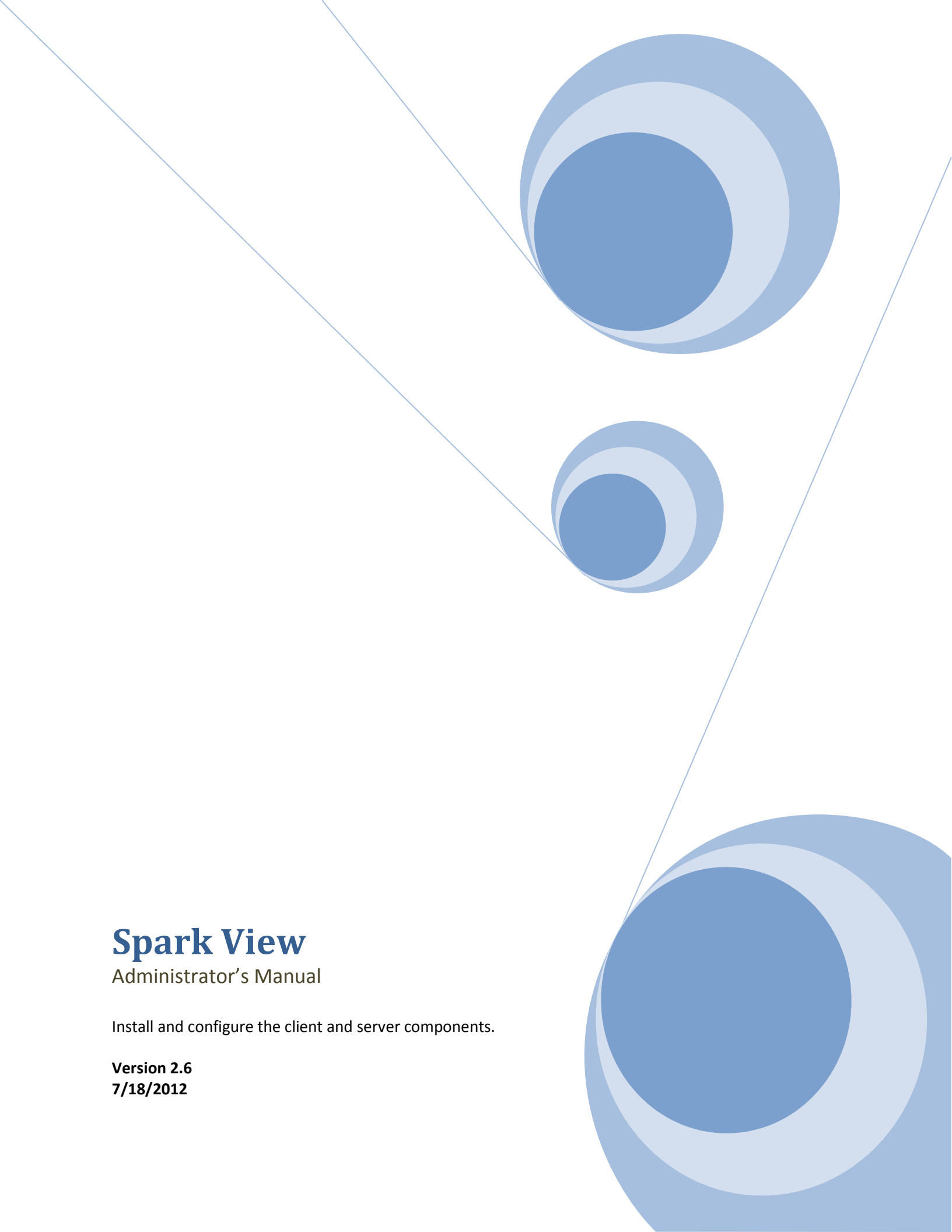


Spark View

Administrator's Manual

Install and configure the client and server components.

Version 2.6
7/18/2012

Contents

1. Overview

Spark View is world's first HTML5 RDP (Remote Desktop Protocol) client which provides end-users with remote access to following RDP hosts:

- RDP enabled Windows desktops, including: Windows 2000 Server, Windows XP Professional, MCE 2005, Windows Server 2003, Windows Vista Business or Ultimate, Windows Server 2008, Windows 7 Professional, Business or Ultimate, Windows Server 2008 R2.
- Linux desktops with xrdp installed.
- Any virtual machines under Oracle VM VirtualBox (with Remote Desktop Server enabled).

1.1.Features

Spark View is a HTML5 RDP client. It use WebSocket, Canvas, Web Audio, local storage etc HTML5 features to implement the Remote Desktop protocol. It has following advantages compared with traditional (native) RDP clients:

- Zero installation on client side, no Java, no flash, no ActiveX, only HTML and JavaScript.
- Zero maintenance and management on client side. You don't need to worry about if user has installed the newest version of Spark View, JRE or flash player.
- Same interface and experience for final users.
- One solution runs on almost all platforms: Windows, Linux, Mac, iOS, Android, BlackBerry and Playbook OS etc.
- Even better performance. It's even faster than our Java RDP client.
- Even more features.
- Control resource access and redirection in one place (Gateway).

RDP features implemented in Spark View:

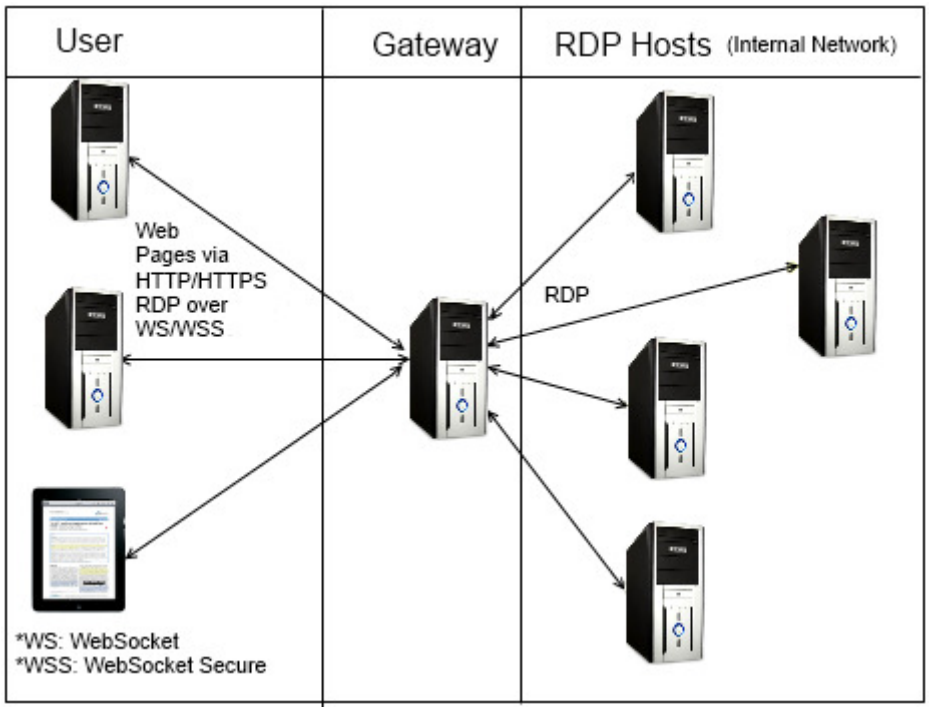
- TLS (SSL over RDP) and NLA (Network Level Authentication).
- RemoteApp. It's the first time that you can use RemoteApp everywhere (on a Mac, iPad, Android etc).
- Seamless clipboard redirection.
- Easy printing, don't need to install drivers for client side printers.
- Bring sound to local or leave it on remote computer.
- File downloading and uploading; Gateway side directory sharing.
- Lossless bitmap compression, give you the best quality you can get.
- Client size IME support. You can use client side IME directly (Even Microsoft RDC cannot do that).
- International keyboard support.

1.2.Architecture

Spark View includes 2 components:

- Gateway, which is a WebSocket server and simple web server.
- Web resources (HTML files, CSS, JavaScript, images), which can be installed on Gateway or any other web servers.

This diagram describes how the components of Spark View work together:



You can also install gateway in RDP host.

2. Installation

Gateway is a Java application and can be installed on almost all operational systems. Web resources fo Spark View are pure HTML and JavaScript, so it can be installed on Gateway(which is also a web server) or any other web servers.

2.1.Install J2SE Software Development Kit (JDK)

Download the Java 2 Standard Edition (J2SE) JDK, release version 1.6 or later (1.6.0_27 X64 is recommended), from:

http://www.oracle.com/technetwork/java/javasebusiness/downloads/java-archive-downloads-javase6-419409.html#jdk-6u27-oth-JPR

NOTE: Downloading the Java Runtime Environment (JRE) instead is not recommended.

Install the JDK according to the instructions included with the release.
Set an environment variable JAVA_HOME to the pathname of the directory into which you installed the SDK release.

Verify the Java version you are using, run following command in a command prompt:

java -version

2.2.Install as a Windows service

Download Spark Gateway for Windows X64 or X86 according to your installed JDK version,

http://www.remotespark.com/view/SparkGatewaySetupX64.exe
http://www.remotespark.com/view/SparkGatewaySetupX86.exe

Install Spark Gateway according the instructions of installer.

Change the name of your license file to “license” and copy it to installation directory if you are using the full version.

Modify gateway.conf file, change listening port and file path according to your installation directory.

Add SparkGateway.exe to your firewall exception list.

Verify the installation, run "SparkGateway Manager" from the Start menu. Open the "Java" tab, make sure you are using the correct Java Virtual Machine if you have multiple JVMs installed. If error of "The specified service does not exist as an installed service. Unable to open the service 'SparkGateway'" was reported, please install the service manually, by opening a command prompt Window and executing following commands:

cd C:\SparkGateway

SparkGateway.exe //IS//SparkGateway --Install=C:\SparkGateway\SparkGateway.exe --DisplayName="SparkGateway" --Jvm=auto --Classpath=C:\SparkGateway\SparkGateway.jar --StartMode=jvm --StartClass=com.toremote.gateway.SparkGateway --StartParams=start;-c=C:\SparkGateway\gateway.conf --StopClass=com.toremote.gateway.SparkGateway --StopParams=stop --LogPath=C:\SparkGateway\logs --StdOutput=auto --StdError=auto ++JvmOptions=-server

java -jar SparkGateway.jar UPDATE

"java -jar SparkGateway.jar UPDATE" will update the content of gateway.conf(using current installation directory).

You can also use the InstallServer.bat to install Spark View as a service. Please make sure the file path in this file is what you want.

We are using Aparche Procrun as a Windows service wrapper, for more information, please check

http://commons.apache.org/daemon/procrun.html

2.3.Install as a Linux/Unix Daemon

Download Spark Gateway for Linux/Unix.

http://www.remotespark.com/view/SparkGateway.zip

Unzip it to your destination directory; here we use /usr/local/bin/SparkGateway. To build the daemon wrapper you will need:

- GNU AutoConf (at least version 2.53)
- An ANSI-C compliant compiler (GCC is good)
- GNU Make
- A Java Platform 2 compliant SDK

Running following commands

cd /usr/local/bin/SparkGateway
tar xvfz commons-daemon-native.tar.gz
cd commons-daemon-1.0.7-native-src/unix
./configure
make
cp jsvc ../..
cd ../..
chmod a+x SparkGateway.sh

Change the name of your license file to “license” and copy it to installation directory if you are using the full version.

Modify gateway.conf file, change listening port and file path according to your installation directory.

Starting the daemon

./SparkGateway.sh start

Stopping the daemon

./SparkGateway.sh stop

We are using Apache Jsvc as a Linux/Unix daemon wrapper, for more information, please check

http://commons.apache.org/daemon/jsvc.html

The script (SparkGateway.sh) is only tested on CentOS, you may need to change it on other Linuxs.

Make it as a service and start automatically:

cp SparkGateway.sh /etc/init.d/SparkGateway

chmode +x /etc/init.d/SparkGateway

chkconfig --add SparkGateway

chkconfig SparkGateway on

Start the service: service SparkGateway start

Stop the service: service SparkGateway stop

2.4.Install HTML Client on Other Web Servers

Spark View (the HTML5 Client part) doesn't include any server side logic; you can also install it on any other Web Servers, like IIS, Apache, Tomcat etc.

You cannot use desktop notifications if the client was installed on other web servers (Cross-Domain issue)

Recommended to use Gateway as the web server, or install it in Chrome Web Store.

3. Server Configuration

3.1.Gateway

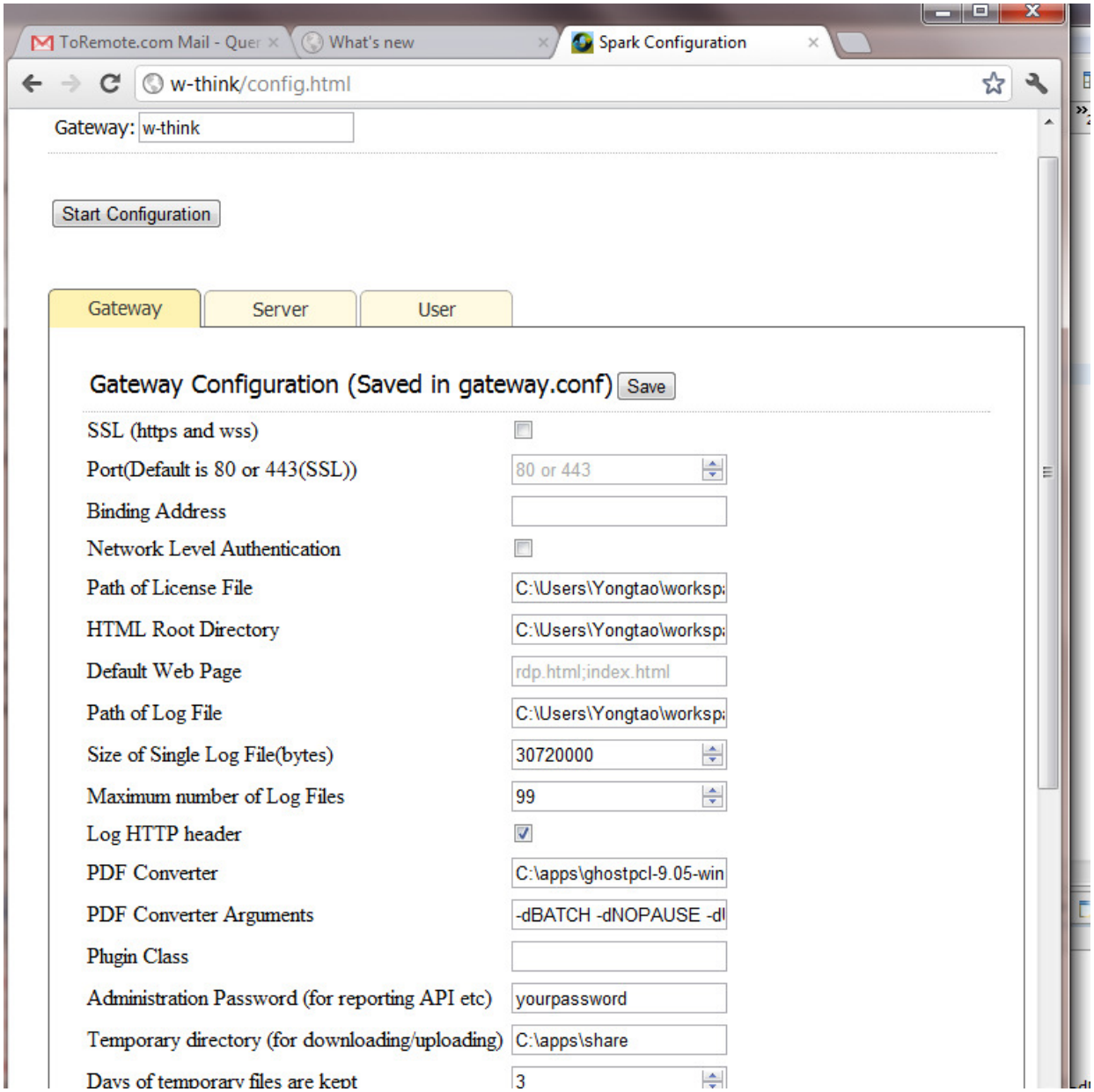
You can configure gateway by editing gateway.conf file, here is a list of all options:

Key	Value
bindAddr	Binding address, if you have multiple IP addresses and want bind to one of them.
port	Listening port, default is 80.
ssl	Use HTTPS and WSS (WebSocket Secure Connection), default is false.
credSSP	Use Network Level Authentication, default is false. “true” will slow down the connection speed. It’s not necessary to use NLA if the gateway is connecting to internal RDP hosts.
backlog	How many connections can be queued, default is 50.
user	Path of user configuration file (JSON format).
server	Path of RDP hosts configuration file (JSON format.
html	HTML root directory.

directoryIndex	Default page for html directory, default is "rdp.html;index.html".
license	Path of license file.
logfile	Path of log file.
maxbytes	Limit the maximum number of bytes to write to any one log file, default is 30M.
maxfiles	Log file rotation, the number of log files to use, default is 99.
logHttpHeader	If log http header, which may contains sensitive information. Default is true.
converter	Postscript to PDF converter, used for printing. Ghostscript is recommended: http://www.ghostscript.com/download/ Example: C:\\Program Files\\gs\\gs9.04\\bin\\gswin64c.exe
arguments	Arguments for converter. %1 is output pdf file name. %2 is input ps file name, they'll be replaced by program. Example: -dBATCH -dNOPAUSE -dUseCIEColor -dPDFSETTINGS=/printer -sDEVICE=pdfwrite -q -sOutputFile=%1 %2
plugin	Class name for your plugin
password	Password for reporting and management API
mime	Add extra mime types for web server
stderrLog	Set false to disable logging to stdout/stderr
keepDays	How many days the temporary files (printed PDF files etc) be kept, default is 3 days
disk	The name for the shared disk, used for file uploading/downloading
webfeed	RD Web Feed URL, for RD web access integration
recording	Session recording, 0: no recording; 1: recording graphic only. 3: recording graphic and audio.
recdir	Parent directory for session recording files.
recwarning	Warn user about the recording, default is true
accessNotInList	if logged in user can access computers which is not in their list (severs.json) or webfeed, default is false
printer	Printer name, default is “Remote Printer from Client”
printerDriver	Printer driver name
shadowing	Shadowing switch, default is true
cipherSuites	The cipher suites can be used by SSL encryption. You may want to use some good cipher suites only, for example: SSL_RSA_WITH_RC4_128_MD5, SSL_RSA_WITH_RC4_128_SHA, SSL_RSA_WITH_3DES_EDE_CBC_SHA, SSL_DHE_DSS_WITH_3DES_EDE_CBC_SHA, SSL_DHE_RSA_WITH_3DES_EDE_CBC_SHA, TLS_DHE_RSA_WITH_AES_128_CBC_SHA, TLS_DHE_DSS_WITH_AES_128_CBC_SHA, TLS_RSA_WITH_AES_128_CBC_SHA, TLS_DHE_RSA_WITH_AES_256_CBC_SHA, TLS_DHE_DSS_WITH_AES_256_CBC_SHA, TLS_RSA_WITH_AES_256_CBC_SHA You need to install Java Cryptography Extension (JCE) Unlimited Strength Jurisdiction Policy Files for AES 256 cipher suites. http://www.oracle.com/technetwork/java/javase/downloads/jce-6-download-429243.html

*Please always use absolute file path if you are running Gateway as a service.

You can also use config.html to configure gateway.conf. Use your browser navigate to: http://localhost/config.html. For security reason, this page can be only accessed from local host.



3.2.HTTPS and WSS (WebSocket Secure Connection)

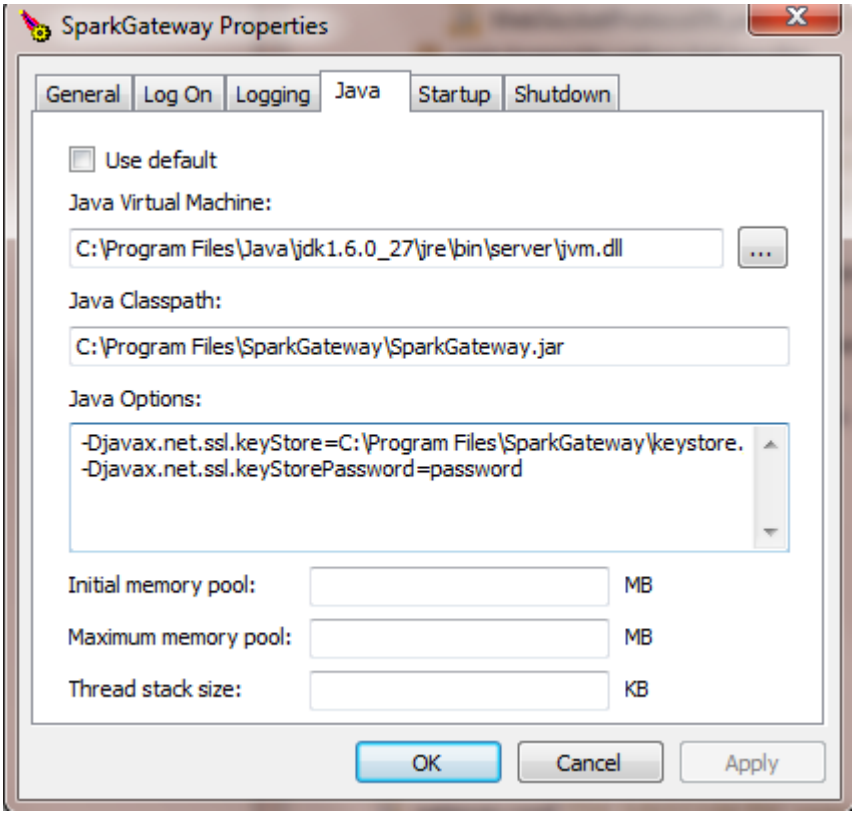
Recommended to enable HTTPS and WSS. There is a self-signed certificate (keystore.jks) in the installation directory.

- Set ssl = true in gatway.conf file.
- Import your SSL certificate to a Java keystore, please check following links or your certificate issuer for reference:
    - http://www.remotespark.com/Install_SSL_Certificate_In_SparkGateway.doc

- https://knowledge.verisign.com/support/ssl-certificates-support/index?page=content&actp=CROSSLINK&id=AR234
- http://www.agentbob.info/agentbob/79-AB.html
- http://portecle.sourceforge.net/

- Add following Java options to start Gateway: -Djavax.net.ssl.keyStore=keystoreFileName -Djavax.net.ssl.keyStorePassword=yourpassword. For example: java -Djavax.net.ssl.keyStore=C:\Program Files\SparkGateway\keystore.jks -Djavax.net.ssl.keyStorePassword=password -jar SparkGateway.jar -c=gateway.conf
- Or add these options in the SparkGateway Manager:

-Djavax.net.ssl.keyStore=C:\Program Files\SparkGateway\keystore.jks
-Djavax.net.ssl.keyStorePassword=password



- Self signed certificate only works on Chrome and Opera.

3.3.Remote Desktop Web Access Portal Integration

User can log in with his domain user name and password, get the RemtoeApps or desktops published on the web access portal with the integration.

What you need:

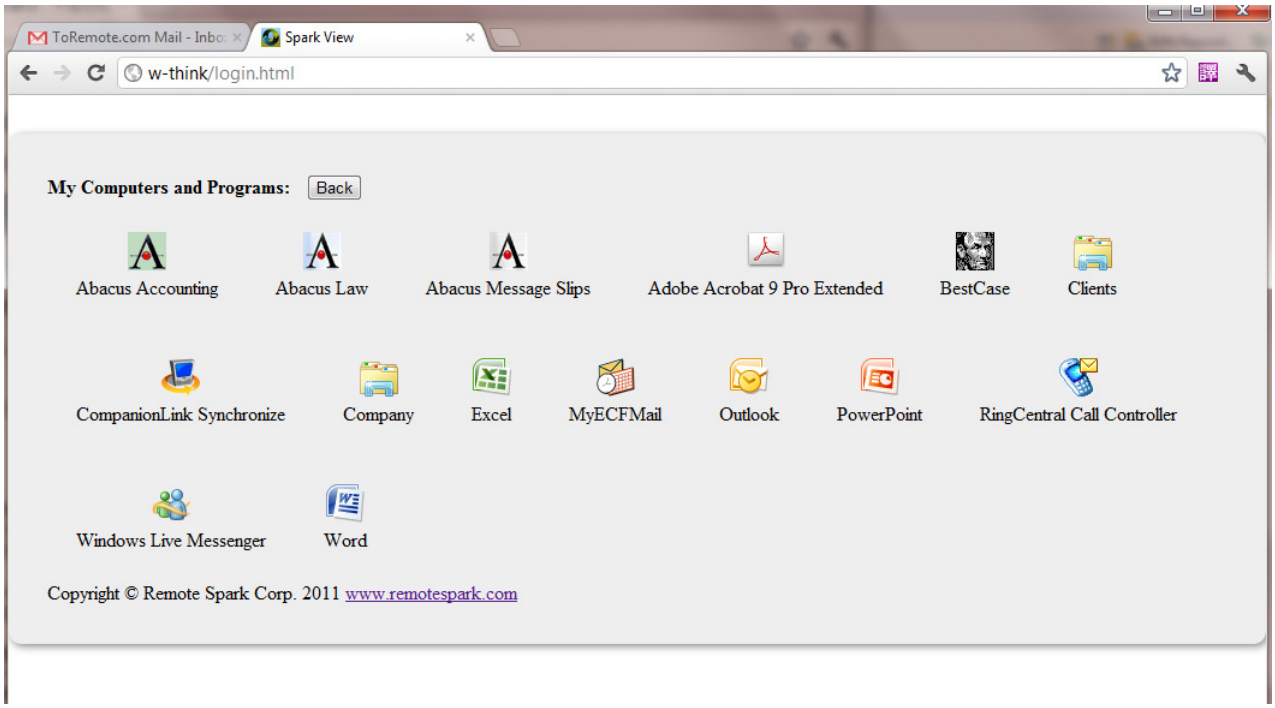
1. RemoteApp is puslibshed and Web Access is enabled.

2. Web Acess portal must be in domain.

What you should do:

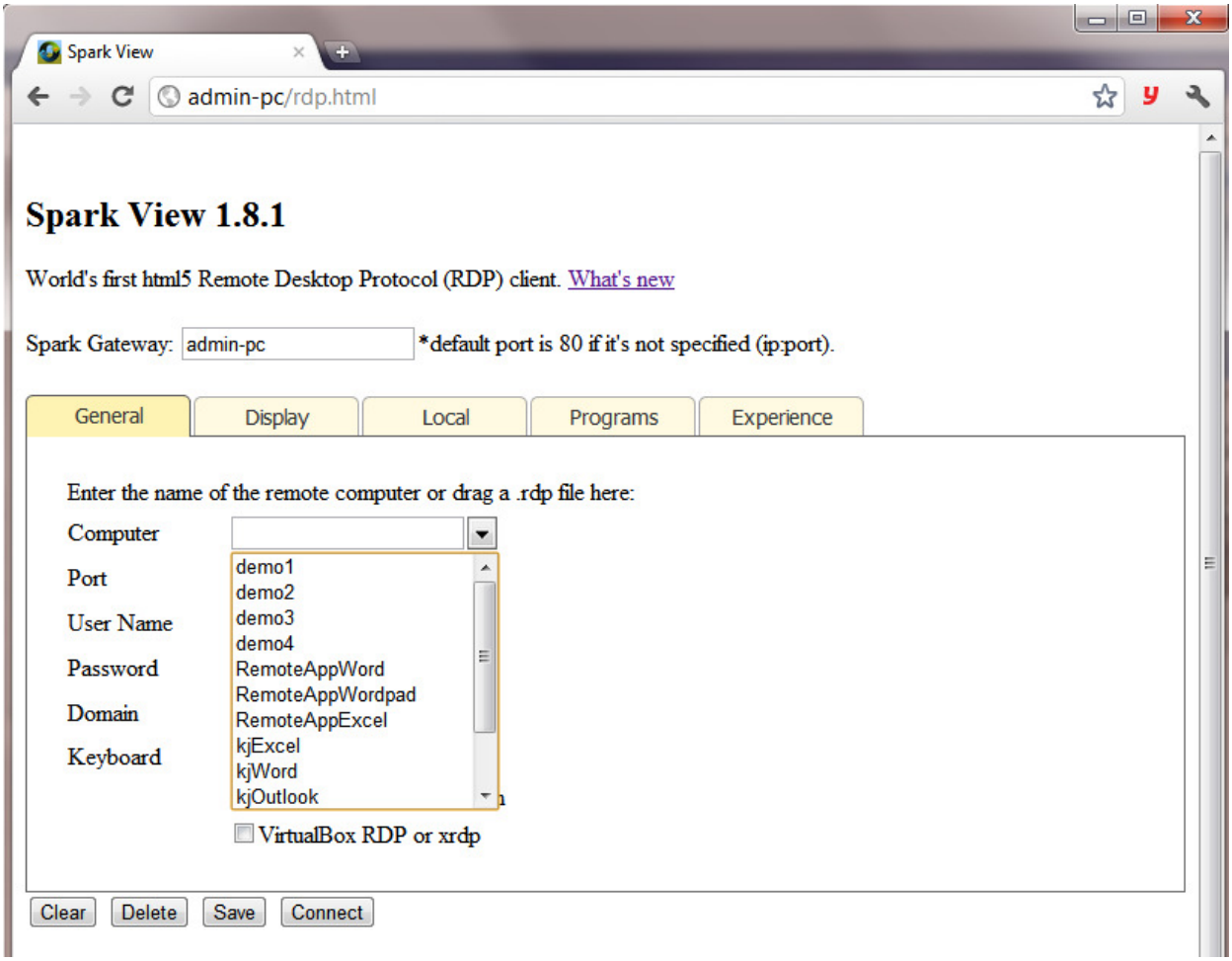
1. Set up the web feed URL of you web access portal in gateway.conf. This URL is your address of your portal + /RDWeb/feed/webfeed.aspx, for example: `webfeed = https://cloud.remotespark.com/RDWeb/feed/webfeed.aspx`
2. Use login.html as the start page, set directoryIndex = login.html;rdp.html;index.html in gateway.conf.
3. Make sure html directory is configured in gateway.conf. Gateway will save application icons under this directory (in RDWeb subdirectory).

You don't need to set up RDP hosts or users in servers.json and users.json anymore.



3.4.RDP hosts

You can use servers.json file to configure: RDP hosts which can be accessed; RDP options for every host. The user can get a list of the RDP hosts if this file was used.



Here is an example:

```
{
 /* this is comment, use UTF-8 (without byte order mark) encoding for Unicode support */
 "type": "NORMALLIST",
 /*type can be WHITELIST, BLACKLIST, NORMALLIST */
  "display": true,
 /* display this list to client */
"connections": [
{
    "id": "Word",
    "displayName": "RemoteApp MS Word",
```

```
    "server": "213.180.85.124",
    "icon": "kbd.png",
    "protocols": "rdp",
    "rdp": {
            "username": "demo",
            "password": "m9ff.QWE",
            "domain": "SERVERSKY",
            "remoteProgram": "||WINWORD",
            "mapClipboard": true,
            "mapDisk": true,
             "playSound": 0,
             "mapPrinter": true
     }
   }
 ]
}
```

This file is in JSON format, {} means an object, [] means an array. Here is a full list of RDP options you can use (All options defined in this file will override the client options):

Key	Value
port	Listening port of RDP, default is 3389
username	User name of your Windows
password	Password of the Windows user
console	Login to console session (or Admin mode).
width	Screen width of RDP session, if no value is given, client will use the width of browser window.
height	Screen height of RDP session, if no value is given, client will use the height of browser window.
color	Color depth of RDP session, default is 16.
command	Start a program on connection
directory	Directory for running “command”
mapClipboard	If enable clipboard redirection
mapDisk	If enable disk redirection

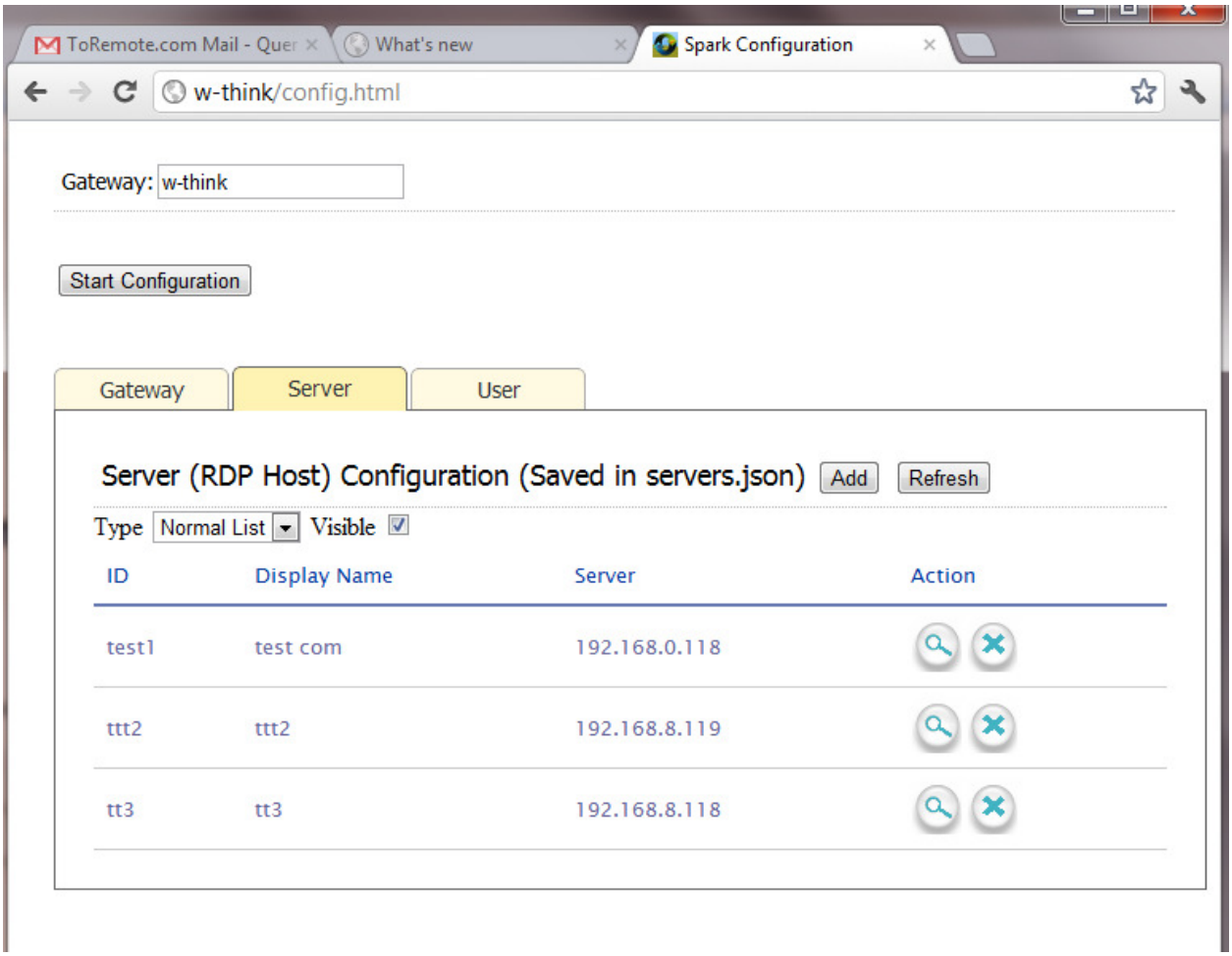
disks	Redirection a disk or directory on Gateway. It's an array of DeviceInfo, example for DeviceInfo:
	{
	"dosName": "disk1",
	"longName": "disk1 on local",
	"devicePath": "/apps/test/",
	"actions": 7
	}
	Default value for actions is 7 = *ACTION_REDIRECT(1)* | *ACTION_DOWNLOAD(2)* | *ACTION_UPLOAD(4).* Set value to 2 if you want this disk downloadable only, 1 if you only want this disk mapped to RDP host. Right now, only the first disk can be a downloadable directory.

playSound	Sound options, 0: bring sound to local, 1: no sound, 2: leave sound on remote computer.
audioRecord	If enable audio record (not implemented)
performanceflags	Default value is 111, PERF_DISABLE_WALLPAPER = 0x01; PERF_DISABLE_FULLWINDOWDRAG = 0x02; PERF_DISABLE_MENUANIMATIONS = 0x04; PERF_DISABLE_THEMING = 0x08; PERF_DISABLE_CURSOR_SHADOW = 0x20; PERF_DISABLE_CURSORSETTINGS = 0x40; PERF_ENABLE_FONT_SMOOTHING = 0x80; PERF_ENABLE_DESKTOP_COMPOSITION = 0x100; 111 = PERF_DISABLE_CURSOR_SHADOW | PERF_DISABLE_CURSORSETTINGS | PERF_DISABLE_FULLWINDOWDRAG | PERF_DISABLE_MENUANIMATIONS | PERF_DISABLE_THEMING | PERF_DISABLE_WALLPAPER;
legacyMode	If enable legacy mode, default is false. Set this true if you are using xrdp or VirtualBox RDP.
mapPrinter	If enable easy printing.
remoteProgram	Connect to a RemoteApp, always use alias name instead of program path, example: ||WINWORD, ||wordpad, or ||EXCEL.
remoteWorkDir	Directory for running remoteProgram.
remoteArgs	Arguments for running remoteProgram.
credSSP	If use NLA (Network Level Authentication).
sessionRecord	0: no session recording, 1: recording grphic only (no sound)
keyboard	Keyboard layout
loadBalanceInfo	Load balance information
shadowing	Shadowing switch

You can also define IP ranges in servers.json, for example:

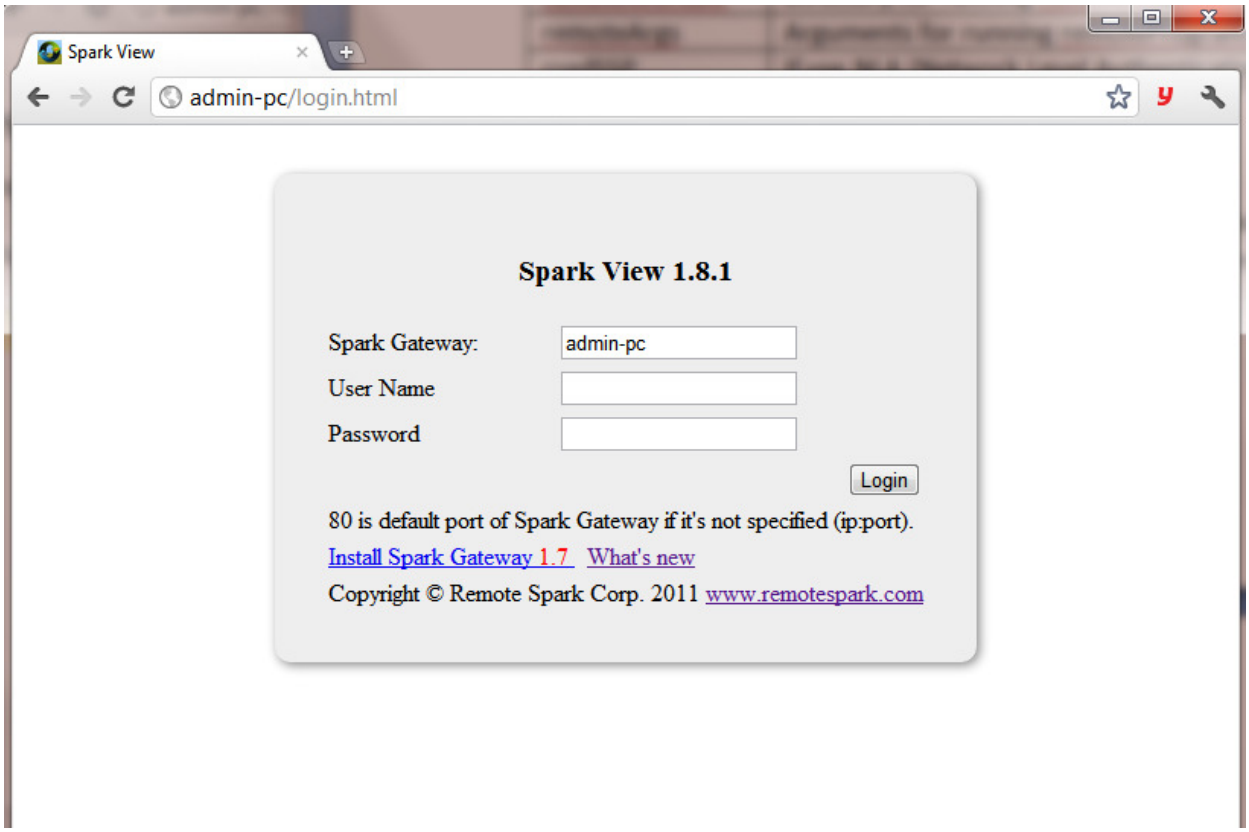
```
{
  "id": "range1",
  "ipRanges": [
            {"from": "192.168.0.0", "to": "192.168.0.250"},
            {"from": "192.168.56.0", "to": "192.168.56.250"}
        ]
},
```

You can also use config.html to configure servers.json. Use your browser navigate to: http://localhost/config.html. For security reason, this page can be only accessed from local host.

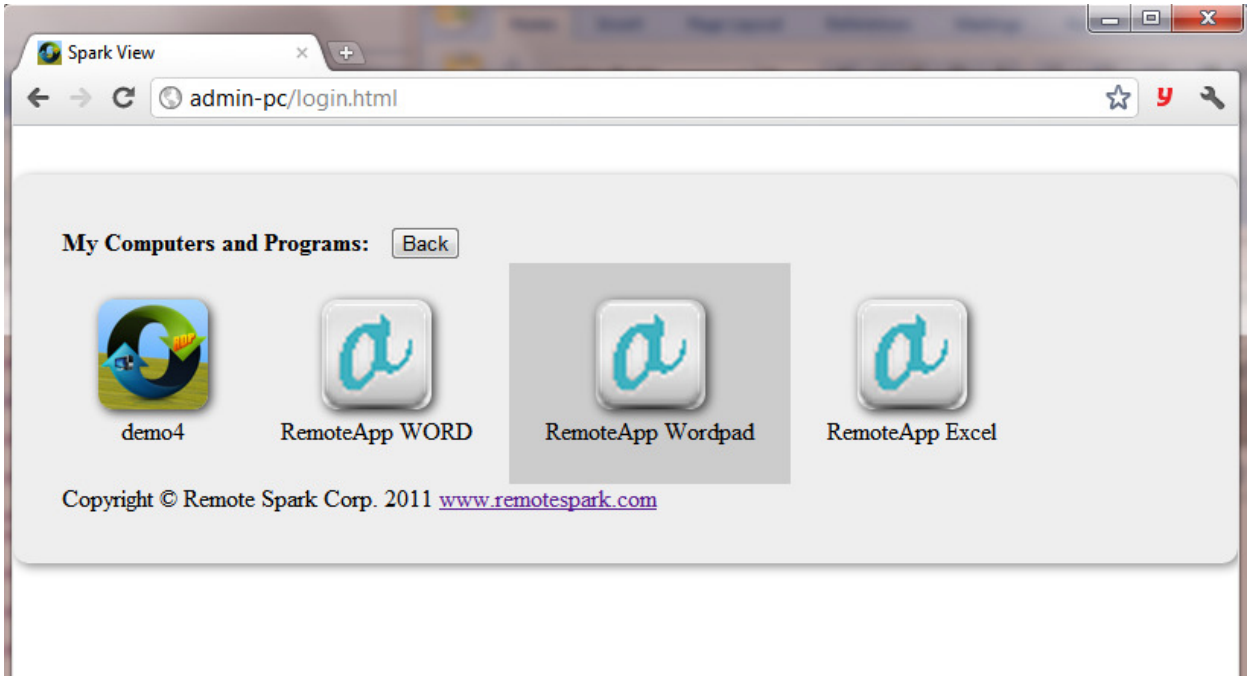


3.5.Users

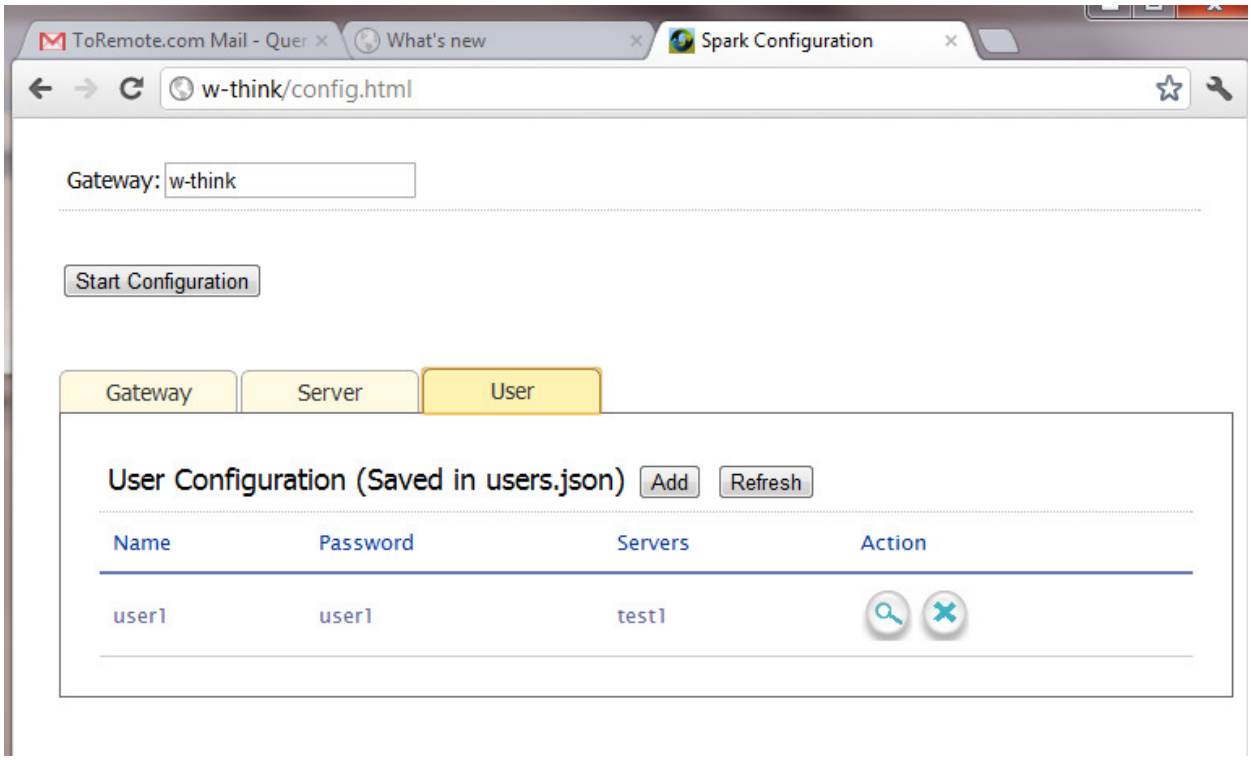
You can use users.json file to configure: users (name and password), RDP hosts (configured in servers.json) a user can access. User will have to log in when this file was used (starting from login.html).



User will see a list of RDP hosts and applications they can use after logging in:



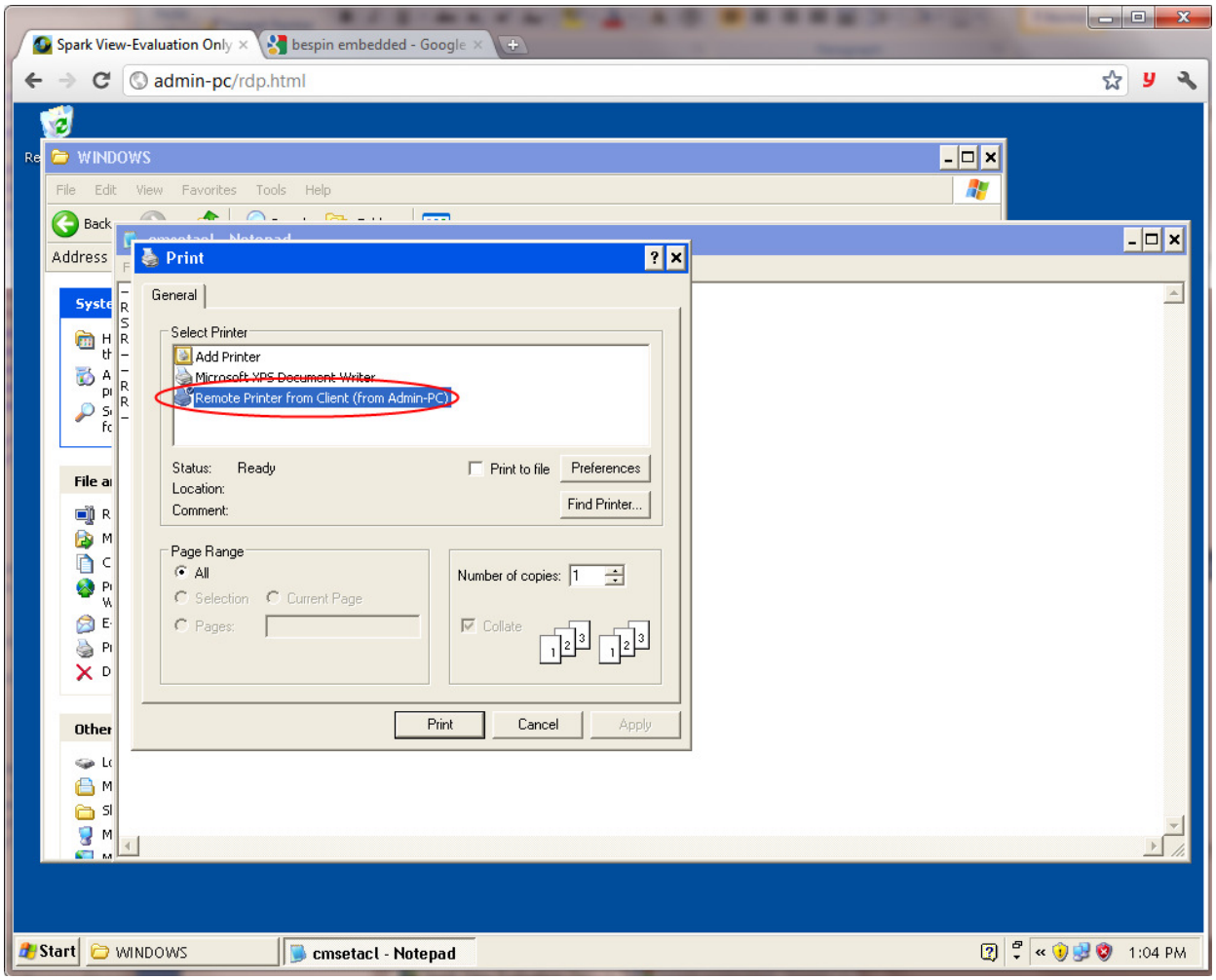
You can also use config.html to configure users.json. Use your browser navigate to: http://localhost/config.html. For security reason, this page can be only accessed from local host.



3.6.Easy Printing

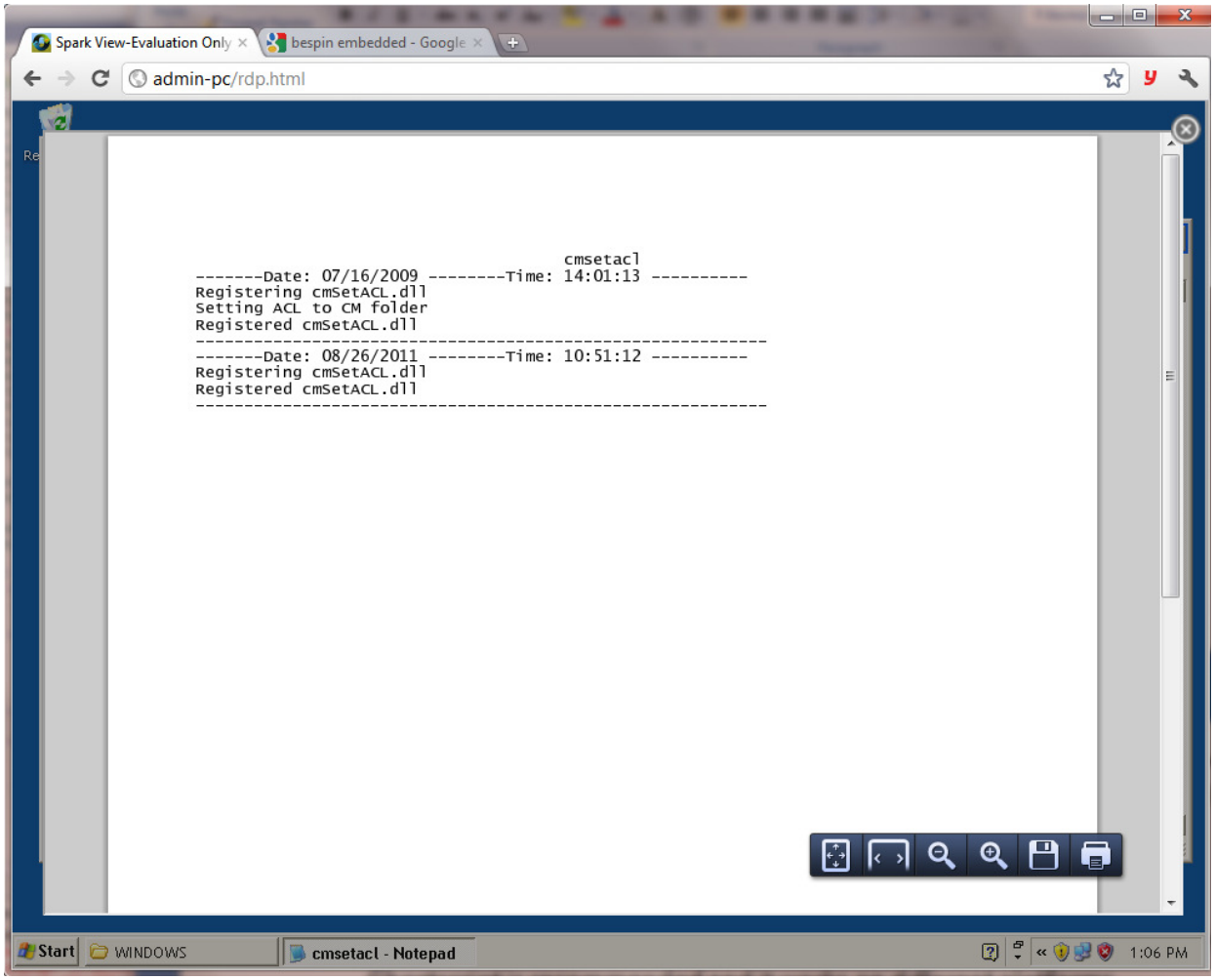
In a traditional RDP environment, you may have to install drivers for client side printers to make printer redirection work. With Spark View Easy Printing, you don't need to do that. This how Spark View Easy printing works:

- Gateway attaches a universal PostScript printer to RDP host automatically.



- Gateway converts the printing (PostScript) to PDF file when user print.
- Gateway then sends the PDF file to user.

- User views or prints the PDF file in local.



To make printing works, you need to install a PostScript to PDF converter along with Gateway. Ghostscript is recommended and it works on different platforms.

Please also make sure printer redirection is enabled in RDP host.

Install a PCL printer instead of a PostScript Printer:

1. Set a PCL to PDF converter in gateway.conf (we use ghostPCL http://www.ghostscript.com/GhostPCL.html here):

converter = C:\\apps\\ghostpcl-9.05-win32\\pcl6-9.05-win32.exe

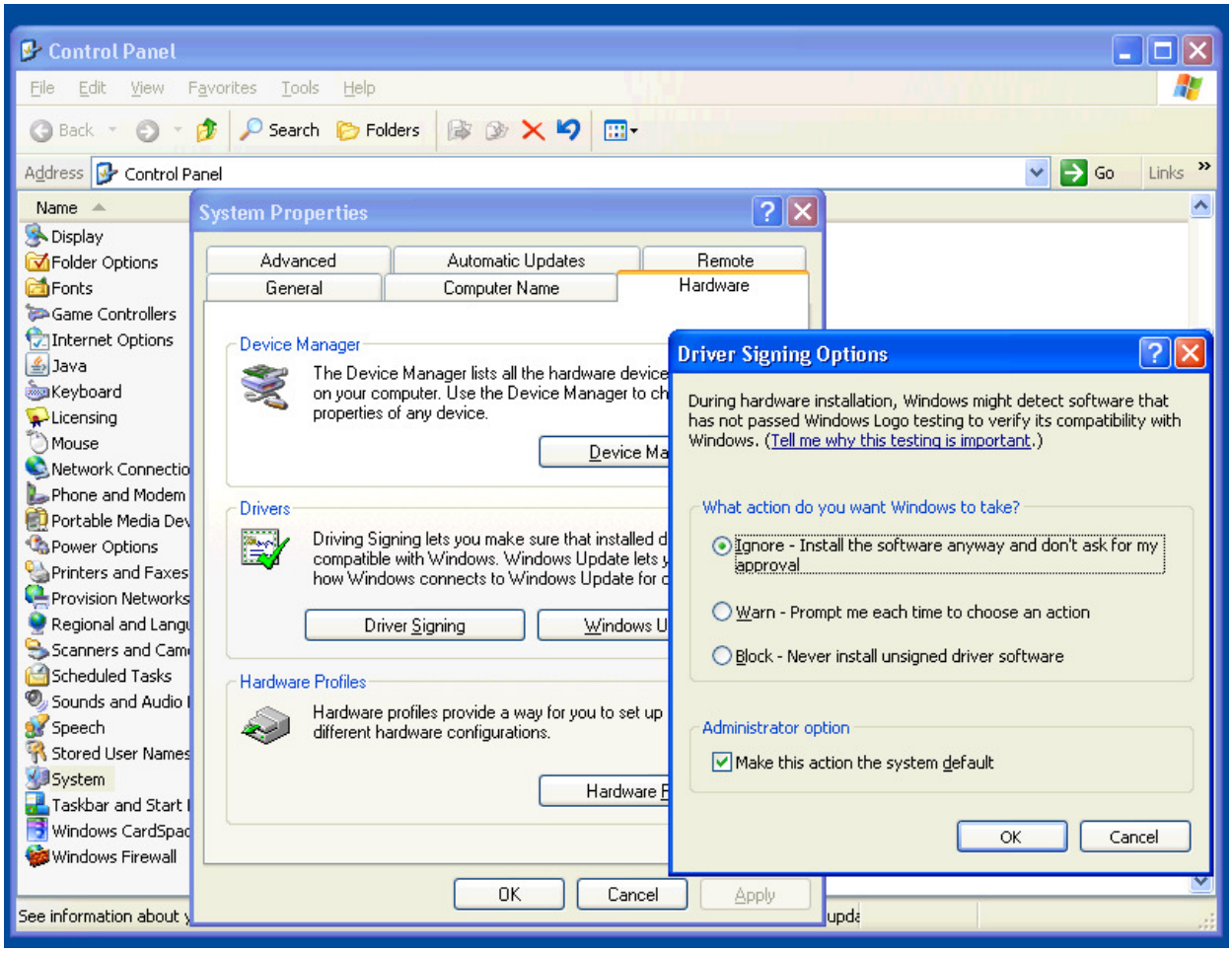
2. Set the arguments for converter in gateway.conf:

arguments = -dNOPAUSE -sDEVICE=pdfwrite -sOutputFile=%1 %2

3. Set a PCL printer driver in gateway.conf:

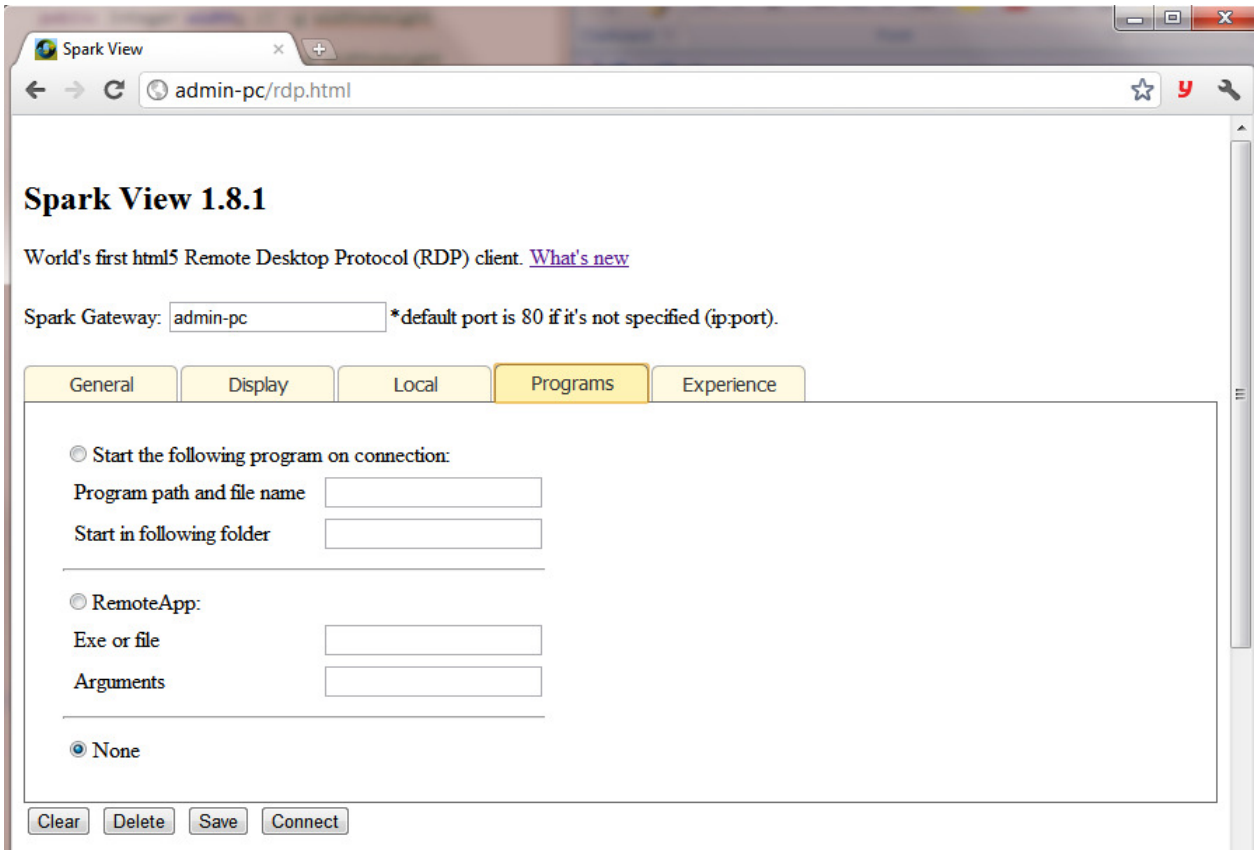
printerDriver = HP LaserJet 4100 Series PCL

If you got “Unsupported driver Installation” warning on Windows 2003, please change following setting:

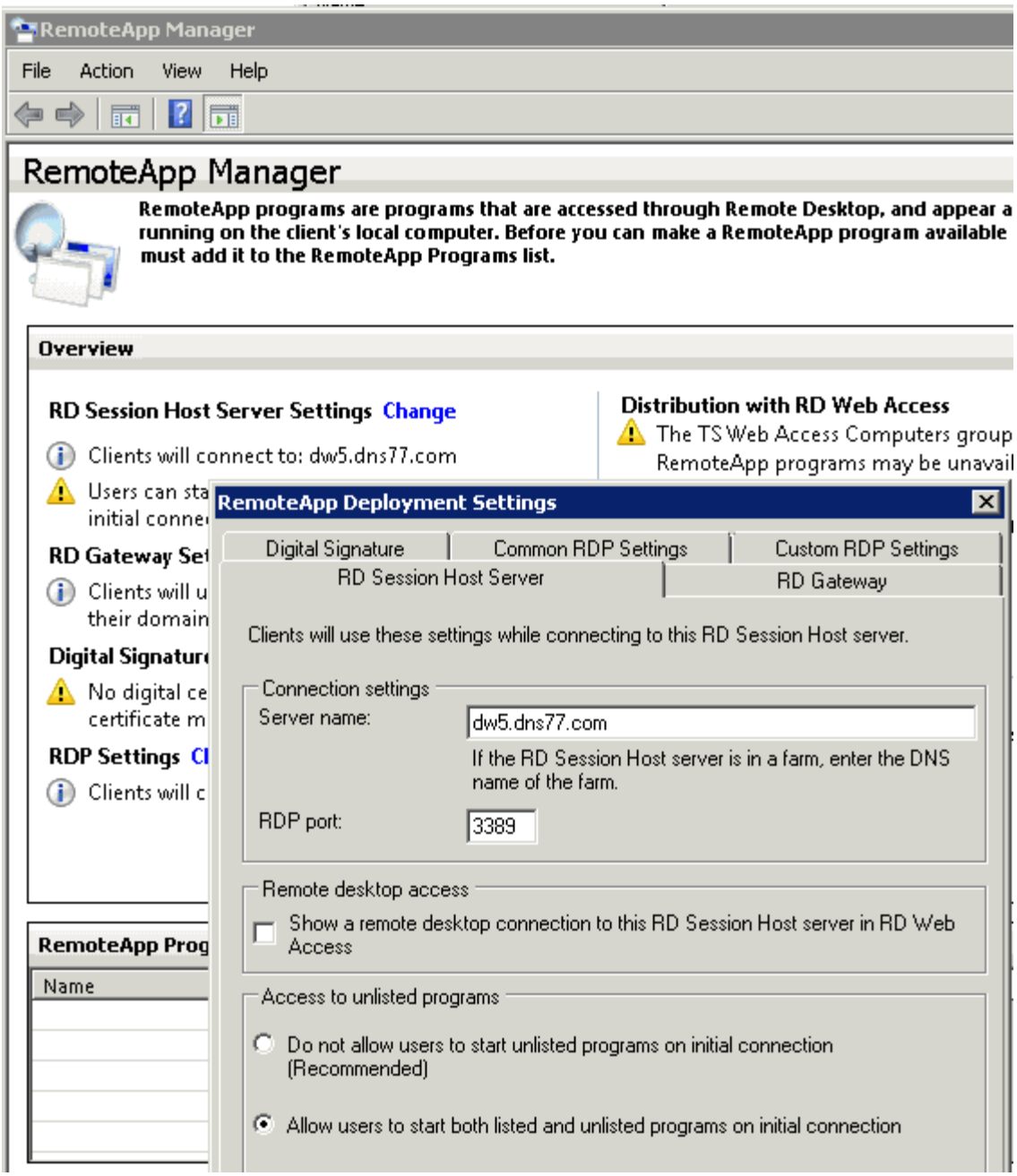


3.7.RemoteApp and start a program instead of the whole desktop

There are two ways to start a program:



Start a program on connection use a program as shell of Windows. That means you can only use one program in this session. You'll need to create 2 sessions to start 2 programs (This user will use two Spark View licenses then). To configure "Start a program on connection" in servers.json file, you need to specify "command" and "directory" options. Please make sure you allow users to start unlisted programs on Windows 2008.



RemoteApp was introduced in RDP 6.1. All RemtoeApps running on client side can share only one session, even you are running thousands of RemoteApps. To configure RemoteApps in servers.json, you need to specify “remoteProgram”, “remoteWorkDir”, and “remoteArgs” options.

RemoteApp window will be automatically resized (no reconnection needed) when you resize the browser window.

Here is a example for setting up RemoteApp in servers.json:

```
{
    "id": "RemoteAppWord",
    "displayName": "RemoteApp WORD",
    "server": "192.168.8.119",
    "icon": "kbd.png",
    "protocols": "rdp",
    "rdp": {
        "username": "Administrator",
        "mapClipboard": true,
        "password": "password",
        "remoteProgram": "||WINWORD"
    }
  },
```

If you are using alias name of the RemoteApp, please make sure there are || before it.

For a good user experience, it's better to start program without splash screen, also set time limit for disconnected session on RDSH:

1. Log on to the terminal server as an administrator.

2. Start the Local Group Policy Editor. To do this, click **Start**, click **Run**, type **gpedit.msc**, and then click **OK**.

3. Locate the following node:

Computer Configuration\Administrative Templates\Windows Components\Terminal Services\Terminal Server\Session Time Limits

Note: The policy settings are also located under **User Configuration\Administrative Templates\Windows Components\Terminal Services\Terminal Server\Session Time Limits**

Please check following links for more information:

http://en.wikipedia.org/wiki/Remote_Desktop_Services#RemoteApp

http://technet.microsoft.com/en-us/library/cc753112(v=ws.10).aspx

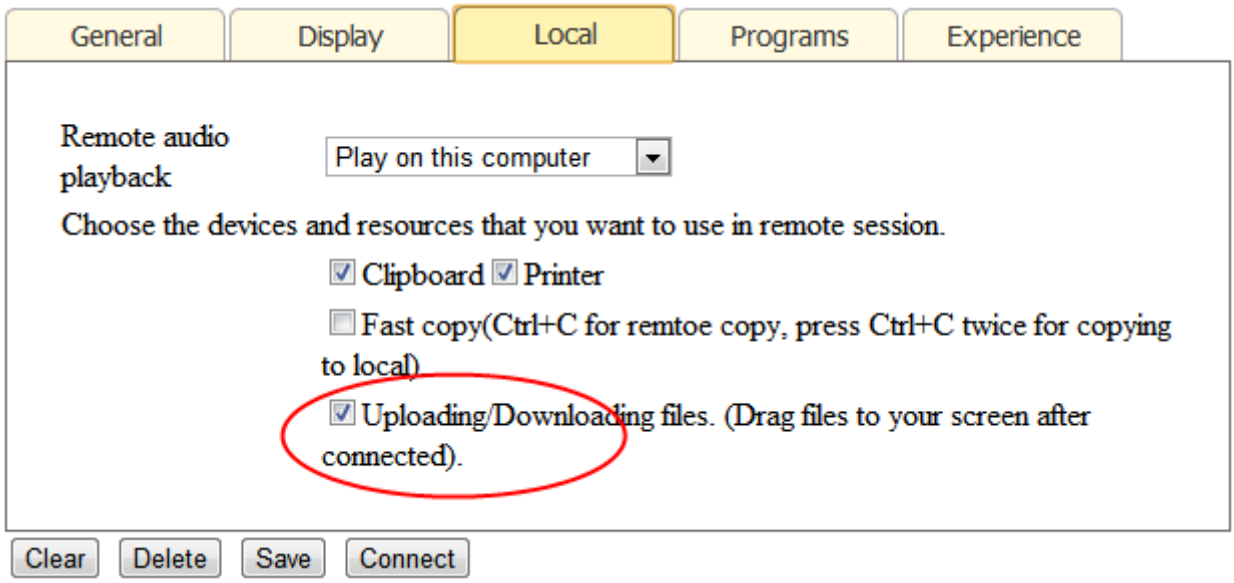
http://technet.microsoft.com/en-us/library/cc730673(WS.10).aspx

3.8.File share (uploading and downloading)

There are two ways to implement file downloading/uploading. One is using temporary directory for every user. The temporary directory will be deleted after user session was terminated. Another is using permanent directory for each RDP host.

Temporary directory:

1. Configure a parent directory in gateway.conf: tmpdir = C:\\apps\\share
2. Make sure "Uploading/Downloading files" selected on client side.



Permanent directory:

1. Configure disk mapping in servers.json:

```
 "mapDisk": true,
"disks": [
 {
  "dosName": "Storage",
  "longName": "Long Display Name",
  "devicePath": "/apps/test/"
```

}

],

2. Make sure “Uploading/Downloading files” selected on client side.

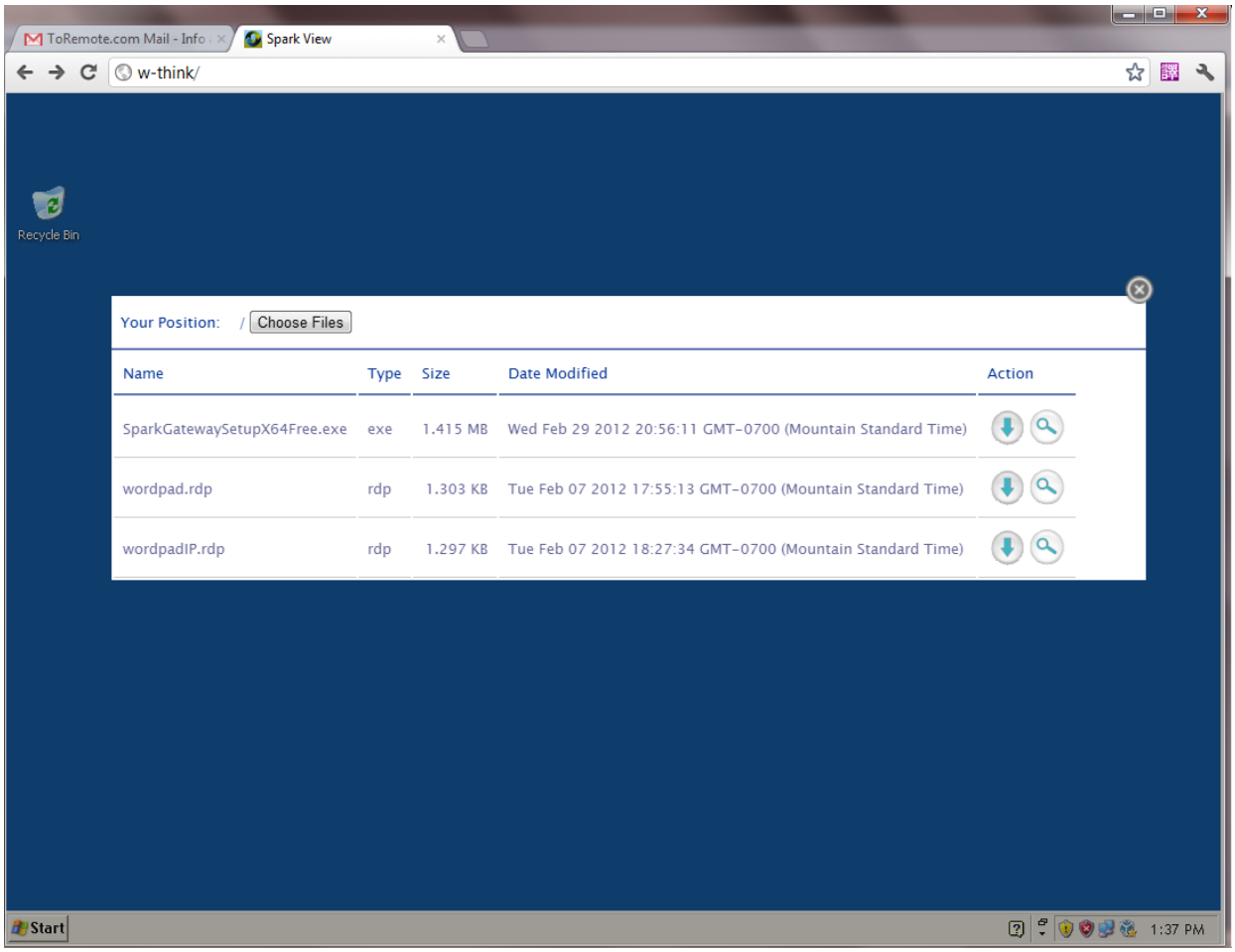
Uploading files:

Choose files or drag files to your remote desktop (anywhere except the cloud icon) after logged in. Click the cloud icon on the top middle of you screen to check the uploading process.

The cloud icon will disappear if you have no operation for a while, click anywhere on the screen to bring it back again.

Downloading files:

Click the cloud icon, a file browser dialog will be displayed. You can enter a folder or select a file to download:



For best result, please make sure share directory is in another disk or file system.

File share will be disabled if no directory is specified in servers.json and gateway.conf.

3.9.Session Recording and Playback

Spark View can record your session in RDP stream format (.rdpv) and play it anywhere. This format has smallest size and best quality in the world.

You need to configure following 3 properties in gateway.conf:

```
#session recording, 1 means recording graphic only, no sound. 3 means recording
graphic and sound.s
recording = 1

#parent directory for session recording
recdir = C:\\apps\\share

#warn user about recordig
recwarning = true;
```

3.10. Session Shadowing (Join or share a session)

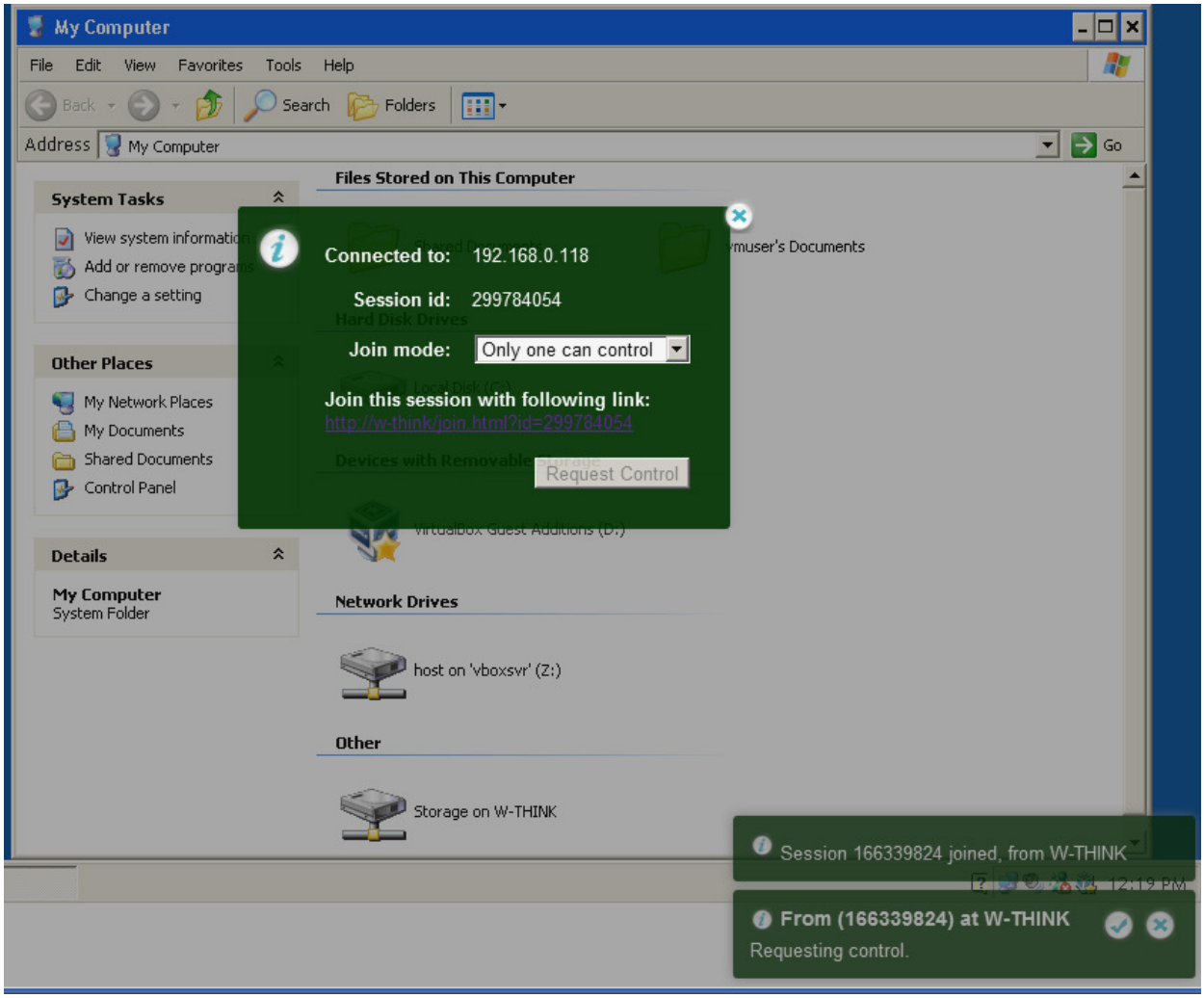
Unlimited users can join/share one existed session via one click if you know the session id:
http://www.remotespark.com/join?id=123456789

The input can be controlled by all users or only one of them. User can require control form other user, or give control to other user.

Spark session shadowing has following advantages compared other solutions:

- Fully based on RDP protocol (no VNC involved), has better performance and using fewer bandwidth.
- Every joined user can see other user's mouse movements.
- Two join mode: Every one can control or only one can control at a time.
- Even sessions on Windows XP, Windows 7, xrdp can be joined too.
- Unlimited user can join one session, depends the ability of you gateway.

RemoteApp session can not be joined yet in current version.



3.11. Touch Interface (iOS, Android etc)

There is a touchpad mode (relative mouse movement) option for touch interface. Please click the keyboard icon  or user 3 finger tap to activate the keyboard.

To drag a window or something under touchpad mode, you'll need to press on the target and hold, then move your finger.

Chrome beta or Firefox is recommended for Android.

4. API and plug-in

4.1.Reporting API(Query server status, Client side JavaScript API)

Include "gateway.js" in your web page:

```
var gw = new Gateway("192.168.9.118");
gw.login("password");
gw.report();// output to console
gw.report(callback);// output to callback method
gw.checkLicense(callback2); // check license status
function callback(obj) {
	if (obj.error) {
		console.log("Error on getting report:" + obj.error);
		return;
	}
	var c, cs = obj.connections;
	var len = cs.length;
	console.log("\nTotal connections:" + len);
	for ( var i = 0; i < len; i++) {
		c = cs[i];
		console.log("connection " + i + " ------");
		console.log("clientIp: " + c.clientIp);
		console.log("clientAgent: " + c.clientAgent);
		console.log("server: " + c.server);
		console.log("startTime: " + c.startTime);
	}
}
```

We also have Java command line tool available for same purpose. Please download it from our web site.

We also have WebSocket client available which can be used to communicate with our gateway or other WebSocket servers.

4.2.Rdp libray (Client side Javascript API)

4.2.1. Rdp parameters

Parameter	Value
gateway	String, address and listening port of the gaetway. For example: 192.168.0.8:443
server	String, address of the RDP host.
port	Integer, RDP listening port. Optional, default is 3389
user	String, user name (Windows User).
pwd	String, password for user name.
domain	String, domain name
keyboard	Integer, keyboard layout, default is 0x409 (US)
useConsole	Boolean, connecting to console session/Admin mode. Default is false.
legacyMode	Boolean, connecting to xrdp or VirtualBox RDP
width	Integer, screen width of RDP session. Default is 800
height	Integer, screen height of RDP session. Default is 600
server_bpp	Integer, color depth of RDP session. Default is 16

playSound	Integer, Default is 1: Do not play sound; 0: bring sound to local; 2: leave sound on remote computer.
startProgram	String, "shell": start a program on connection; "app": start a RemoteApp.
command	Command for "Start a program on connection (startProgram=shell)"
directory	Directory for running command (startProgram=shell)
exe	Program or file for RemoteApp (startProgram=app).
args	Arguments for RemoteApp (startProgram=shell).
background	Boolean, default is false, disable background
smoothfont	Boolean, default is false, disable font smoothing.
contents	Boolean, default is false, disable full windows drag.
animation	Boolean, default is false, disable menu animations.
composition	Boolean, default is false, disable desktop composition.
styles	Boolean, default is false, disable theming.
mapClipboard	Boolean, default is false, disable clipboard rediretioin.
mapPrinter	Boolean, default is false, disable printer redirection.
mapDisk	Boolean, default is false, disable disk redirection.
touchpad	Boolean, default is false, touchpad mode (relative mouse movement, touch interface only).
waWidth	Work area width for RemoteApp, Default value is the screen width. You may want to change it if you display app in a iframe.
waHeight	Work area height for RemoteApp. Default value is the screen height. You may want to change it if you display app in a iframe.
printer	Printer name
useSSL	Use WSS (WebSocket secure connection), only used by Rdp2 class.
timezone	The client time zone name. Please check the values you can use in rdp.html
loadBalanceInfo	Load balance information

4.2.2. Passing parameter via URL.

Please use "on" and "off" for Boolean value if you are using URL to pass parameters.

Connecting to desktop:

```
var parameters = "server=192.168.0.2&user=admin&pwd=" + encodeURIComponent("&=@#");
//use encodeURIComponent to escape special characters in value
```

```
var width = 800, height = 600, server_bpp = 16;
var r = new svGlobal.Rdp("http://" + gateway + "/RDP?" + parameters, width, height,
server_bpp);
r.addSurface(new svGlobal.LocalInterface());
r.run();
```

Connecting to RemoteApp in current window:

You only need to add some extra parameters:

```
parameters += encodeURIComponent("startProgram=app&exe=||EXCEL");
```

Connecting to RemoteApp in a new window:

```
var parameters = "server=192.168.0.2&user=admin&pwd=" + encodeURIComponent("&=@#");
//use encodeURIComponent to escape special characters in value
parameters += encodeURIComponent("startProgram=app&exe=||EXCEL");
var width = 800, height = 600, server_bpp = 16;
var r = svManager.getInstance(); //try use the existed session.
if (r == null){
	r = new svGlobal.Rdp(protocol + gw + "/RDP?" + s, width, height, server_bpp);
}

var rail = window.open("rail.html");
function onSurfaceReady(surface){
	r.addSurface(surface);
	r.startApp(frmConn["exe"].value, frmConn["args"].value, "");
};
rail.svOnSurfaceReady = onSurfaceReady;
r.run();
```

4.2.3. Passing parameter via object or cookie

Rdp2 class can be used to replace Rdp class. You can pass a object to Rdp2:

```
var obj = {gateway: "192.168.0.2", server:"192.168.0.8", user: "user"};
var r = new svGlobal.Rdp2(obj);
```

Rdp2 class will create an object from cookies if obj is undefined. If value of the document.cookie is "gateway=192.168.0.2;server=192.168.0.8;user=user", Rdp2 will create a object automatically for connection.

4.2.4. Usage of Rdp class

Properties:

Name	Type	Description
appTimeout	int	Close the RemoteApp if no Windows found after this period, default is 800 ms.
displayMsg	Boolean	If display error or warning message, default is true
reconnectOnResize	Boolean	If reconnect when resize the browser window, default is true

reconnectTimes	Int	Automatically reconnecting time, default 0.
sessionTimeout	Int	Close the session disconnection if no RemoteApp running after this period. Default value is 3000 (3 seconds). You may want to make it longer, so user can use the current session for new RemoteApp.
windowState	Int	State of RemoteApp main window, 3: always maximized, 0: controlled by user
openLink	Boolean	Display a web link button when user copy a web link in remote computer, default is true

Methods:

Name	Description
close()	Close current RDP session.
exeAppCmd(cmd)	Execute command on current RemoteApp, cmd (Int) values: 0xF020: Minimize the window 0xF030: Maximize the window 0xF060: Close the window 0xF100: Display the windo's system menu 0xF120: Restore the window
mouseDown(x, y, button)	Send mouse down to RDP host. X, y: mouse position, button: which button, same as event.button.
mouseUp(x, y, button)	Send mouse up to RDP host.
mouseMove(x, y)	Send mouse move to RDP host.
running()	Check if connected to a RDP session.
setAudioBuffer(seconds)	Audio buffer size, default is 2.0 seconds
writeKeyCode(down, keyCode)	Send browser keyCode to RDP host. "down": Boolean
writeText(txt)	Send Unicode to RDP host

Events:

Name	Description
onclose()	Triggered when RDP session is closed.
onerror(error)	Triggered by an error. Use error.name, error.message to get error details.

4.2.5. Virtual Channel

You can create one and only one RDP virtual channel on client side using JavaScript:

```
var r = new svGlobal.Rdp(protocol + gw + "/RDP?" + s, w, h, server_bpp);
var vc = new r.VirtualChannel();
vc.name = "CUST";
vc.process = function(buffer){
	console.log(buffer.getByte());
	console.log(buffer.getLittleEndian16());
};
vc.onopen = function(){
	var data = new Array(7);
	var rb = new RdpBuffer(data, 0, 7);
	rb.setByte(1);
	rb.setLittleEndian16(345);
	rb.setLittleEndian32(567);
	rb.markEnd();
	vc.send(rb)
}
r.addChannel(vc);
```

You can create more virtual channels on server side using gateway plug-in and Java.

4.3.Plug-ins (Server side Java API)

Your plug-in must implement com.toremote.gateway.plugin.ManagerInterface. With the plugin, you can do authentication integration, session querying and reporting, RemoteApp management and RDP virtual channel extensions, player integration, new protocol handler etc. Please download our plugin example project for more information:

http://www.remotespark.com/Plugin.zip