

ZICE 17 On-boarding



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Jan. 24th, 2017
ZICE 17 – University of Zürich

Outline

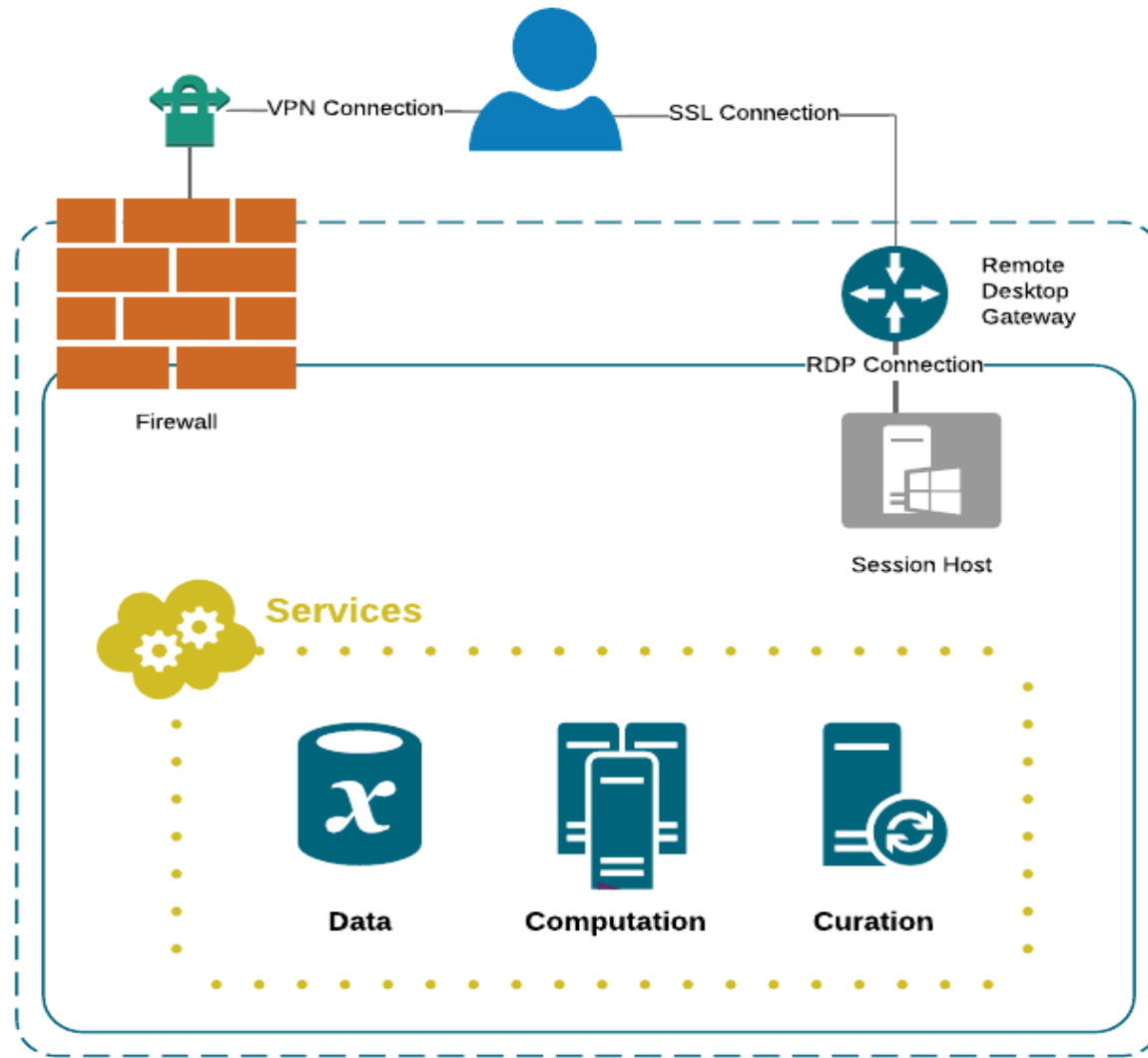
1. The compute infrastructure for ZICE
2. Accessing WLAN during ZICE
3. Access to ALPHACRUNCHER Services
4. Course management – git Classroom
5. First steps on a Linux Cluster

Aim

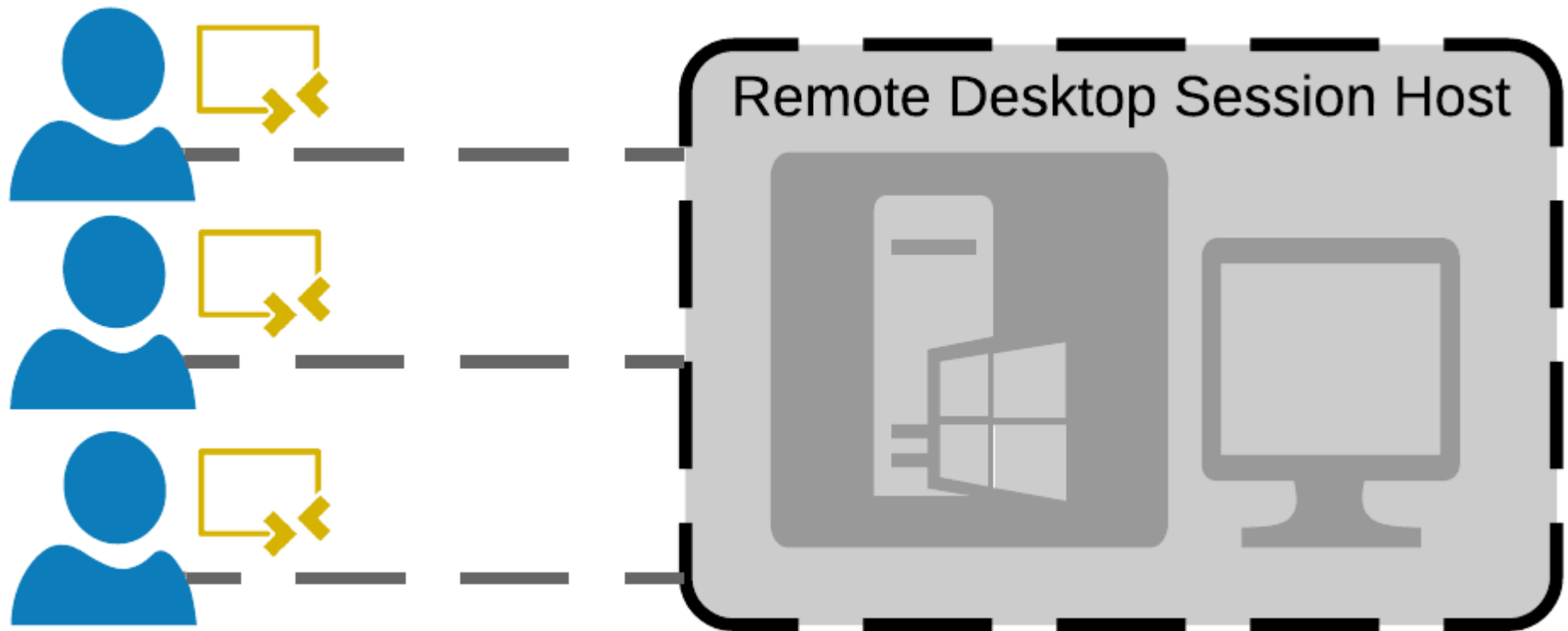
- Every student works on a unified environment (no issues with licenses etc.)
- Service to the community: knowledge transfer
Access to resources for an extended period of time, even outside the UZH network.

1. The compute infrastructure

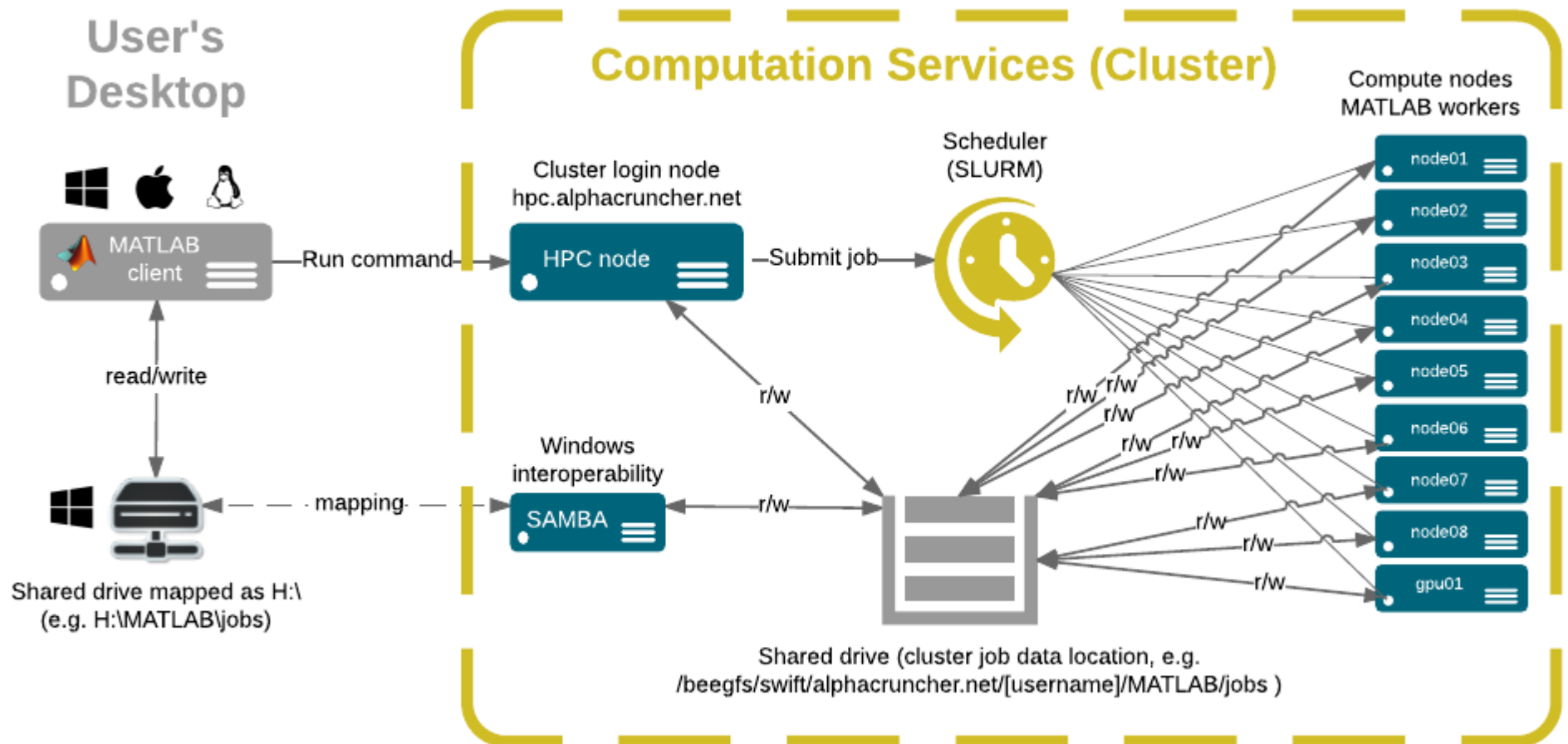
©Alphacruncher



Session-based desktop deployment



Compute Cluster



2. Accessing WLAN during ZICE

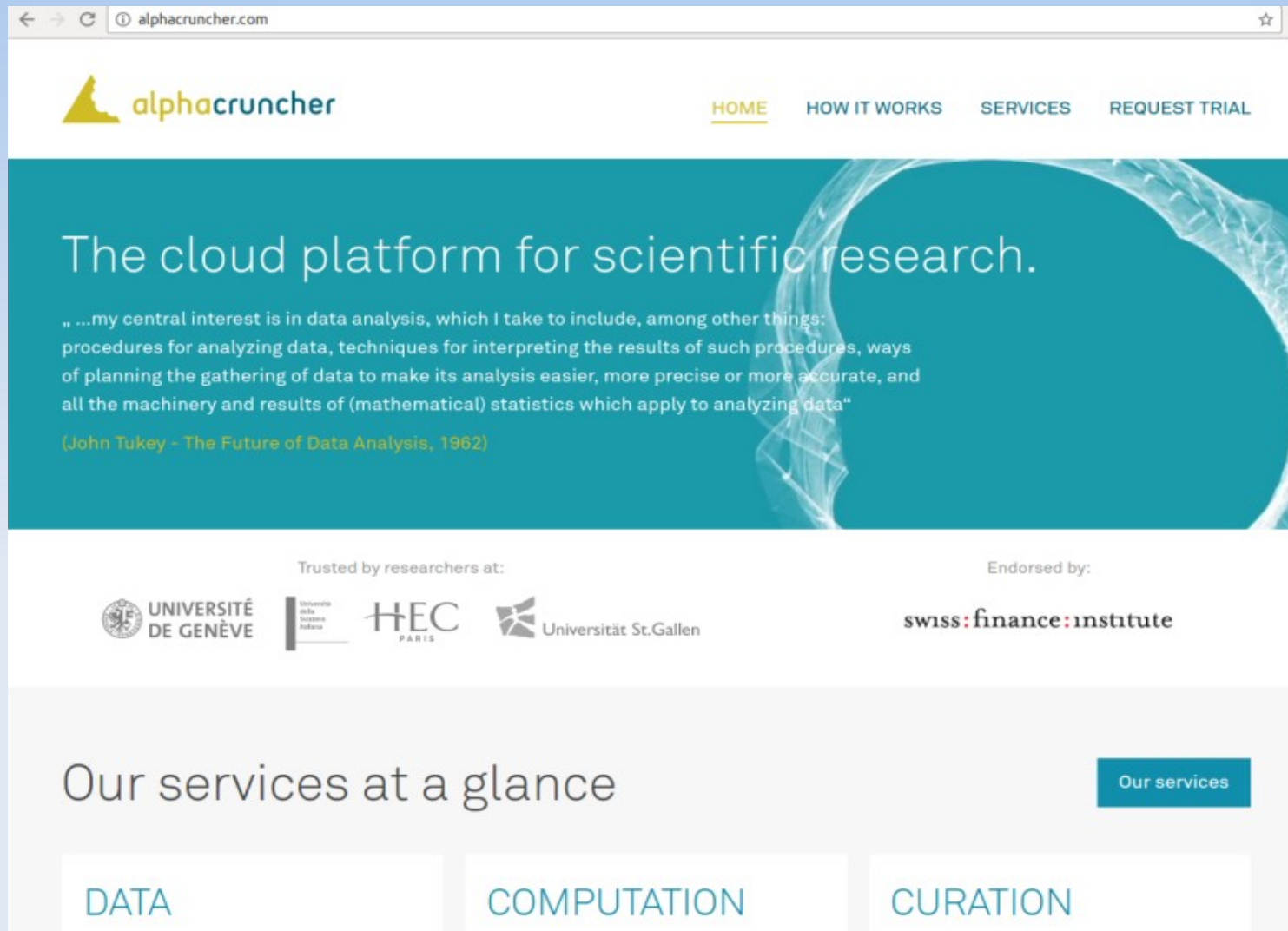
You all received the login credential today.

Make sure you **DO (IF POSSIBLE) NOT LOG INTO THE NETWORK WITH MULTIPLE DEVICES AT THE SAME TIME.**

→ we want to avoid bandwidth problems.


3. Access to Alphacruncher Services

URL: alphacruncher.com



The screenshot shows the homepage of alphacruncher.com. The browser address bar displays "alphacruncher.com". The website features a teal header with the "alphacruncher" logo and navigation links: "HOME", "HOW IT WORKS", "SERVICES", and "REQUEST TRIAL". The main content area has a teal background with a white circular graphic on the right. The text reads: "The cloud platform for scientific research." followed by a quote from John Tukey (1962) about data analysis. Below this, logos of partner institutions are shown under the headings "Trusted by researchers at:" and "Endorsed by:". The bottom section, titled "Our services at a glance", includes a "Our services" button and three service categories: "DATA", "COMPUTATION", and "CURATION".

← → ↻ ⓘ alphacruncher.com ☆

 **alphacruncher**




[HOME](#) [HOW IT WORKS](#) [SERVICES](#) [REQUEST TRIAL](#)

The cloud platform for scientific research.

„...my central interest is in data analysis, which I take to include, among other things: procedures for analyzing data, techniques for interpreting the results of such procedures, ways of planning the gathering of data to make its analysis easier, more precise or more accurate, and all the machinery and results of (mathematical) statistics which apply to analyzing data“

(John Tukey - The Future of Data Analysis, 1962)

Trusted by researchers at:

 **UNIVERSITÉ DE GENÈVE**  **HEC PARIS**  **Universität St.Gallen**

Endorsed by:

swiss:finance:institute

Our services at a glance

[Our services](#)

DATA **COMPUTATION** **CURATION**

Access to the remote desktop

- You all obtained an access guide for Windows – Mac OS X – Linux
- More in the lecture notes – GIT classroom
 - [edualphacruncher/zice17/simon/onboarding/onboarding_ZICE17.pdf](#)
 - [edualphacruncher/zice17/simon/onboarding/access_guide_zice.pdf](#)
- We will step you now through Windows & Mac OS X



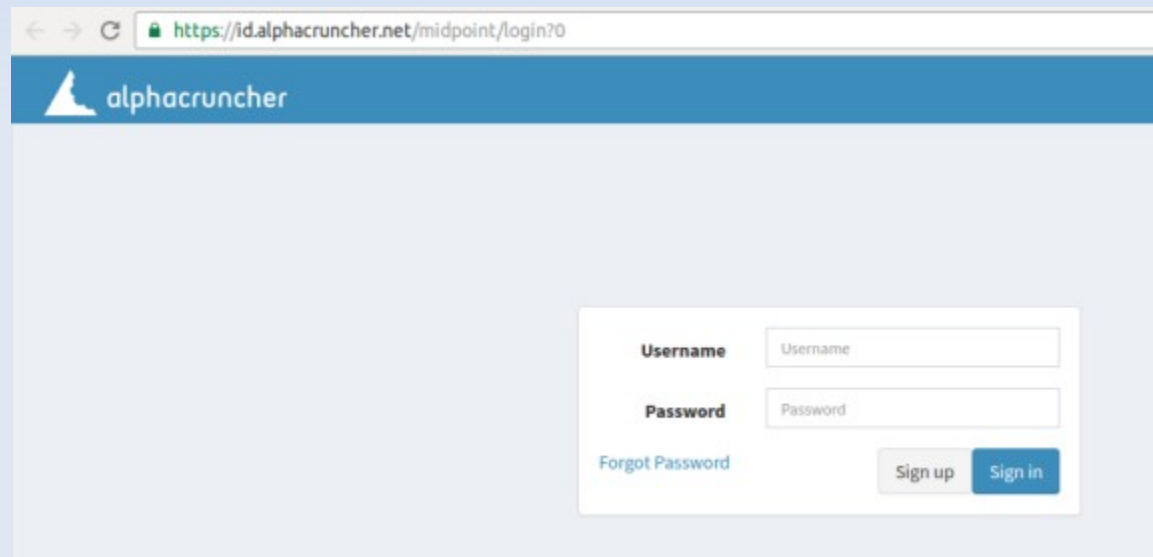
User name and password

You all (?) obtained an email stating

Access to the platform is available via Remote Desktop Connection. You need to (re)set the password first before proceeding. Please point your browser to <https://id.alphacruncher.net> and follow the instructions (see [access guide](#)).

Your username: **XYZ**

→ Reset your password here: **<https://id.alphacruncher.net>**
Click on the **Forgot Password** Link and follow the instructions



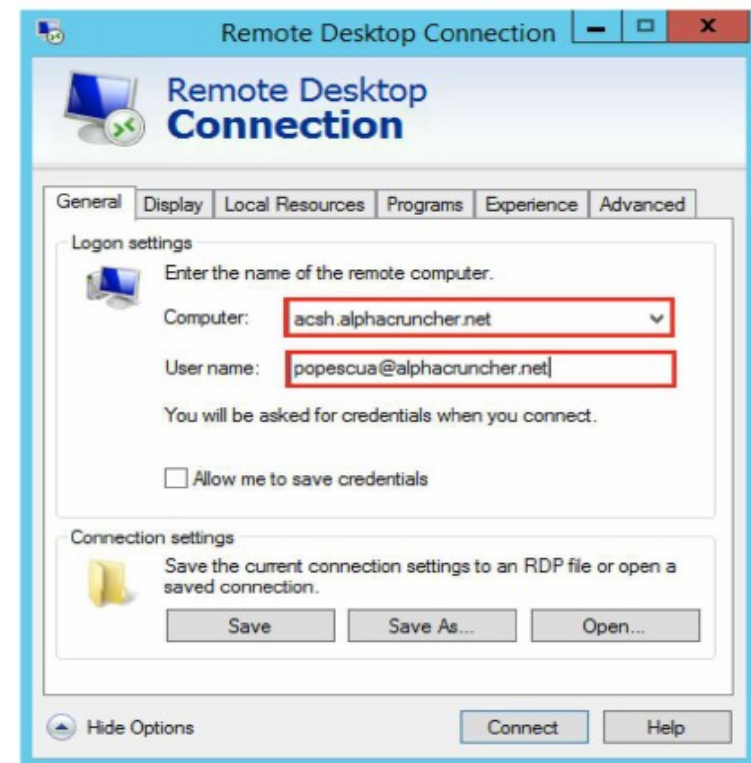
The screenshot shows a web browser window with the URL <https://id.alphacruncher.net/midpoint/login?0>. The page features the 'alphacruncher' logo in the top left. Below the logo, there is a login form with the following elements:

- Username** label next to a text input field.
- Password** label next to a text input field.
- A link labeled **Forgot Password** below the password field.
- Two buttons: **Sign up** and **Sign in**.

Windows (I)

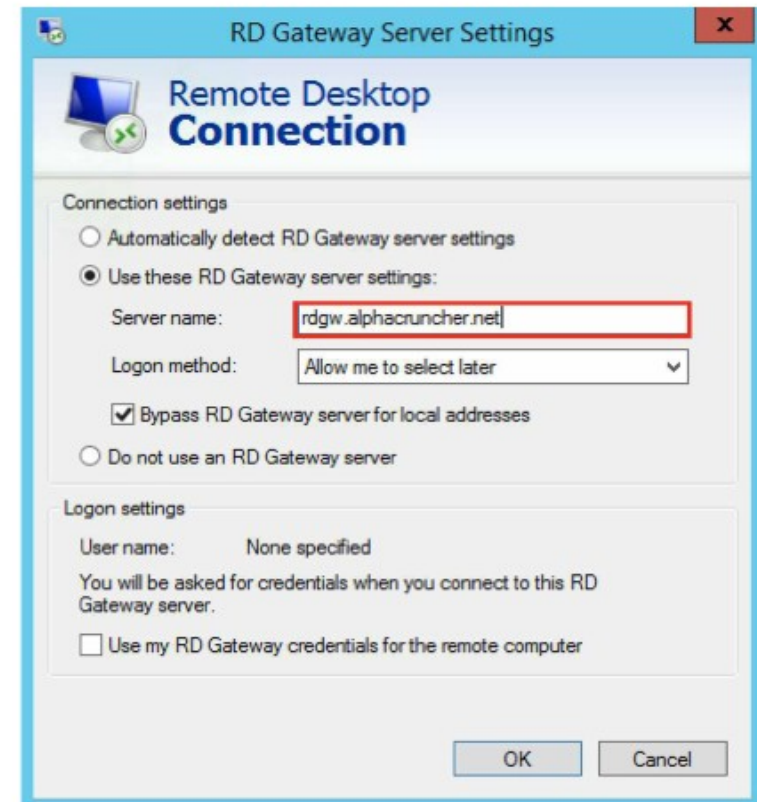
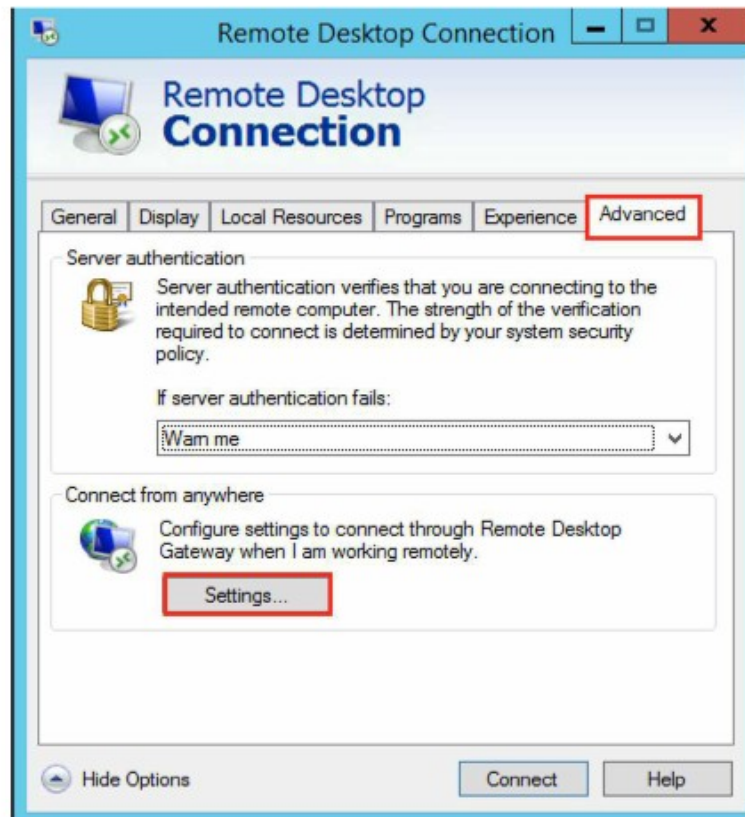


Access Remote Desktop Connection from the **Start** button, then click on **show options**



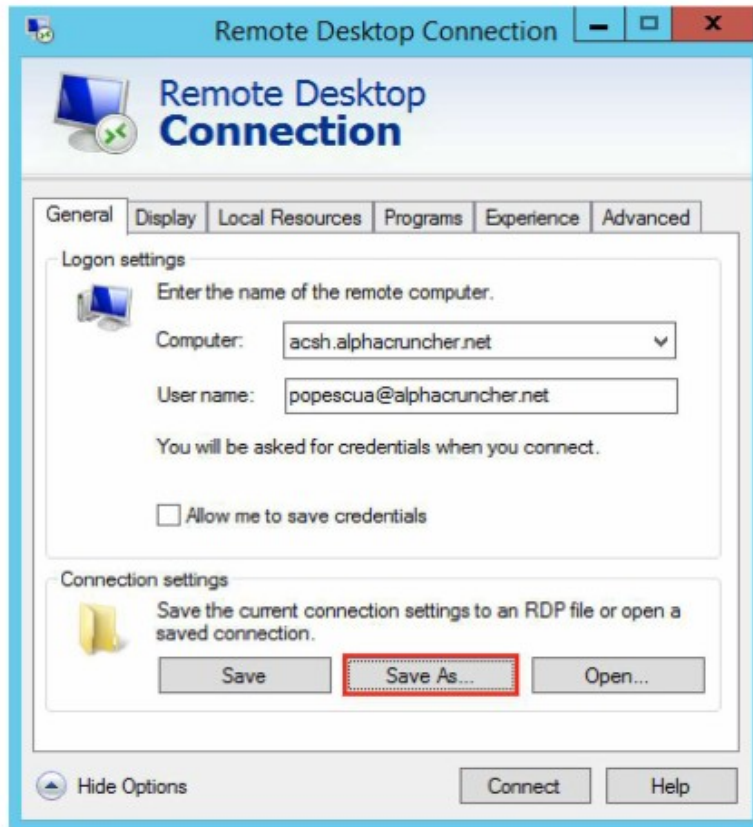
Computer: **eduzh.alphacruncher.net**
User Name: **your** username

Windows (II)

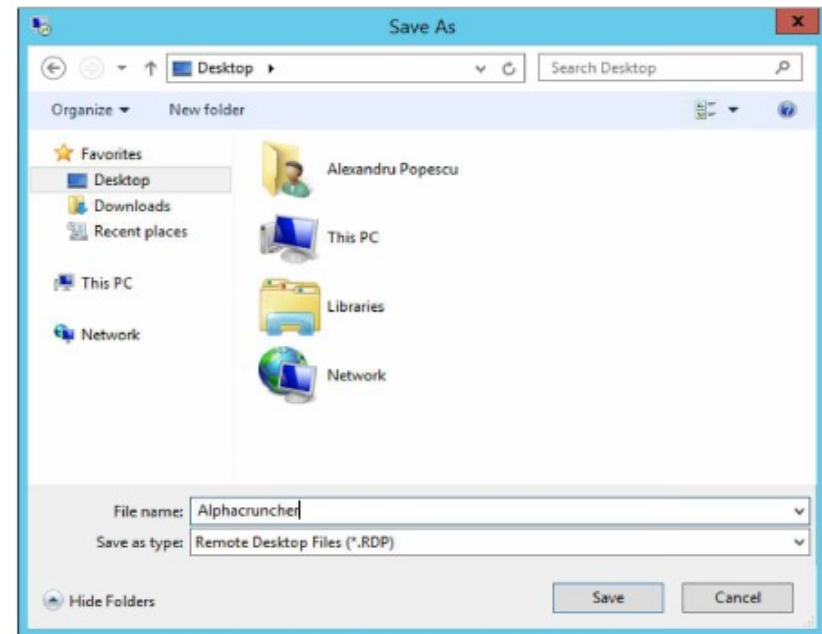


Go on "Advanced", click "Settings" Server: **rdgw.alphacruncher.net**
Logon: *Allow me to select later*

Windows (III)

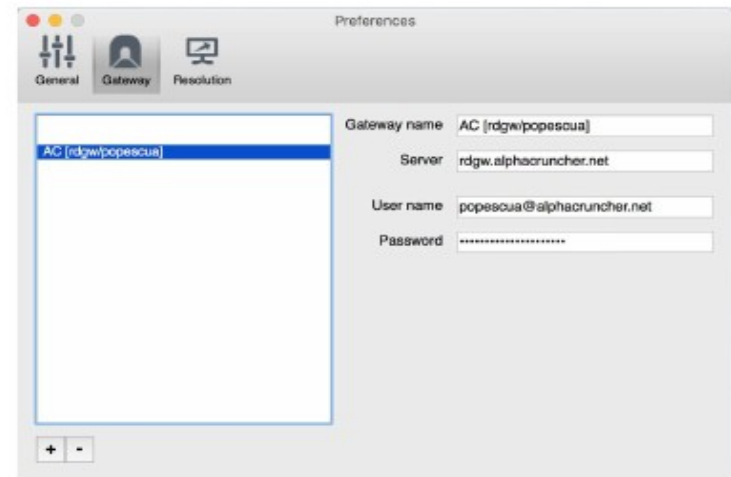
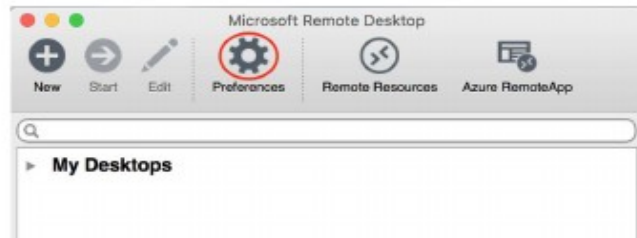


Click on "**save as**"



Save with ***.rdp** extension. Now you can connect

MAC OS X



Download the Remote Desktop Client from the Mac App Store.
Set up a New Gateway and click **Preferences**

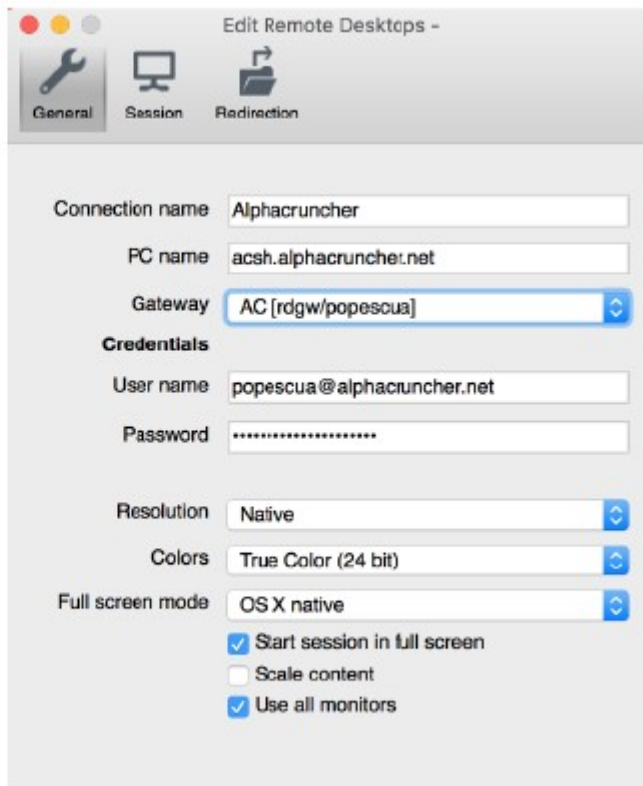
Gateway: AC[rdgw/username]
Server: rdgw.alphacruncher.net
User:
[username]@alphacruncher.net

MAC OS X (II)

On the Connection Center screen, click **New**

Enter the following information:

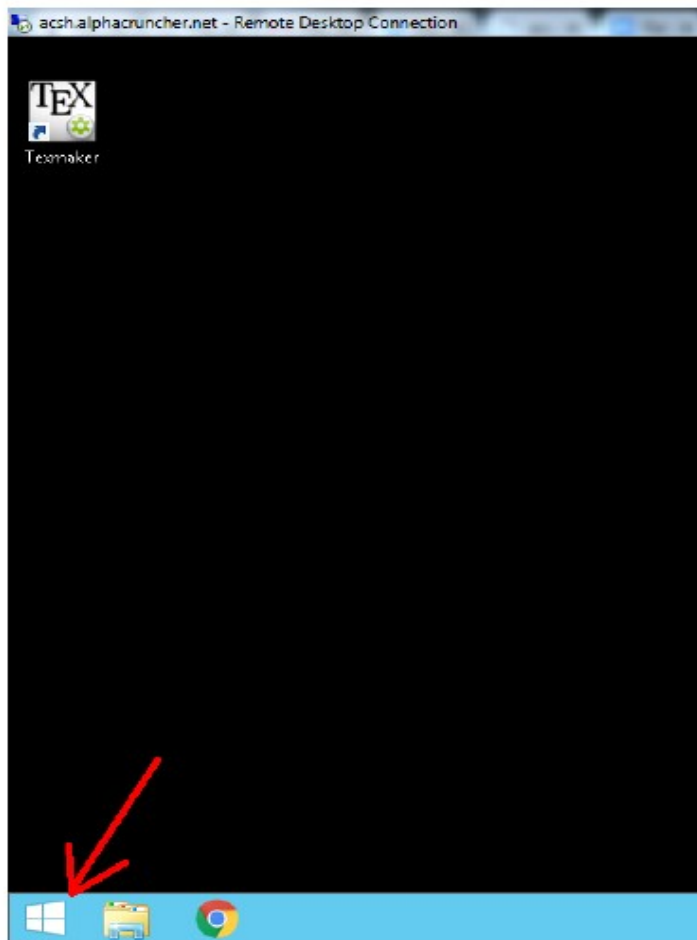
- General: Alphacruncher
 - PC name: eduzh.alphacruncher.net
 - Gateway: AC [rdgw/your username]
 - User name: [your username]@alphacruncher.net
- Connect!



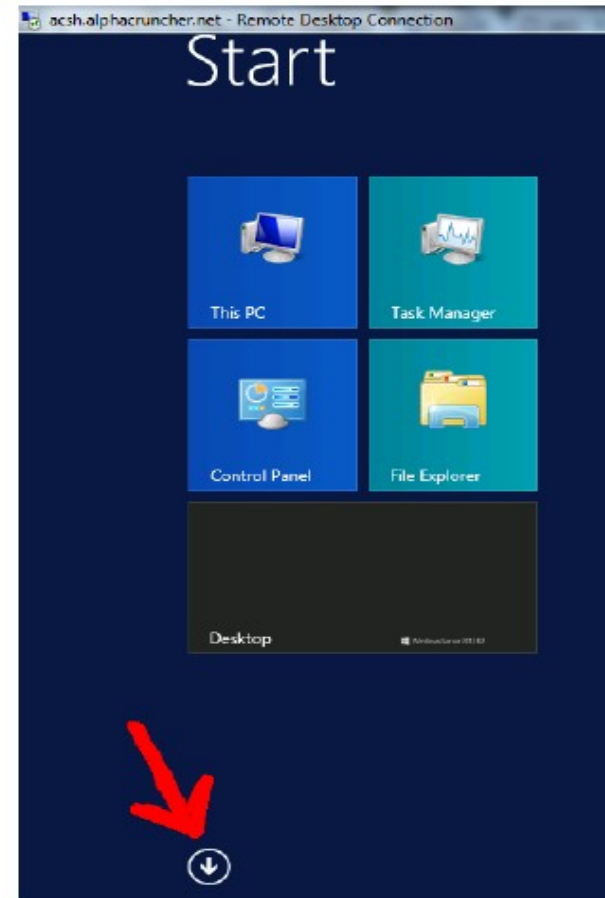
The screenshot shows the 'Edit Remote Desktops' window with the 'General' tab selected. The fields are as follows:

Field	Value
Connection name	Alphacruncher
PC name	acsh.alphacruncher.net
Gateway	AC [rdgw/popescua]
Credentials	
User name	popescua@alphacruncher.net
Password
Resolution	Native
Colors	True Color (24 bit)
Full screen mode	OS X native
<input checked="" type="checkbox"/> Start session in full screen	
<input type="checkbox"/> Scale content	
<input checked="" type="checkbox"/> Use all monitors	

Remote desktop

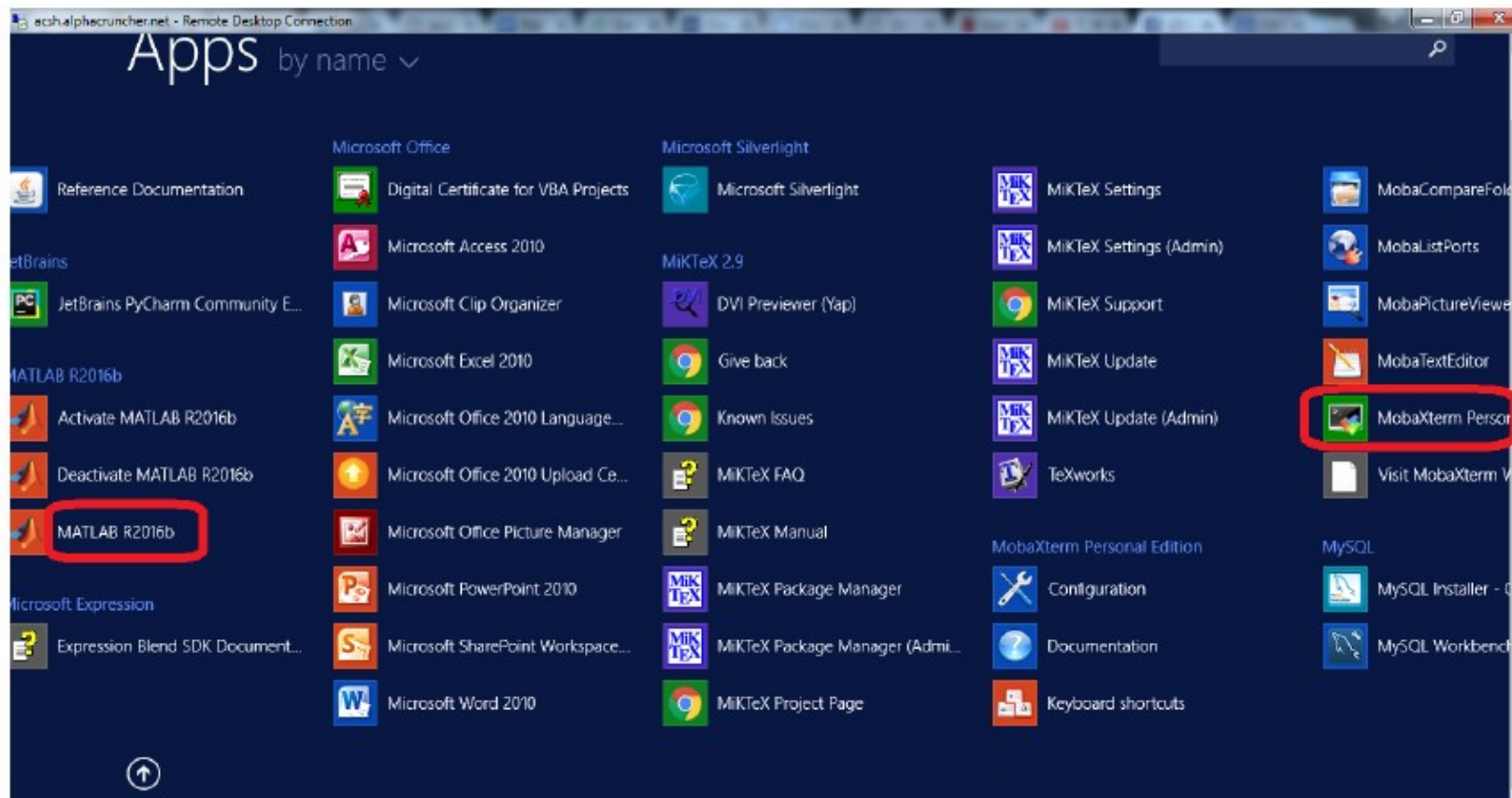


Click on the **Start** button



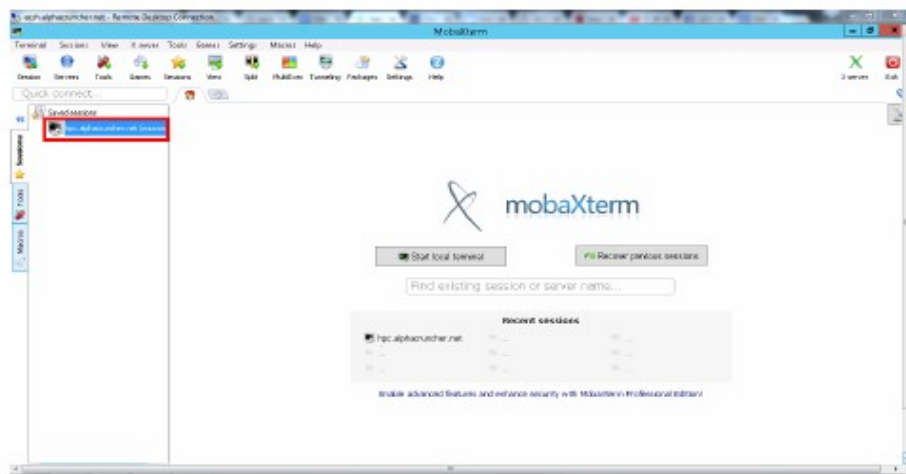
Use the lower-pointing arrow to scroll down...

Two apps you need all the time

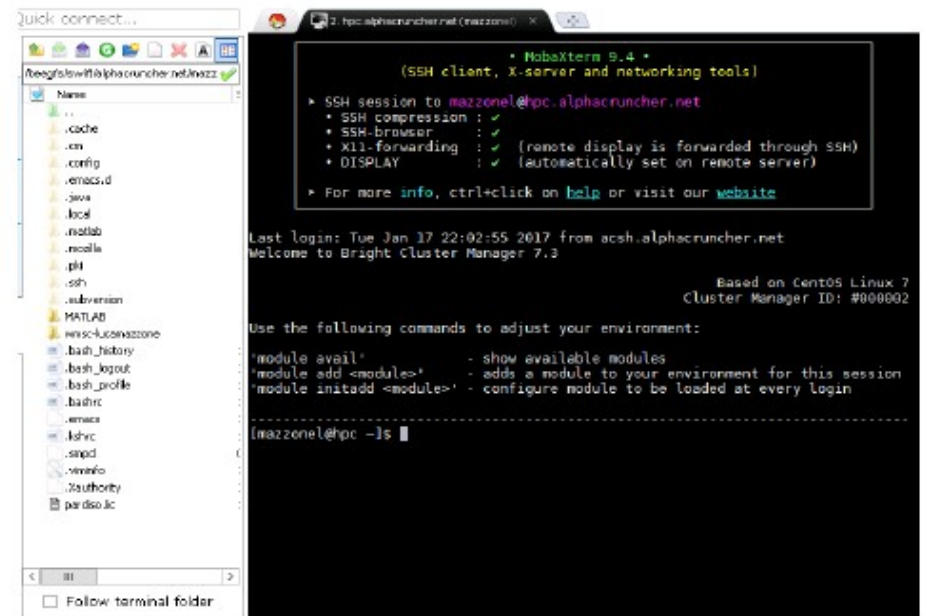


Now you can open Matlab 2016b in display mode by clicking on the icon
Click on MobaXterm to access the command line of the cluster

Accessing the “Linux” cluster



Access by clicking on the highlighted icon on top left...



... and you're finally on the command line of the cluster!

Help

On-sight support:

- Luca Mazzone (luca.mazzone@bf.uzh.ch)

Support in case of nasty cases:

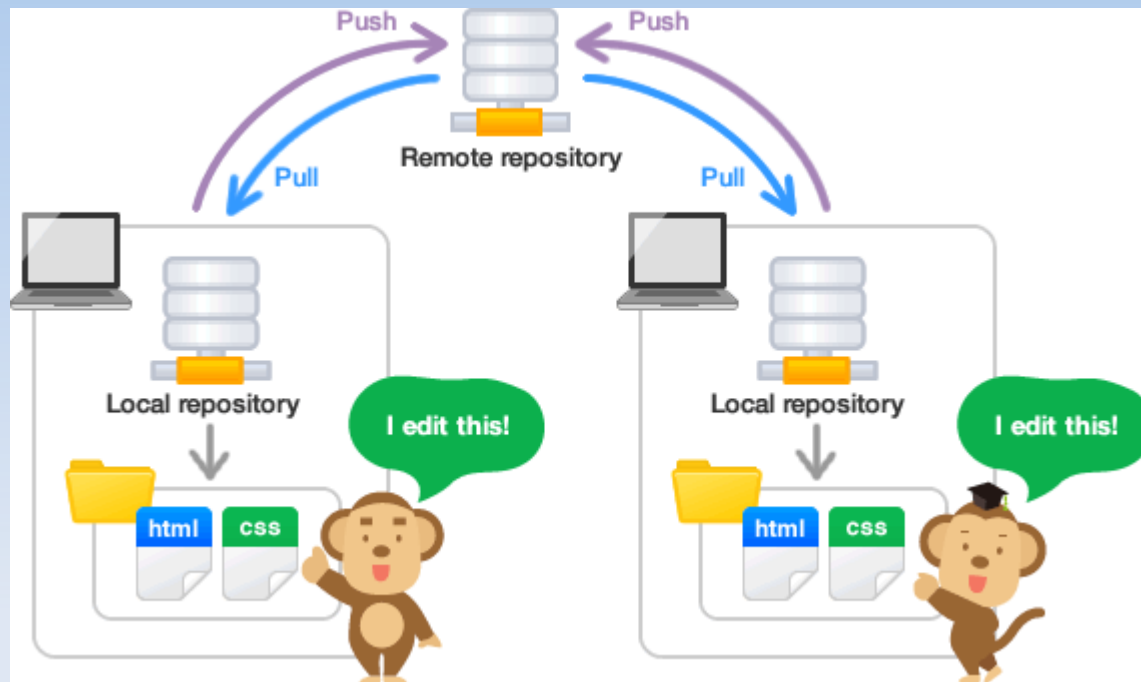
- Alphacruncher (support@alphacruncher.com)

Emergency support :)

<http://imgtfy.com/?q=help+on+alphacruncher>

4. Course management – GIT classroom

Link to classroom <https://github.com/edualphacruncher/zice17>



The official website: <https://git-scm.com/>

Free git book: <https://progit2.s3.amazonaws.com/en/2016-03-22-f3531/progit-en.1084.pdf>

How I use git :)



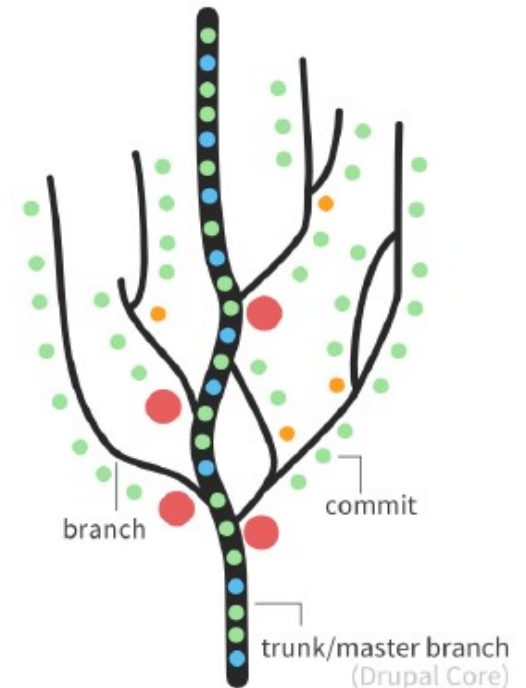
<https://xkcd.com/1597/>

Git overview

- As you develop software and make changes, add features, fix bugs, etc. it is often useful to have a mechanism to keep track of changes and to ensure that your code base and artifacts are well-protected by being stored on a reliable server (or multiple servers).
- This allows you access to historic versions of your application's code in case something breaks or to “roll-back” to a previous version if a critical bug is found.
- The solution is to use a revision control system that allows you to “check-in” changes to a code base.
- It keeps track of all changes and allows you to “branch” a code base into a separate copy so that you can develop features or enhancements in isolation of the main code base (often called the “trunk” in keeping with the tree metaphor).
- Once a branch is completed (and well-tested and reviewed), it can then be merged back into the main trunk and it becomes part of the project.

Version control system

- Git essentially keeps track of all changes made to a project and allows users to work in large teams on very complex projects while minimizing the conflicts between changes.
- These systems are not only used for organizational and backup purposes, but are absolutely essential when developing software as part of a team.
- Each team member can have their own working copy of the project code without interfering with other developer's copies or the main trunk.
- Only when separate branches have to be merged into the trunk do conflicting changes have to be addressed.
- Otherwise, such a system allows multiple developers to work on a very complex project in an organized manner.



ZICE 17 Classroom

Link to classroom <https://github.com/edualphacruncher/zice17>

We use git to provide you with lecture slides/codes

You all got access granted to our Classroom
<https://github.com/edualphacruncher/zice17>

→ Keep the master repository up to date

→ You find github's cheat sheet here:
</zice17/simon/onboarding/github-git-cheat-sheet.pdf>

Git on the remote desktop

The screenshot shows the GitHub interface for the repository 'edualphacruncher / zice17'. The repository is private and has 9 commits, 1 branch, 0 releases, and 2 contributors. A blue box with the text 'You need this address' points to the 'Clone with HTTPS' button, which is circled in red. The URL 'https://github.com/edualphacruncher/zice17' is displayed in a text box next to the button. Below the button is a 'Download ZIP' link. The repository name 'Zurich Initiative on Computational Economics' is visible at the top and bottom of the page.

edualphacruncher / zice17 Private

Unwatch 7 Star 0 Fork 0

Code Issues 0 Pull requests 0 Projects 0 Wiki Pulse Graphs Settings

Zurich Initiative on Computational Economics Edit

9 commits 1 branch 0 releases 2 contributors

Branch: master New pull request

Create new file Upload files Find file Clone or download

Clone with HTTPS ? Use SSH

Use Git or checkout with SVN using the web URL.

<https://github.com/edualphacruncher/zice17>

Download ZIP

Zurich Initiative on Computational Economics

Go on <https://github.com/edualphacruncher/zice17> and copy the address of the repository.

Git on the remote desktop (II)

On the remote computer, write:

>> **cd Desktop (or other folder)**

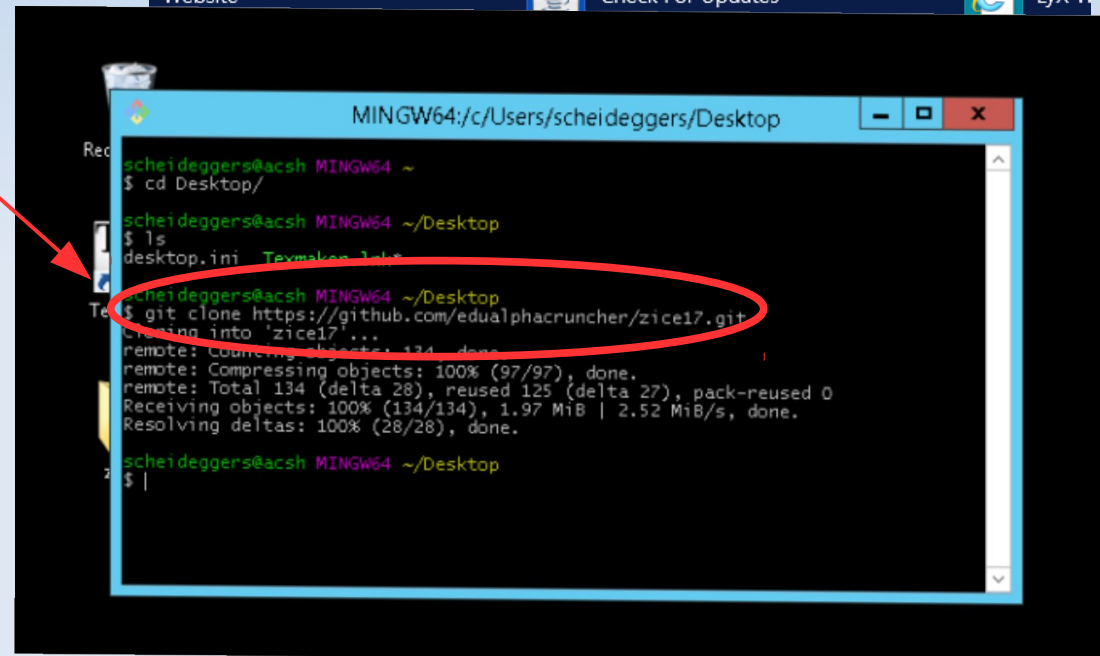
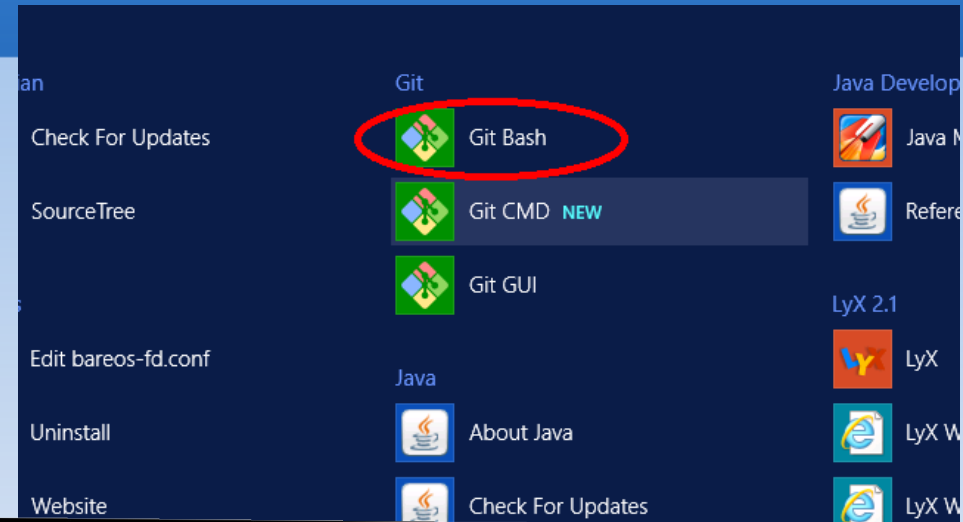
>> **git clone *address***

To **update the folder everyday**, just go again on desktop and write:

>> **cd zice17**

>> **git pull**

This downloads the file that are not (yet) in your folders.



Git on the cluster

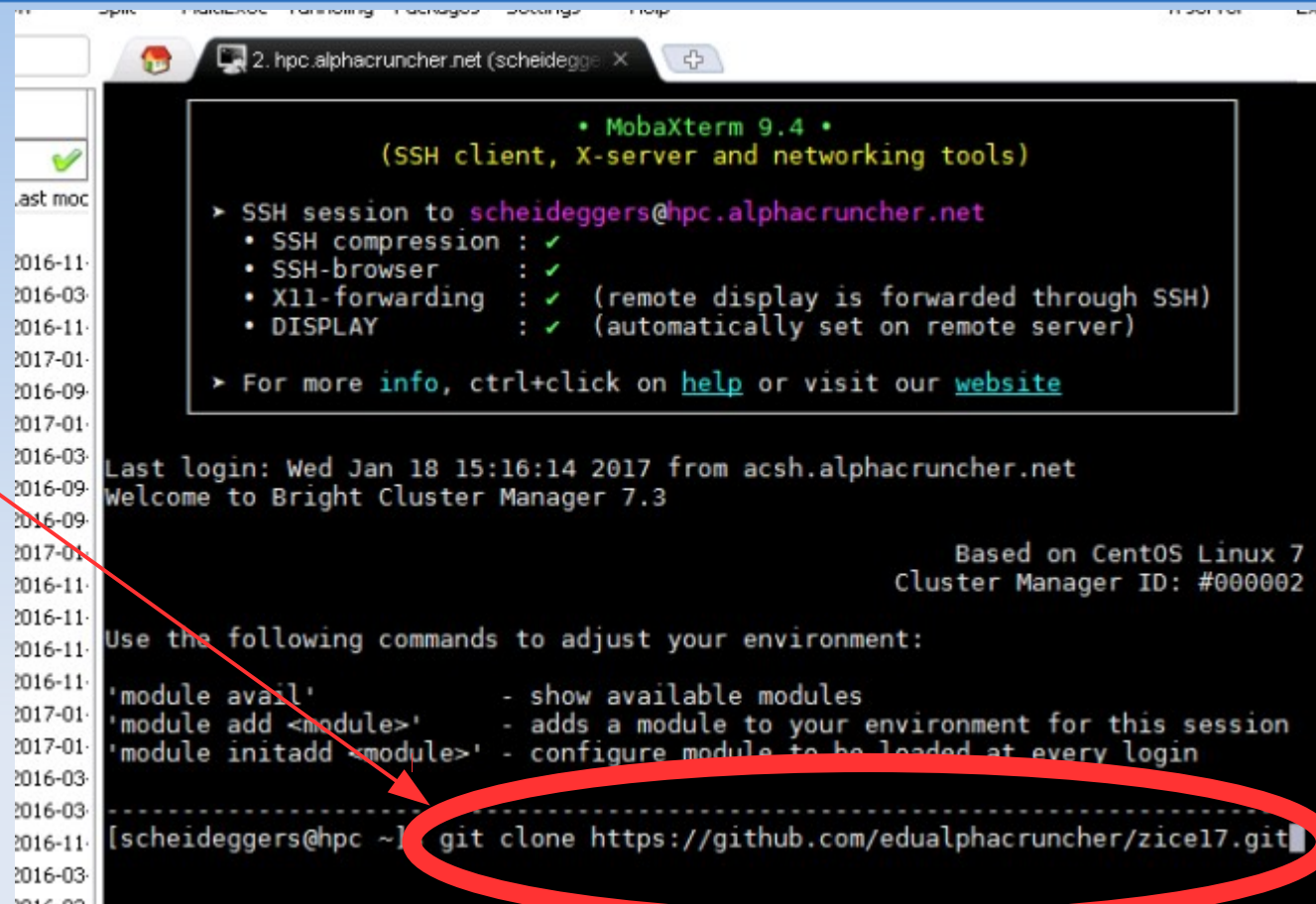
MobaXTerm, log in

clone the repository:
\$git clone *address*

To update the repository
in future circumstances,
go to the directory

>> **cd zice17**

>> **git pull**



```
2. hpc.alphacruncher.net (scheidegge X)
• MobaXterm 9.4 •
(SSH client, X-server and networking tools)

> SSH session to scheideggers@hpc.alphacruncher.net
• SSH compression : ✓
• SSH-browser      : ✓
• X11-forwarding   : ✓ (remote display is forwarded through SSH)
• DISPLAY          : ✓ (automatically set on remote server)

> For more info, ctrl+click on help or visit our website

Last login: Wed Jan 18 15:16:14 2017 from acsh.alphacruncher.net
Welcome to Bright Cluster Manager 7.3

Based on CentOS Linux 7
Cluster Manager ID: #000002

Use the following commands to adjust your environment:
'module avail'          - show available modules
'module add <module>'    - adds a module to your environment for this session
'module initadd <module>' - configure module to be loaded at every login

[scheideggers@hpc ~] git clone https://github.com/edualphacruncher/zice17.git
```

4. First steps on a Linux cluster

The screenshot displays the MobaXterm 9.4 application window. The title bar reads "hpc.alphacruncher.net (scheideggers)". The menu bar includes Terminal, Sessions, View, X server, Tools, Games, Settings, Macros, and Help. The toolbar contains icons for Session, Servers, Tools, Games, Sessions, View, Split, MultiExec, Tunneling, Packages, Settings, Help, X server, and Exit. A "Quick connect..." field is present. On the left, a file explorer shows the directory structure of the remote host, with a table of files and folders.

Name	Size (KB)	Last mod
..		
.cache		2016-11-
.cm		2016-03-
.config		2016-11-
.java		2017-01-
.local		2016-09-
.matlab		2017-01-
.mozilla		2016-03-
.pki		2016-09-
.ssh		2016-09-
.subversion		2017-01-
.vim		2016-11-
intel		2016-11-
recycle_workshop		2016-11-
wmsc		2016-11-
.bash_history	11	2017-01-
.bash_logout	1	2016-03-
.bash_profile	1	2016-03-
.bashrc	1	2016-11-
.emacs	1	2016-03-
.kshrc	1	2016-03-
.viminfo	8	2016-11-
.Xauthority	1	2017-01-

The main terminal window shows the following output:

```
• MobaXterm 9.4 •
(SSH client, X-server and networking tools)

> SSH session to scheideggers@hpc.alphacruncher.net
• SSH compression : ✓
• SSH-browser      : ✓
• X11-forwarding   : ✓ (remote display is forwarded through SSH)
• DISPLAY          : ✓ (automatically set on remote server)

> For more info, ctrl+click on help or visit our website

Last login: Wed Jan 18 12:29:22 2017 from acsh.alphacruncher.net
Welcome to Bright Cluster Manager 7.3

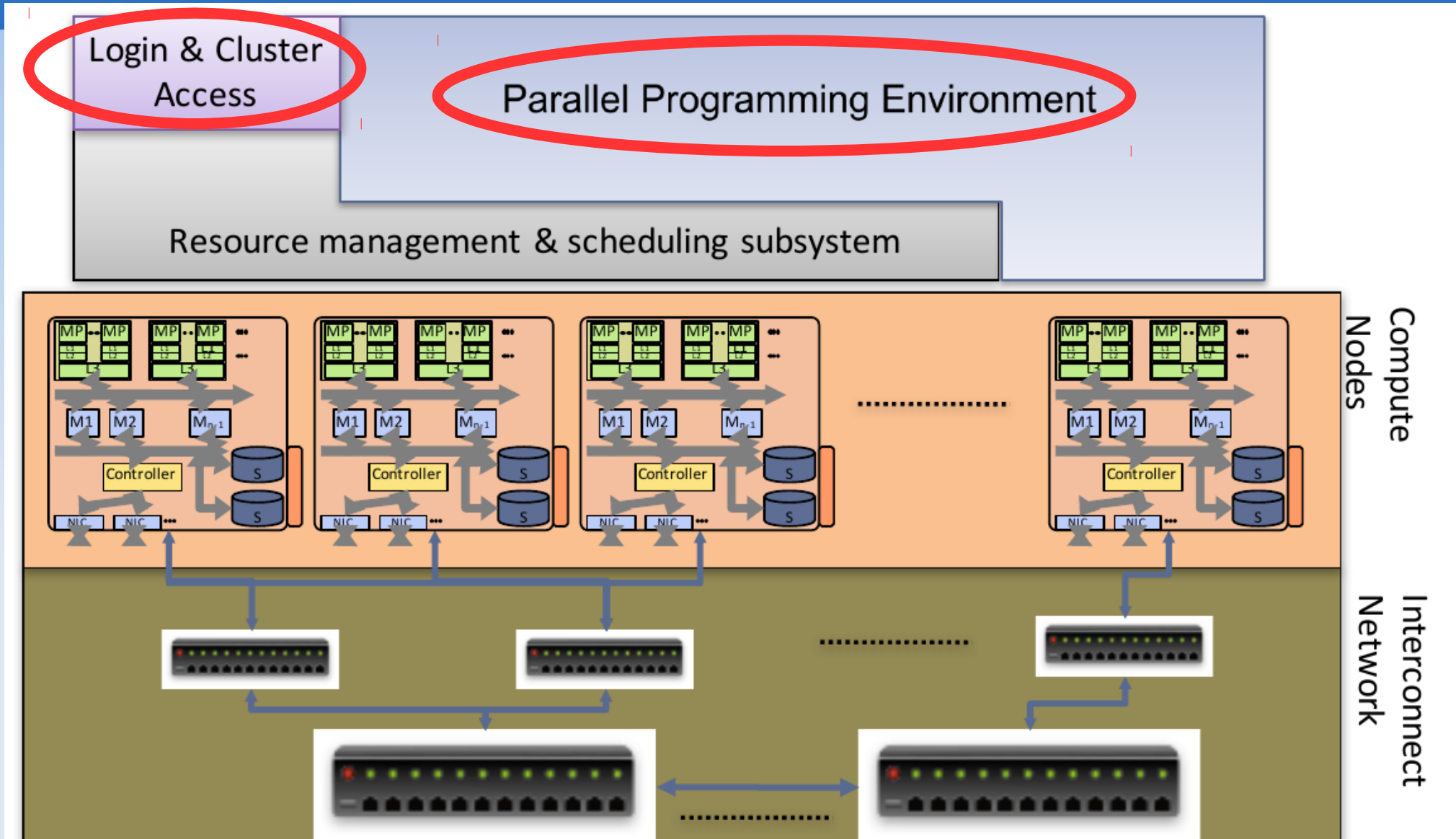
Based on CentOS Linux 7
Cluster Manager ID: #000002

Use the following commands to adjust your environment:
'module avail'           - show available modules
'module add <module>'    - adds a module to your environment for this session
'module initadd <module>' - configure module to be loaded at every login

[scheideggers@hpc ~]$
```

The status bar at the bottom indicates "UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: <http://mobaxterm.mobatek.net>". The system clock shows "Wednesday, January 18, 2017" and "12:48 PM 1/18/2017".

High-level architecture of a HPC system



Programming environment

Supporting diverse user community requires supporting diverse tool sets (versions of compilers, debuggers, libraries, etc)

- Check available packages

\$module avail

```
[scheideggers@hpc ~]$ module avail
----- /cm/local/modulefiles -----
cluster-tools/7.3      dot                module-info
cmd                   freeipmi/1.5.2      null
cm-scale-cluster/7.3  gcc/6.1.0           openldap
cmsh                  ipmitool/1.8.17     shared
cm-upgrade/7.3        module-git
----- /cm/shared/modulefiles -----
acml/gcc/64/5.3.1      intel/mkl/64/11.1/2013_sp1.3.174
acml/gcc/fma4/5.3.1    intel-cluster-checker/2.2.2
```

- Load a module (e.g. Matlab)

\$module load matlab/R2016b

```
[scheideggers@hpc ~]$ module load matlab/R2016b
matlab/R2015b matlab/R2016b
[scheideggers@hpc ~]$ module load matlab/R2016b
[scheideggers@hpc ~]$ module li
Currently Loaded Modulefiles:
  1) shared
  2) slurm/16.05.2
  3) openmpi/gcc/64/1.10.1
  4) python/2.7.11
  5) matlab/R2016b
[scheideggers@hpc ~]$
```

- Check what is loaded

\$module list

Note: most high-performance clusters set-up in this way !

Basic Linux commands (1)

Small-scale cheat-sheet on terminal commands

Command	Description
<code>pwd</code>	Print name of current/working directory
<code>cd [Directory]</code>	Change directory (no directory → change to home)
<code>ls [Directory]</code>	List directory contents (no directory → list current)
<code>cat FILE</code>	Concatenate files and print on the standard output
<code>mkdir DIRECTORY</code>	Make directories
<code>mkdir -p DIRECTORY</code>	Make directories, make parent directories as needed
<code>cp SOURCE... DIRECTORY</code>	Copy files and directories
<code>cp -r SOURCE... DIRECTORY</code>	Copy files and directories, copy directories recursively
<code>mv SOURCE... DIRECTORY</code>	Move (rename) files
<code>man COMMAND</code>	An interface to the on-line reference manuals

Basic Linux commands (2)

Small-scale cheat-sheet on terminal commands

Command	Description
<code>ssh -X foo@host.com</code>	OpenSSH SSH client (remote login program), access to host.com with user foo
<code>scp foo@host.com:/home/bar ./</code>	Secure copy (remote file copy program), copy file bar from /home on host.com to directory
<code>scp bar foo@host.com:/home/</code>	Secure copy (remote file copy program), copy file bar from the local host to /home on host.com
<code>git clone git@github.com:whatever folder-name</code>	The stupid content tracker, Clone a repository (whatever) into a new directory (folder-name).
<code>git checkout</code>	Checkout a branch or paths to the working tree.

Step-by-Step – an example

```
> pwd
/beegfs/swift/alphacruncher.net/USERNAME
> mkdir -p firstFolder/secondFolder
> ls
FirstFolder
> ls firstFolder
secondFolder
> cd firstFolder
> pwd
/beegfs/swift/alphacruncher.net/USERNAME/firstFolder
> ls
secondFolder
```



**KEEP
CALM
AND
GOOD
LUCK**