-share
      browsable = yes
      guest ok = no
      read only = yes
      ```
   Where:
   - `[canvas]` defines the name of the network share provided by the Samba server. You will map a drive on the auxiliary computer to this share in section 18.9.
   - `comment` defines a description of the network share. You will see this description in Windows Explorer on the auxiliary computer when you map a drive to this share; see section 18.9.
   - `path` defines the path to the shared folder that you created in step 1.
4. Now create a Samba user account that MT Canvus can use to access the canvas shared network folder on the Samba server.

   MT Canvus runs as the Ubuntu user 'multi'. This user was created automatically when MT Canvus was installed on the application computer. Now you need to create a Samba account and map the Ubuntu user to the new Samba user.
   a. Run the following command to create a new Samba user 'multi':
      `$ sudo smbpasswd -a multi`

b. When prompted, enter a password for the new Samba multi user.

Note: *You will need to supply the user name and password for this Samba user when you map a drive on the auxiliary computer to the* canvas *network share in section 18.9.*

c. Prepare to edit the Samba user list, smbusers, using your preferred text editor. For example:

```
$ sudo vim /etc/samba/smbusers
```

Note: *You will need to create this file if it does not exist.*

d. Map the Samba multi user to the Ubuntu multi user in the smbusers list. In effect, this mapping allows the Ubuntu user to utilize the Samba user account to access the shared folder on the Samba server.

User mappings use this format:

```
<Ubuntu user> = "<Samba user>"
```

Therefore, add this line to smbusers:

```
multi = "multi"
```

5. Restart Samba:

```
$ sudo service smbd restart
```

18.8.4 Add auxiliary computer settings to mt-canvas.ini

Follow these steps:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Edit the following settings in the `[auxiliary-pc]` section.

(Manually add this section and settings to mt-canvus.ini if they do not already exist.)

```
[auxiliary-pc]
username=multi
password=<password>
host=<IP address of auxiliary computer>
port=8080
remote-touch-port=5020
primary=USB
secondary=Encrypted
remote-source=<capture card video input>
canvus-mapped-drive=z:
desktop-mode-exts=<file extensions>
```

Where

- `username` and `password` specify the credentials for the multi user account that you created on the auxiliary computer in section 18.7.5.
- `host` specifies the IP address of the auxiliary computer. You assigned a static IP address (or used DHCP reservation) in section 18.7.3.

Settings descriptions continue on next page

- `port` is the port number that MT Canvus uses to communicate with the auxiliary computer. By default, MT Canvus uses port 8080 for this communication, but you can specify a different port if 8080 is already being used by a different process.

  If you specify a different port, you must also update configuration.txt on the auxiliary computer. For example, if you specify port 8088 in mt-canvus.ini, ensure that configuration.txt includes these lines:

  ```
  ;Port for user mode process
  Port=8088
  ```

  Note: *Find configuration.txt in C:\Program Files (x86)\MTCanvus Auxiliary PC on the auxiliary computer. This folder also contains config.txt. Do not confuse the two files!*

- `remote-touch-port` specifies the port number used by the application computer for Remote Touch communication ie, sending touch data to the auxiliary computer. By default, the application computer listens on port 5020.

  This port number must match the port specified in config.txt on the auxiliary computer; see step 5 in section 18.7.8.

  Note: *Find config.txt in C:\Program Files (x86)\MTCanvus Auxiliary PC on the auxiliary computer. This folder also contains configuration.txt. Do not confuse the two files!*

- `primary` sets the display name of any *non-secure* USB memory stick inserted into the auxiliary computer. This name appears in the USB menu in MT Canvus.

- `secondary` sets the display name of any *secure* USB memory stick inserted into the auxiliary computer. This name appears in the USB menu in MT Canvus.

- `remote-source` specifies the video input on the capture card that the auxiliary computer is connected to.

  Use the supplied mt-video-check utility to check the video input identifier. Enter the identifier exactly as listed by mt-video-check. For example, if you are using the Datapath VisionSC HD4+ capture card, use the following identifiers:

  Ubuntu application computers

  ```
  remote-source=rgb133 <0-0>
  ```

  Windows application computers

  ```
  remote-source="video=Datapath VisionSC-HD4+ Video 01:audio=Datapath
  VisionSC-HD4+ Audio Digital 01"
  ```

  Important! *You must enter the video input identifier correctly, including all spaces and punctuation! To discover the correct identifier, see section 18.11.1.*

- `canvus-mapped-drive` specifies Z: as the drive that the canvus share maps to. You will set up this mapping in section 18.9.

- `desktop-mode-exts` specifies a comma-separated list of file extensions that you want MT Canvus to recognize as supported file types. For setup details, see section 21.

  For example, if you want MT Canvus to recognize Microsoft Visio files, add:

  ```
  desktop-mode-exts=vsd,vsdx
  ```

3. *Applies to Windows computers only. For Ubuntu computers, go to step 4.*

   Note: *Skip this step if you have already configured a* `[remote-mount]` *section in mt-canvus.ini when setting up Remote Codice in section 15.5.6.*

   Now enable a connection from the application computer to the encrypted folders of any secure USB memory stick attached to the auxiliary computer.

   Add a `[remote-mount]` section with the following settings:

   ```
   [remote-mount]
   daemon-port=0
   mount-folder=<symlink folder>
   ```

   Where:

   - `daemon-port` specifies a null value. No mount operation is required on Windows application computers. You must therefore set `daemon-port` to zero to prevent MT Canvus from attempting to communicate with a (non-existent) mount daemon.
   - `mount-folder` specifies a folder that will contain a symbolic link (symlink) to the encrypted folders of any secure USB memory stick attached to the auxiliary computer. You can choose any folder on the application computer, but we recommend you use %APPDATA%/mt-canvus-mount.

     For example, if the MT Canvus installation user is multi, add:

     ```
     mount-folder=C:\\Users\\multi\\AppData\\Roaming\\mt-canvus-mount
     ```

     Important! *Verify the folder exists on the application computer!*

     Notes

     - *Single backslashes are not supported in mt-canvus.ini on Windows computers. You must use forward slashes or double backslashes; see section 5.2.5.*
     - *Because this method requires MT Canvus to create symbolic links, the MT Canvus installation user must have the 'Create symbolic links' privilege; see section 2.5.3.*

4. *Applies to Ubuntu computers only. For Windows computers, see step 3.*

   Note: *Skip this step if you have already configured a mount operation. That is, skip this step if you added a* `[remote-mount]` *section to mt-canvus.ini when setting up Remote Codice in section 15.5.6.*

   Now configure the mount operation to attach the encrypted folders on the USB memory stick to the folder tree on the local application computer.

   Add a `[remote-mount]` section with the following settings:

   ```
   [remote-mount]
   daemon-port=8081
   mount-options=<options, including Samba version>
   mount-folder=/mnt
   ```

   Where

   - `daemon-port` specifies the port number that MT Canvus uses to communicate with the daemon that manages the mount operation. By default, MT Canvus listens on port 8081, but you can specify a different port if 8081 is already being used by a different process.

- `mount-options` specifies a comma-separated list of options for the Linux `mount` command. This list includes the Samba version. Add other options if required. For example:

  ```
  mount-options=vers=2.0
  ```

  (MT Canvus uses a daemon to connect to remote network folders. In turn, this daemon runs the `mount` command to attach the encrypted USB drive to the local folder tree.)

- `mount-folder` specifies the *mount folder*. This is the folder on the application computer that will contain the mount point to the encrypted USB drive. By default, the mount folder is /mnt. This folder already exists on Ubuntu computers. If you specify a different mount folder, verify that the new mount folder exists!

5. Finally, specify the shared folder on the application computer that temporarily hosts the Microsoft Office documents while a user is editing them on the video wall.

   Still in mt-canvus.ini, add a `[local-share]` section with these settings:

   ```
   [local-share]
   shared-folder=/home/multi/.mt-canvus-share
   share-name=canvus
   ```

   Where

   - `shared-folder` is the shared folder on the *application computer* that the *auxiliary computer* connects to.
   - `share-name` is the name of the network share.

6. Restart MT Canvus; see section 4.

18.8.5 Next steps

The setup for the application computer is now complete. You can now perform the final setup task for the auxiliary computer; continue to section 18.9.

18.9 Final setup task for auxiliary computer: mapping the network share

Now that you have set up the application computer, you can complete the setup for the auxiliary computer. Specifically, you must map the canvus network share on the *application computer* (see section 18.8.1) to a drive letter on the *auxiliary computer*.

Note: *Mapping the canvus share to a drive letter ensures the required logon credentials are cached. This ensures that Microsoft Office on the auxiliary computer can always access Office documents on the application computer without needing to resubmit logon credentials.*

Follow these steps:

1. Log on to the auxiliary computer as the multi user.
2. In File Explorer, expand the Network branch and connect to the MT Canvus application computer.
3. Select the canvus share on the application computer. You will need to supply the correct user credentials.

   Ubuntu application computers: Enter the credentials for the Samba user that you created in step 4 of section 18.8.3.

   Windows application computers: Enter the credentials of any authenticated user. You set up the permissions for this shared folder in section 18.8.1.
4. Map the canvus share to a network drive. In the Map Network Drive dialog:
   a. Choose a drive letter. We recommend you assign this share to the Z: drive.
      If Z: is already being used, you can specify a different drive. Remember to also update the `canvus-mapped-drive` setting in mt-canvus.ini; see step 2 of section 18.8.4.
   b. Select the 'Reconnect at sign-in' check box. This ensures that the multi user is always able to connect to the canvus share.
   c. Select the 'Connect using different credentials' check box.
   d. Click Finish.
   e. When the network credentials dialog displays, enter the name and password for the Samba user you created in step 4 of section 18.8.1. (The user name is multi.)
5. Log on to the application computer and edit mt-canvus.ini; see section 5.2.
   a. Go to the `[auxiliary-pc]` section.
   b. Assign the `canvus-mapped-drive` setting to the drive you chose in step 4. For example:

```
[auxiliary-pc]
canvus-mapped-drive=z:
```

This completes the setup for the auxiliary computer.

18.10 Test the auxiliary computer setup

Now you need to test the auxiliary computer setup. Specifically, you need to confirm that screen touches on the video wall are replicated to the auxiliary computer.

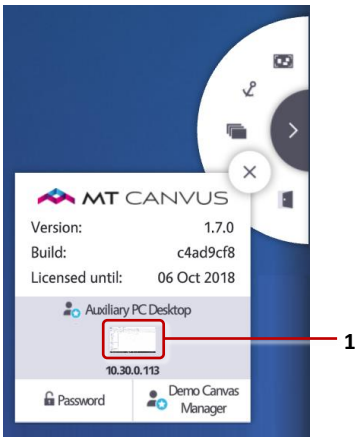
Follow these steps:

1. Confirm that a video output on the auxiliary computer is connected to a video input on the capture card (a PCIe card installed on the application computer).

   Note: *This applies particularly if you attached a temporary monitor to the video output while setting up the auxiliary computer!*

2. Restart the auxiliary computer.
3. In MT Canvus, tap the About button in the System menu.

   The auxiliary computer appears as the Auxiliary PC Desktop thumbnail in the About dialog:



About dialog. 1 *Auxiliary PC Desktop thumbnail.*

4. Tap the Auxiliary PC Desktop thumbnail to open the Auxiliary PC widget.

   The Auxiliary PC widget shows the desktop of the auxiliary computer.

5. Pin the Auxiliary PC widget. This ensures that touch data is transmitted to the auxiliary computer. See the example screenshot in section 11.7.
6. Wait for the Remote Control Info button to turn blue, confirming that Remote Touch is enabled on the auxiliary computer. This can take up to a minute. See a screenshot of this button in section 11.7.

Remote Control Info button

7. In the Auxiliary PC widget, tap and hold the taskbar of the auxiliary computer to display the Windows 10 shortcut menu.

   Note: *'Tap and hold' is a Windows Touch feature equivalent to right-clicking with a mouse.*

8. Confirm that the Shortcut menu displays on the auxiliary computer desktop.

18.11 Troubleshooting

18.11.1 How to connect the auxiliary computer to the correct video input on the capture card

When you edit mt-canvus.ini on the application computer, you must set the `remote source` setting to the video input on the capture card that connects to the auxiliary computer.

However, the video inputs on the capture card are not labelled. You must therefore run a utility to discover the video input identifiers, and then assign `remote source` to the identifier of the input connected to the auxiliary computer. Finally, you physically connect a video cable from the auxiliary computer into this video input. You may need to use trial and error to discover the correct input.

Recommended Datapath video capture cards
1 *VisionSC-HD4+ with quad DVI inputs*
2 *VisionHD4 with quad channel DVI-I inputs*
3 *VisionAV-HD with dual channel DVI-I inputs*

Follow these steps:

1. Connect the auxiliary computer to any video input on the capture card.
2. Discover the list of available video inputs:
   - **Ubuntu application computers:** Run mt-video-check.py to list the available video inputs on the capture card. Find mt-video-check.py in: /opt/mt-canvus-<version>/bin.
   - **Windows application computers:** Run mt-video-check.exe to list the available video inputs on the capture card. Find mt-video-check.exe in: C:\Program Files\MT Canvus\bin.
3. Specify the video input connected to the auxiliary computer.

   Follow these steps:

   a. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.

b. In the `[auxiliary-pc]` section of mt-canvus.ini on the application computer, assign `remote-source` to the video input connected to the auxiliary computer.

Important! *Enter the identifier of the video input exactly as listed by mt-video-check, including all spaces and punctuation!*

For example, if you are using the recommended Datapath VisionSC-HD4+ capture card (see section 10.2), add these identifiers:

- **Ubuntu application computers**

```
[auxiliary-pc]
remote-source=rgb133 <0-0>
```

You may need to amend this identifier if—when you get to step 6—you are unable to see the auxiliary computer thumbnail in the About dialog.

Unfortunately, mt-video-check can identify video inputs on the capture card but it cannot show which input is connected to the auxiliary computer. Therefore, you may need to repeat this step, but replacing the "`<0-0>`" input with one of the other input identifiers returned by mt-video-check. For example:

```
remote-source=rgb133 <0-1>
```

- **Windows application computers**

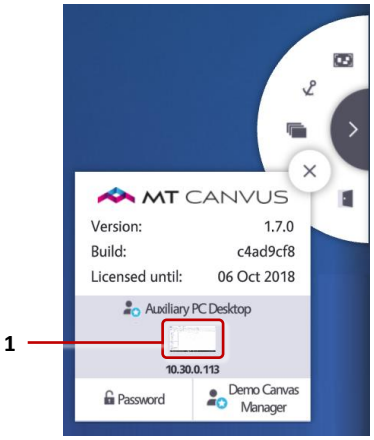
```
[auxiliary-pc]
remote-source="video=Datapath VisionSC-HD4+ Video 01:audio=Datapath
VisionSC-HD4+ Audio Digital 01"
```

4. Restart MT Canvus on the application computer; see section 4.

   Now check which video input the auxiliary computer is currently connected to; continue to step 5.

5. In MT Canvus, tap the About button in the System menu.

   Any video source currently connected to the first video input on the capture card appears as the Auxiliary PC Desktop thumbnail in the About dialog:



About dialog. **1** *Auxiliary PC Desktop thumbnail. This thumbnail shows the video source connected to the first video input on the capture card.*

6. Refer to the thumbnail to determine which source is currently connected to the first video input on the capture card.
   a. If the thumbnail does not show the auxiliary computer's desktop, swap the video cables on the capture card until the thumbnail does show the auxiliary computer.
   b. *On Ubuntu application computers only.* If the thumbnail still does not show the auxiliary computer's desktop after swapping the video cables on the capture card, return to step 3 and try the alternate video input identifier.
7. Restart the application computer; see section 4.
8. In MT Canvus, tap the About button in the System menu and confirm that the Auxiliary PC Desktop thumbnail is now showing the auxiliary computer's desktop.

18.11.2 How to disable pop-ups when secure USB memory sticks are inserted

If you need to disable Windows pop-up messages when users insert a secure USB memory stick into the auxiliary computer, you can disable the relevant AutoRun feature.

Follow these steps:

1. As an administrator, open the Registry Editor.
2. Go to the follow registry key:
   HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Policies\Explorer
   If this key does not exist, create it.
3. In the right-hand pane, create a new DWORD value NoDriveTypeAutorun.
4. Set the NoDriveTypeAutorun value to 4.
   Where '4' disables AutoRun for removable drives.
5. Close the Registry Editor and restart the auxiliary computer.

More information can be found at www.windows10update.com/2015/05/windows-10-tutorials-85-how-to-disable-the-autorun-feature/

18.11.3 Which port numbers must I configure?

When setting up an auxiliary computer, you need to specify several port numbers, in different files on various computers! This section clarifies the port requirements.

1. **Port for communication with auxiliary computer**

   Purpose: Used by application computer for communication with the auxiliary computer. This port number must match port 2.

   Setup instructions: Section 18.8.4, step 0.

   Default port: 8080

   Location: Find this `port` setting in the `[auxiliary-pc]` section of mt-canvus.ini on the application computer:

   ```
   [auxiliary-pc]
   port=8080
   ```

2. **Port for communication with application computer**

   Purpose: Used by auxiliary computer for communication with the application computer. This port number must match port 1.

   Setup instructions: Section 18.8.4, step 0.

   Default port: 8080

   Location: Find this `Port` setting in configuration.txt on the auxiliary computer:

   ```
   ; Port for user mode process
   Port=8080
   ```

3. **Port for communication with daemon that manages mount operations**

   Purpose: *On Ubuntu application computers only.* This is the port that MT Canvus uses to communicate with the daemon that manages the mount operation. Two MT Canvus features require mount operations:

   - **Storing personal items on a network share (Remote Codice):** This port is used on each application computer to identify the central Codice server and configure the operation to mount the codice network share. *(This port is not part of the auxiliary computer setup, but is included here for completeness.)*
   - **Support for encrypted USB memory sticks:** This port is used in mount operations to attach encrypted folders on a USB memory stick to the folder tree on the application computer.

   Setup instructions:

   - To support encrypted USB memory sticks, see section 18.8.4, step 4.
   - To set up Remote Codice, see section 15.5.6.

   Default port: 8081

   Location: Find the `daemon-port` setting in the `[remote-mount]` section of mt-canvus.ini on the application computer or, for Remote Codice, on each local application computer:

   ```
   [remote-mount]
   daemon-port=8081
   ```

4. **Port for mail submission on SMTP server**

   Purpose: Specifies the TCP port for mail submission. *(This port is not part of the auxiliary computer setup, but is included here for completeness.)*

   Setup instructions: Section 13.1.

   Default port: Typically, you use ports 25, 465, or 587:
   - 25 is used for unsecure connections.
   - 465 is used for SSL connections.
   - 587 is the default mail submission port. This port is typically used when the mail server is set up for TLS encryption.

   Location: Find the `port` setting in the `[smtp]` section of mt-canvus.ini on the application computer:

```
[smtp]
port=587
```

5. **Port for Remote Touch communication with the auxiliary computer**

   Purpose: Specifies the port number used by the application computer for Remote Touch communication with the auxiliary computer.

   Setup instructions: See section 18.8.4, , step 0.

   Default port: 5020.

   Location: Find the `port` setting in the `[remote-touch]` section of mt-canvus.ini on the application computer:

```
[auxiliary-pc]
remote-touch-port=5020
```

6. **Port for Remote Touch communication with screen-sharing devices**

   Purpose: Specifies the initial port number used by the application computer for Remote Touch communication with screen-sharing devices. *(This port is not part of the auxiliary computer setup, but is included here for completeness.)*

   Setup instructions: Section 11.1.

   Default port: 5010. *Note that Remote Touch uses a different port for each screen-sharing computer. For each additional computer, MT Canvus increments the port number by 1 and assigns that port to the additional computer. For example, if there are two computers sharing their screens, the second screen-sharing instance is assigned to port 5011.*

   Location: Find the `port` setting in the `[remote-touch]` section of mt-canvus.ini on the application computer:

```
[remote-touch]
port=5010
```

7. **Port for Remote Touch communication with application computer**

   Purpose: Specifies the Remote Touch port used by the screen-sharing computers or the auxiliary computer.

   - For screen-sharing computers, this port must match port 6 (or the incremented port number assigned to this device).
   - For the auxiliary computer, this port must match port 5.

   Setup instructions:

   - For each screen-sharing computer, you must discover this port number in the Remote Control Info message box in MT Canvus; see section 11.5. You specify the discovered port number in section 11.6.3.
   - For the auxiliary computer, see section 18.7.8, step 5.

   Default port: 5010. *But see the note for port 6.*

   Location: Find the `port` setting in the `NetBridge` block of config.txt on each screen-sharing computer or on the auxiliary computer:

```
NetBridge {
  host = "10.36.0.70"
  port = "5010"}
```

19 Support for secure USB memory sticks

MT Canvus allows users to import images, videos and PDFs onto their canvas from a USB memory stick or similar device. Users can also export items onto the USB memory stick.

MT Canvus also supports secure USB memory sticks that use hardware encryption. This feature requires an auxiliary computer; you must set up the auxiliary computer as described in section 18 before you can use secure USB memory sticks with MT Canvus.

19.1 How to import files from a secure USB memory stick

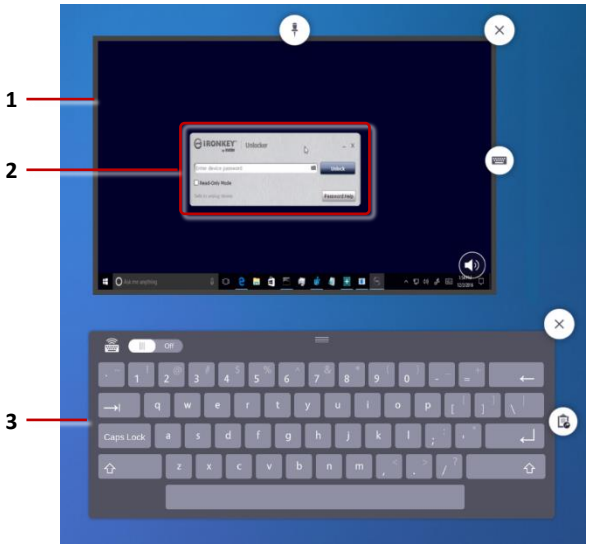
Follow these steps:

1. Start MT Canvus.
2. Attach your secure USB memory stick to the *auxiliary computer*.

   Tip: *The auxiliary computer may not be conveniently positioned for users on the video wall. For this reason, we recommend that you attach a USB extension cable to the auxiliary computer*.
3. MT Canvus detects that the USB memory stick is encrypted and displays a Shared Screen widget for the auxiliary computer plus an on-screen keyboard.

   The Shared Screen widget will be displaying the unlock dialog for the USB memory stick. (Note that this dialog is proprietary and its design will vary according to the manufacturer of the USB memory stick.)
4. Type the password for the USB memory stick directly into the unlock dialog.

   Tip: *The Shared Screen widget and unlock dialog already have focus, so you can start typing immediately. You do not need to tap the widget to select it. Also, you do not need to pin the widget.*



1 *Shared screen widget, showing the auxiliary computer.* 2 *Unlock dialog for secure USB memory stick.* 3 *On-screen keyboard.*

5. In MT Canvus, open the USB menu.
6. Tap the secure USB memory stick. By default, this USB stick is labeled 'Encrypted'.

   Tip: *This label is defined by the* `primary` *setting in mt-canvus.ini; section 18.8.4.*

USB menu. **1** *Secure USB memory stick attached to auxiliary computer*

7. When the USB folder opens, drag items from the USB memory stick onto the canvas or into the main Files folder or your personal items folder.

   Note that items are *copied*, not *moved*.

19.2 How to export files to a secure USB memory stick

Follow these steps:

1. Follow steps 1 to 3 in section 19.1.
2. When the USB folder opens, drag items into the USB folder from the canvas, main Files folder or your personal items folder.
3. Detach the secure USB memory stick from the auxiliary computer.

20 Support for Microsoft Office documents

MT Canvus supports Microsoft Office documents. This is feature is designed primarily for presentation purposes.

This feature requires an auxiliary computer; you must set up the auxiliary computer as described in section 18 before you can view Microsoft Office documents saved in MT Canvus.

Shared screen widget, displaying example Microsoft PowerPoint presentation

20.1 How does this feature differ from using remote touch?

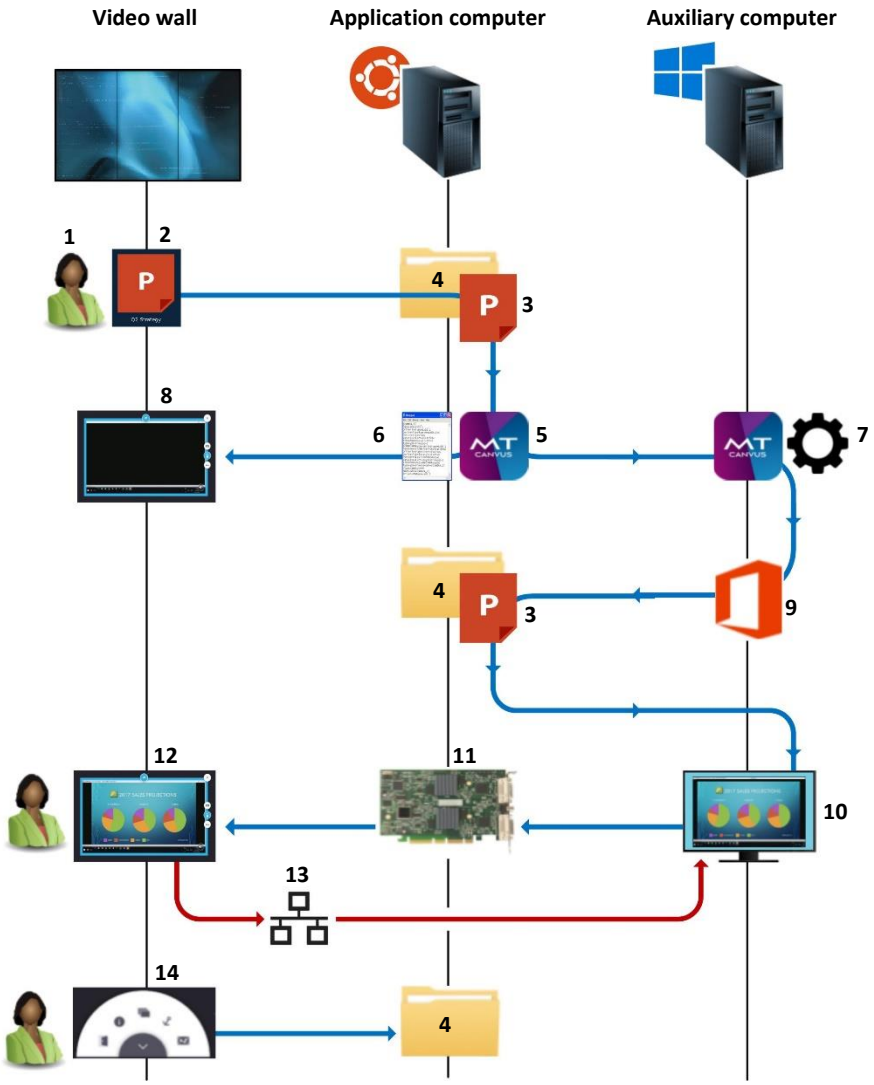
How does the 'Support for Microsoft Office documents' feature differ from simply using remote touch to update a document on your video wall?

The remote touch feature allows touch operation of applications running on Windows computers that are sharing their screen with MT Canvus (see section 11). For example, a user could open an Excel spreadsheet on her Windows laptop and share her screen with MT Canvus. She could then use hand gestures to update the spreadsheet while it is displayed on the video wall.

However, this remote touch scenario differs from the 'Support for Microsoft Office documents' feature in one key respect. In the remote touch scenario, the spreadsheet is saved on the user's laptop. If the user is not sharing her laptop screen with MT Canvus, the spreadsheet is not available to other users. Conversely, the 'Support for Microsoft Office documents' feature allows users to save Office documents in the MT Canvus file system. For example, if the spreadsheet is saved on a canvas, it is available to anyone using that canvas.

20.2 What happens when an Office document is opened?

The diagram below summarizes the sequence of operations when a user opens a Microsoft Office document in MT Canvus.



Sequence diagram for an Office document opened in MT Canvus

A user (1) taps an Office placeholder widget (2) to open the document (in this example, a .pptx file). The underlying file (3) is temporarily moved to a shared folder (4) on the application computer.

MT Canvus (5) uses details in mt-canvus.ini (6) to notify MTCanvusAgent.exe on the auxiliary computer (7) about the shared Office document. MT Canvus also sets up screen sharing for the auxiliary computer (8).

Using the local version of Microsoft Office (9), MTCanvusAgent.exe opens the shared Office document on the auxiliary computer (10).

Video output of this Office document is sent to a video capture card (11) on the application computer. MT Canvus then shares the auxiliary computer's screen on the video wall. From the user's viewpoint, the Office document is now open on the video wall (12).

Remote Touch data is transmitted over the office network from the video wall back to the auxiliary computer (13).

The Office document remains in the shared folder until the user closes the canvas (14). The document is then removed from the shared folder (15).

20.3 How to open an Office document in MT Canvas

You cannot create an Office document in MT Canvus. You must import an existing document from a USB memory stick or download a document from web pages that have a download capability, such as Google Drive or Dropbox.

Follow these steps:

1. Start MT Canvus.
2. If you have already imported the Office document onto your canvas, go to step 4.
3. If you are importing an Office document into MT Canvus for the first time:

   Downloading from a web page:

   a. Download the document, using the web page's own download method.

      For example, in Google Drive you tap and hold the item. Then tap Download in the pop up menu.

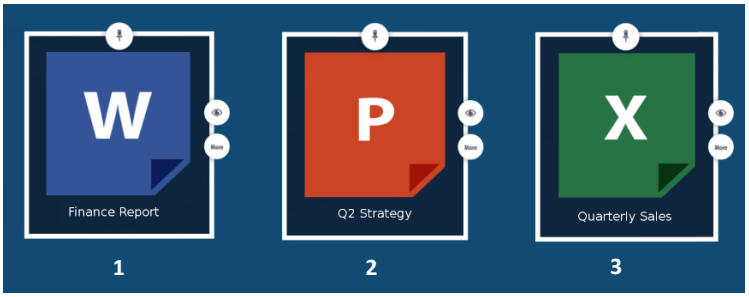
      Tip: *In MT Canvus, a 'long press' (tap and hold) is equivalent to right-clicking with a mouse.*

   b. The document is saved to the Downloads folder in the Files widget. Drag the *placeholder widget* for the Office document onto the canvas.

   Importing from a USB memory stick:

   a. Import the document from a USB memory stick; see the *MT Canvus User Manual* for details.

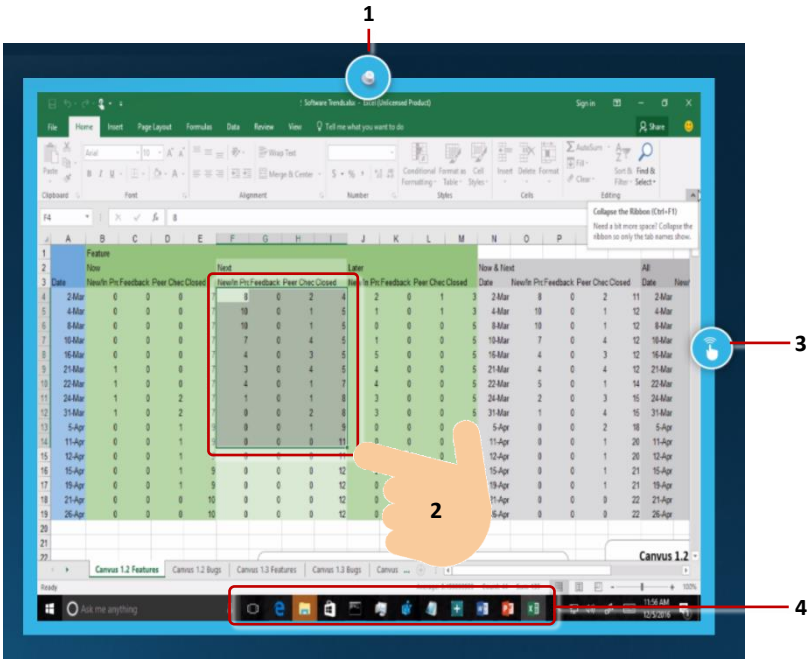
   b. When the USB folder opens, drag the *placeholder widget* for the Office document onto the canvas.



Placeholder widgets for Microsoft Office documents. 1 *Word document.* 2 *PowerPoint presentation.* 3 *Excel spreadsheet.*

4. Tap the placeholder widget to open the Office document in a *shared screen* widget.

   Note: *The shared screen widget is displaying the screen of the auxiliary computer.*



Shared screen widget, displaying example Microsoft Excel spreadsheet

1 *Pin the widget.* **2** *Use your finger to highlight cells.* **3** *Remote Touch button.*

4 *Windows taskbar. The taskbar icons can help with troubleshooting if you experience issues when opening Office documents on your video wall.*

5. Important! *You must pin the shared screen widget before you can start browsing the document or using the Microsoft Office menus and toolbars.*

   a. Tap the  Pin button.

   b. The white Pin button changes to a blue  Pinned button.

6. You can now browse the Office document. For example, you can page through the slides in a PowerPoint presentation or select cells in an Excel spreadsheet.

7. *(Optional)* After closing the Office document, you can save the document's placeholder widget in your Personal Items widget.

   Note: *You cannot save placeholder widgets for Office documents in the Files widget.*

20.4 Save changes to an Office document

MT Canvus support for Office documents is intended primarily for presentation purposes. By default, changes to Office documents are not saved. For example, if you make changes to an Excel spreadsheet saved on your canvas, these changes are discarded when you close the canvas or end the MT Canvus session.

However, you *can* save changes to an Office document by using the Office application's Save As menu command and saving a copy of the updated document to a USB memory stick attached to the auxiliary computer.

20.5 Troubleshoot opening an Office document

You can only have one Office document open in MT Canvus at any time. If an Office document is already open in the shared screen widget when you open a second Office document, the second document displays in front of the first document.

However, issues can sometimes occur when switching between Office documents in MT Canvus. For example, if you try to open a PowerPoint presentation while an Excel spreadsheet is open, it may appear that MT Canvus has incorrectly reopened the spreadsheet in the shared screen widget.

This issue is usually caused by incorrect application switching on the auxiliary computer. If you examine the taskbar icons in the shared screen widget, you can normally tap the icon for the application you want (in this example, PowerPoint) to display it in the shared screen widget.

Windows taskbar. 1 *Taskbar icons for Excel, Word and PowerPoint.*

21 Support for other file types

MT Canvus supports third party file types.

As with Microsoft Office documents, the critical determinant is not the type of file. Instead, you simply need the relevant program or file viewer on the auxiliary computer.

As a simple example, if you want to display text files in Notepad++ on your canvas, you first install Notepad++ on the auxiliary computer, and then configure Windows to always open .txt files in Notepad++. Finally, you configure MT Canvus to recognize .txt files as a supported file type (by editing the mt-canvus.ini file). Now if a user imports a .txt file onto a canvas, tapping the file will display it in Notepad++ on your video wall.

This feature allows you to add MT Canvus support for any file type. For example, if you install Microsoft Visio on the auxiliary computer, you can configure MT Canvus to support imported .vsdx and .vsd drawings and display them in Visio on your video wall.

21.1 Add support for other file types

Follow these steps:

1. Install the required program or file viewer on the auxiliary computer and, if necessary, set up the necessary file association in Windows.

   For the Visio example above, you would simply need to install Microsoft Visio.

   For the Notepad++ example, you would need to install Notepad++ and configure Windows to always open .txt files in Notepad++.

2. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.

3. Edit the following setting in the `[auxiliary-pc]` section.

   (Manually add this setting to mt-canvus.ini if it does not already exist.)

   ```
   [auxiliary-pc]
   desktop-mode-exts=<file extensions>
   ```

   Where `<file extensions>` defines a comma-separated list of file extensions that you want MT Canvus to recognize as supported file types.

   For example, if you want MT Canvus to recognize text files and Microsoft Visio files, specify the following file extensions:

   ```
   desktop-mode-exts=txt,vsd,vsdx
   ```

4. Restart MT Canvus; see section 4.

Note: *For full details about adding auxiliary computer settings to mt-canvuis.ini, see section 18.8.4.*

21.2 Add placeholder widgets for other file types

When adding support for other file types, you can also define placeholder widgets, or icons, for these files. Suitable placeholder widgets can give your canvas a professional appearance. For example, you can use a Visio icon as the placeholder widget for Microsoft Visio files.

Microsoft Visio icon

MT Canvus uses placeholder widgets to represent these files on the canvas and in the Files widget (accessed from the Finger menu). Users tap the placeholder widget to open the file in a *shared screen* widget.

Adding a placeholder widget is a six-step process:

1. Specify the Canvus plug-ins folder and subfolders; see section 21.2.1.
2. Save the image file to the assets subfolder; see section 21.2.2.
3. Add the Canvus plug-ins folder to mt-canvus.ini; see section 21.2.3.
4. Set up docsupport.canvusplugin; see section 21.2.4.
5. Set up styles.css; see section 21.2.5.
6. Restart MT Canvus.

21.2.1 Specify the plug-ins folder and subfolders

The MT Canvus plug-ins folder contains subfolders for assets such as placeholder widget images. Follow these steps:

1. Create a plug-ins folder. We recommend you name this folder CanvasPlugins and use the following folder locations:
   - **Ubuntu application computers:** Set the folder location to ~/CanvasPlugins, where ~/ refers to the home folder of the MT Canvus runtime user.
     If the user logged on while MT Canvus runs is 'multi', the expanded path is: /home/multi/CanvasPlugins
   - **Windows application computers:** Set the folder location to the MT Canvus runtime user's profile: %APPDATA%\MultiTouch\CanvasPlugins.
     If the user logged on while MT Canvus runs is 'multi', the expanded path is: C:\Users\multi\AppData\Roaming\MultiTouch\CanvasPlugins
2. Create subfolders named docsupport and assets below the Canvus plug-ins folder. For example:
   - **Ubuntu application computers:** /home/multi/CanvasPlugins/docsupport/assets/
   - **Windows application computers:** C:\Users\multi\AppData\Roaming\MultiTouch\CanvasPlugins\docsupport\assets

Now continue to section 21.2.2.

21.2.2 Save the image file to the assets subfolder

Save the required image file into the assets subfolder that you created in step 2 of section 21.2.1.

This image is used as the placeholder widget or icon. This image must be a PNG file; other image types are not currently supported.

Now continue to section 21.2.3.

21.2.3 Add the plug-in folder in mt-canvus.ini

Follow these steps:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Edit the following setting in the `[content]` section.
   (Manually add this setting to mt-canvus.ini if it does not already exist.)

   ```
   [content]
   plugin-folders=<folder>
   ```

   Where `<folder>` is the full path to the Canvus plug-ins folder you created in section 21.2.1. For example, if you used the recommended folder locations:

   - **Ubuntu application computers:** Add this line:

     ```
     [content]
     plugin-folders=/home/multi/CanvasPlugins
     ```

   - **Windows application computers:** Add either of these lines:

     ```
     plugin-folders=C:/Users/multi/AppData/Roaming/MultiTouch/CanvasPlugins
     ```

     ```
     plugin-folders=C:\\Users\\multi\\AppData\\Roaming\\MultiTouch\\CanvasPlugins
     ```

     Note: *Single backslashes are not supported in mt-canvus.ini on Windows computers. You must use forward slashes or double backslashes; see section 5.2.5.*

3. Restart MT Canvus; see section 4.

Now continue to section 21.2.4.

21.2.4 Set up a docsupport.CanvusPlugin file

docsupport.canvusplugin specifies the MT Canvus version and identifies styles.css (see next section). Follow these steps:

1. Create this file with the following content:

   ```
   {
     "api-version" : "<version>",
     "css-files" : "styles.css",
     "asset-folders" : "assets"
   }
   ```

   Where `<version>` *must* match the installed version of MT Canvus. For example:

   ```
     "api-version" : "1.7.0",
   ```

2. Copy docsupport.canvusplugin to the docsupport subfolder. You created this subfolder in step 2 of section 21.2.1.

Now continue to section 21.2.5.

21.2.5 Set up a styles.css file

Styles.css defines one or more CSS selectors for a placeholder widget. Follow these steps:

1. Create this file with the following content:

```
.auxdoc-general.<extension>[,.auxdoc-general.<extension>] {
  source: "<path>/<image>";
}
```

   Where:

   - `<extension>` is the file extension for the file type. For example, vsd or vsdx. (The dot preceding the file extension denotes a CSS class.)
   - `<path>/<image>` specify the full path to the image file that you want to use as the placeholder widget. You defined the path in section 21.2.1.
   - If multiple file extensions require the same placeholder widget (for example, .vsd and .vsdx both require the same Visio image), use a comma-separated list of selectors.

   Example: Here, styles.css defines a single placeholder widget for .vsd and .vsdx Visio files. The image file, visio.png, is in /home/multi/CanvusPlugins/docsupport/assets on an Ubuntu application computer.

```
.auxdoc-general.vsd,.auxdoc-general.vsdx {
  source: "/home/multi/CanvusPlugins/docsupport/assets/visio.png";
}
```

2. Copy docsupport.canvusplugin to the docsupport subfolder. You created this subfolder in step 2 of section 21.2.1.

Now continue to section 21.2.6.

21.2.6 Restart MT-Canvus

The setup for placeholder widget images is now complete. Restart MT Canvus for the changes to mt-canvus.ini to take effect; see section 4.

When users next import the supported file type onto a canvas, MT Canvus will use the placeholder widget that you set up in the preceding sections.

22 Support for third party touch screen overlays

Users typically run MT Canvus on a video wall of MultiTaction Cells. However, MT Canvus also supports touch screen overlays by third party manufacturers.

Note: *MultiTaction Cells are multi-touch, modular LCD displays. 'Multi-touch' means the Cells can track and react to several people interacting with them simultaneously. 'Modular' means that Cells can be easily stacked and combined to form a video wall (a single large display array) that shows interactive content.*

22.1 What is a touch screen overlay?

A touch screen overlay—also called an infrared touch frame or IR touch frame—converts a standard display into a multi-touch screen.

An overlay resembles a large metal picture frame with a toughened glass screen. Infrared transmitters and receivers for detecting touch events are built into the surround frame. A USB cable connects the overlay to the MT Canvus application computer.

Touch screen overlays can be standalone devices attached to your existing display(s) with double-sided adhesive tape, or they can be integrated into a custom-built video wall.

Note there are some limitations when MT Canvus is optimized for touch screen displays; see section 22.5.

Example touch screen overlay: PQ Labs G4 Series Multi-touch screen. 1 *Ultra-smooth toughened glass.* 2 *Infrared transmitters and receivers built into the surround frame.* 3 *USB cable.*

22.2 Deployment options

There are two main deployment options:

- **Single overlay covering all displays:** Here, a single touch screen overlay covers your video wall or table. For example, you may have a single overlay covering a single display, with the overlay being identical in size to the display. Or you may have a single large overlay covering an array of smaller displays.

  The setup for this deployment option is described in the following sections.

- **Multiple overlays covering multiple displays:** Here, the video wall features multiple touch screen overlays and displays. It may even include breakout screens, each with its own touch screen overlay.

  The setup for these deployment options is considerably more complex. For guidance on these deployment options, please contact MultiTaction Support; see section 1.1.

22.3 Configure MT Canvus to receive tracking data in native touch format

By default, MT Canvus uses the proprietary NetBridge protocol to receive streams of tracking data coming from MultiTaction Cells. However, if you are using a third party touch screen overlay, you must reconfigure MT Canvus to receive streams of tracking data transmitted in *native touch* format (ie, a format that can be recognized by the Ubuntu operating system of the MT Canvus application computer).

22.3.1 Where is config.txt?

To configure MT Canvus to receive tracking data in native touch format, you must edit config.txt. This file is installed as part of the Cornerstone runtime; see section 2.5.1. The location of config.txt depends on the operating system of the application computer:

- **Ubuntu application computers**

  The file is saved in the ~/.MultiTouch folder, where ~/ refers to the home folder of the *installation user*.

  If Cornerstone was installed by the user 'multi', the expanded path is:
  /home/multi/.MultiTouch/config.txt

- **Windows application computers**

  The file is saved in the *installation user's* profile. Using the APPDATA variable, the location of this folder is:
  %APPDATA%\MultiTouch

  If Cornerstone was installed by the user 'multi', the expanded path is:
  C:\Users\multi\AppData\Roaming\MultiTouch\config.txt

For full details about config.txt, see the *MultiTaction Cell User Manual*.

22.3.2 Enable MT Canvus to receive tracking data in native touch format

Follow these steps:

1. Locate the config.txt configuration file; see section 22.3.1.
2. Edit config.txt to include a `NativeTouch` block.

```
NativeTouch {
}
```

   Note that this block is empty; it contains no settings. Simply including this block is sufficient to reconfigure MT Canvus to receive streams of tracking data transmitted in native touch format.

3. If config.txt contains any of the following blocks, delete them:
   - `NetBridge`: Sends tracking data to applications in proprietary format.
   - `TUIOSender`: Sends tracking data to applications as a TUIO stream.
   - `Globals`: Sends tracking data to applications in XML format.

22.4 Optimize MT Canvus for touch screen overlays

By default, MT Canvus is optimized for touch activity on MultiTaction Cells, including the use of infrared pens and Codice cards. However, infrared pens and Codice cards are not supported by touch screen overlays. You must therefore reconfigure MT Canvus to optimize the user experience where touch screen overlays are deployed.

Note also that the touch selector is enabled when you optimize MT Canvus for touch screen overlays. The touch selector comprises three 'touch mode' buttons that allow users to quickly change touch mode; for details, see section 5.4.

Follow these steps:

Follow these steps:

1. Edit the *working version* of mt-canvus.ini; see section 5.2.2 and section 5.2.3.
2. Set third-`party-touch` setting to `true` in the `[hardware]` section.

   Manually add this section and setting if they do not already exist.

```
[hardware]
third-party-touch=true
```

   Where `third-party-touch` toggles MT Canvus between operation modes.

   If set to `true`, MT Canvus is optimized for third party touch screen overlays.

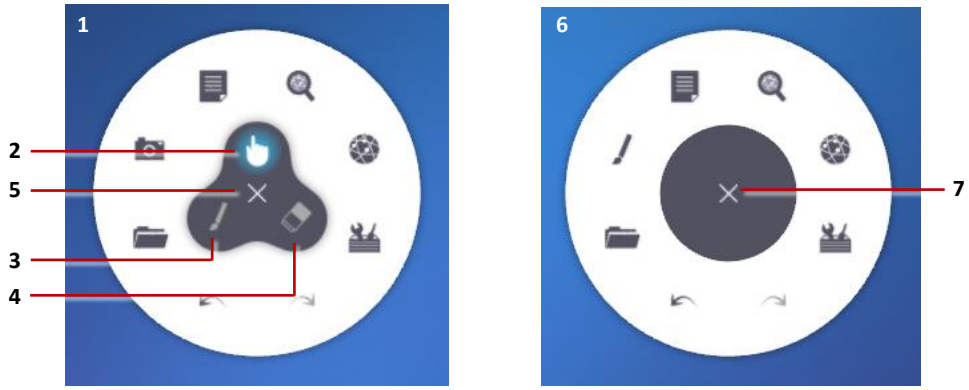
   If set to `false`, MT Canvus is optimized for MultiTaction Cells.

3. If MT Canvus is running, restart it; see section 4.
4. Confirm that MT Canvus is now optimized for touch screen overlays.
   a. Launch Canvus
   b. Open a finger menu. (Tap and hold any empty area of the canvas.)

c. Confirm that the center of the finger menu offers three touch modes (pointer, pen and eraser). Tap the mode you want. For example, if you tap the pen mode, you can use your finger to draw annotations on the screen.

   If the center of the finger menu only includes a close button, MT Canvus has not been optimized for touch screen overlays.

Note there are some limitations when MT Canvus is optimized for touch screen displays; see section 22.5.



1 *Finger menu when MT Canvus is optimized for third party touch screen overlays.*
2 *Pointer mode.* 3 *Pen mode.* 4 *Eraser mode.* 5 *Close button.*

6 *Finger menu when MT Canvus is optimized for MultiTaction Cells.* 7 *Close button.*

22.5 Limitations for MT Canvus when using touch screen overlays

If you use MT Canvus with touch screen overlays, most functionality is available. However, be aware of the following:

- No Codice-related features are available.

  In particular, folders of personal items are not available. This means that users cannot save personal items, send personal items as email attachments, or make presentations of their personal items.

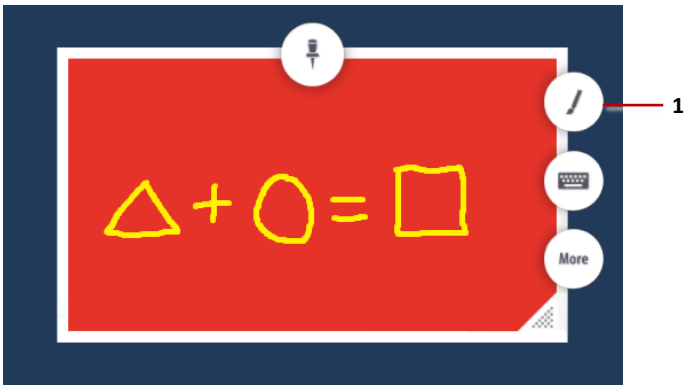
  This limitation also means that you cannot use a Codice card as a shortcut for accessing the Demo Canvas Manager; see section 8.2.

- You cannot mix touch modes within a single workspace.

  This limitation applies to situations where multiple users are working in the same workspace. It is not possible, for example, for one user to set the touch mode to 'pointer' while another user has the touch mode set to 'pen'. Instead, both users must be working in the same touch mode (pointer, pen or eraser).

- Widget-level annotation is not supported. That is, widgets do not have an Annotation tool. Only canvas-level annotation is supported.

  Note: *When MT Canvus is optimized for MultiTaction Cells, most widgets include an Annotation tool on the widget border*:



1 Example Annotation tool for widget. This tool is not available when MT Canvus is optimized for touch screen overlays.

23 Back up and restore MT Canvus data

This section describes how to back up and restore MT Canvus data.

23.1 Create a backup

All MT Canvus user data is stored under the application root folder.

- **Ubuntu application computers:** The default root folder for MT Canvus is /home/multi/.mt-canvus. To make a backup, simply back up all files in this folder.

  For example, run these commands to make a compressed archive of this folder:

  ```
  $ cd /home/multi
  $ tar -zcvf mt-canvus-backup.tar.gz .mt-canvus
  ```

- **Windows application computers:** User data is stored in the \mt-canvus folder in the *installation user's* profile. To make a backup, simply zip all the files in this folder.

  Using the APPDATA variable, the location of this folder is:
  %APPDATA%\mt-canvus

  If MT Canvus was installed by the user 'multi', the expanded path is:
  C:\Users\multi\AppData\Roaming\mt-canvus

  Note: *The installation user is the account that you used to install MT Canvus. You created this account in section 2.5.3.*

23.2 Restore a backup

To restore a backup, replace the application root folder with your backup files.

- **Ubuntu application computers:** The compressed backup archive that you made previously can be restored with these commands:

  ```
  $ cd /home/multi
  $ tar -zxvf mt-canvus-backup.tar.gz
  ```

- **Windows application computers:** To restore a backup, unzip the backup that you made previously into this folder:
  %USERPROFILE%\%APPDATA%\mt-canvus

23.3 Backups during upgrade

Only applies to upgrades from MT Canvus 1.4 or earlier. In practice, this only affects upgrades on Ubuntu application computers.

If you upgrade from MT Canvus 1.4 or earlier (see section 24), it automatically backs up the user data (ie, canvases) before migrating it to the new version. The backup is created in the same folder as the MT Canvus data folder and has a .tar.gz extension. Backup files have a numeric identifier if a backup with the same name already exists. For example:
/home/multi/.mt-canvus.tar.gz
/home/multi/.mt-canvus1.tar.gz
/home/multi/.mt-canvus2.tar.gz

The backup file retains the old version number and data structure so the data can be restored if you need to roll back to a previous MT Canvus version.

24 Upgrade MT Canvus

This section describes how to upgrade MT Canvus on Ubuntu and Windows application computers. In both cases, you must then configure the upgraded version by manually copying new settings from the *example version* of mt-canvus.ini into your *working version*.

24.1 Upgrading on Ubuntu application computers

Use the mt-canvus-setup command line tool to upgrade MT Canvus. First, you must download and install the new version. Then you must then make the new version into the active version.

Note: *For information about available mt-canvus-setup commands, see section 3.*

Follow these steps:

1. Quit MT Canvus; see section 4.
2. Launch a terminal emulator.
3. Run the following command to install the latest version of MT Canvus:
   ```
   $ sudo mt-canvus-setup --install <n.n.n>
   ```
   Where `<n.n.n>` is version of MT Canvus. For example:
   ```
   $ sudo mt-canvus-setup --install 1.7.0
   ```
4. Run the following command to confirm that the new version of MT Canvus was downloaded and installed:
   ```
   $ sudo mt-canvus-setup --list
   ```
   This command lists all installed versions of MT Canvus and identifies the version that is currently active. For example:
   ```
   mt-canvus-1.3.1-build454 <hash>
   mt-canvus-1.3.4-build489 <hash>
   mt-canvus-1.4.0-build62 <hash> (active)
   mt-canvus-1.4.1-build65 <hash>
   ```
   Where `<hash>` is a hash key used as an identifier.
5. Run the following command to activate the version of MT Canvus that you installed in step 3:
   ```
   $ sudo mt-canvus-setup --set-active <n.n.n>
   ```
   Where `<n.n.n>` is version of MT Canvus. For example:
   ```
   $ sudo mt-canvus-setup --set-active 1.7.0
   ```
6. (Optional) Re-run the `--list` command in step 4 to confirm that the new version is now active.

Now configure the upgraded version of MT Canvus; continue to section 24.3.

24.2 Upgrading on Windows application computers

To upgrade MT Canvus, you simply download and install the new version.

1. Quit MT Canvus; see section 4.
2. Obtain the new version of MT Canvus; see section 2.5.2.
3. Run the MT Canvus installer; see section 2.5.5.

   Note that, unlike upgrades on Ubuntu computers, you do *not* need to manually activate the new version of MT Canvus.

Now configure the upgraded version of MT Canvus; continue to section 24.3.

24.3 Configure the upgraded version of MT Canvus

After installing the new version of MT Canvus, you must manually update your *working version* of mt-canvus.ini. You can then launch MT Canvus.

Follow these steps:

1. Settings for the new features in MT Canvus 1.7 are listed in the *example version* of mt-canvus.ini. We recommend that you now copy these settings into the *working version* of mt-canvus.ini using your preferred editor. For file locations, see section 5.2.2 and section 5.2.3.
2. Configure MT Canvus to use the new features. To do this, you must add the new settings to the *working version* of mt-canvus.ini and then edit these settings as required. For details about configuring individual features, see the relevant sections of this manual.
3. Now launch MT Canvus. Any existing data (ie, canvases) on the application computer will be automatically upgraded. Do one of the following:
   - *If you installed MT Canvus from a preconfigured disk image,* right-click the desktop and choose 'MT Canvus (auto-restart)' from the pop-up menu.
   - *If you installed MT Canvus manually*:

     Ubuntu application computers: Run the following command:
     ```
     $ mt-canvus.sh
     ```

     Windows application computers: Double-click the MT Canvus desktop shortcut:

Instructions continue on next page.

4. (*Applies only to upgrades from version 1.4 or earlier*) If MT Canvus detects existing canvases that must be upgraded, it launches a data migration utility and displays an advisory on the video wall:

   Upgrading MT Canvus
   Migrating MT Canvus data from version *n* to *n*

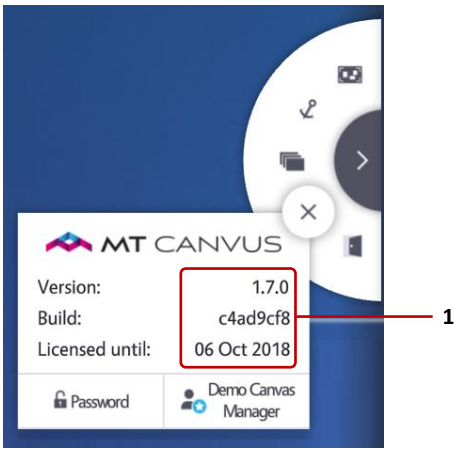
   Notes

   - *MT Canvus data has its own version numbers that do not correspond to version numbers for the MT Canvus product.*
   - *MT Canvus backs up all existing user data (ie, canvases) before starting the data migration; see section 23.3.*

5. (*Applies only to upgrades from version 1.4 or earlier*) Wait while the data migration runs. The migration typically completes in less than five minutes. MT Canvus launches when the migration is complete.

6. (*Optional*) To confirm that the upgrade was successful, tap the About button in the System menu.

   The About dialog shows the MT Canvus version and build number.



About dialog. **1** *Version number, build number and expiry date.*

25 MT Canvus plugins

You can extend MT Canvus functionality through plugins. For example, you can change its styles through CSS plugins.

Reference documentation for MT Canvus plugins can be found here:
https://cornerstone.multitouch.fi/plugins

Note: *MT Canvus no longer supports compiled plug-ins.*

Appendix A. MT Canvus disk images

MultiTaction can provide preconfigured MT Canvus images. The disk images are intended for the standard Meeting Room package package by MultiTaction, which comprises three MultiTaction MT555 Cells in portrait mode. Each disk image includes a preconfigured Ubuntu 14.04 LTS operating system running a pre-installed version of MT Canvus.

Alternatively, you can request disk images for specific releases. You can then manually install these images (see section 2.5).

Details about the latest disk images are available on https://cornerstone.multitouch.fi/.

Note: *If you require an MT Canvus image, contact MultiTaction Support*; *see section 1.1*.