

CSF641 – P2P Computing

點對點計算

Developing Programs on PlanetLab

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Outline

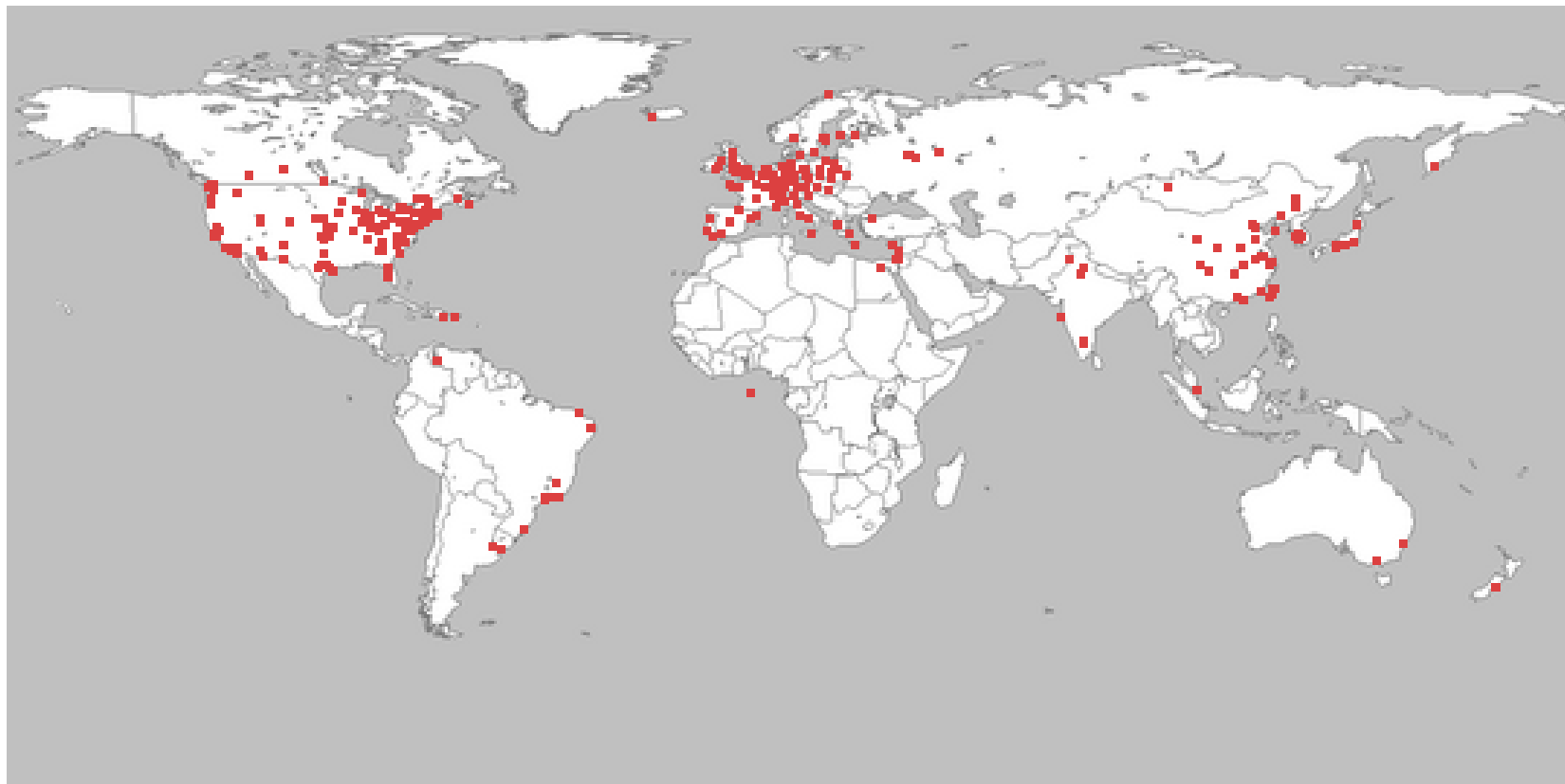
- Introduction to PlanetLab
- Work on PlanetLab
 1. Registration an account
 2. Login PlanetLab
 3. Login Nodes
- Network Programming
 - Program Development
 - Network Programming
 - Copy programs
- Practice

<http://www.csie.nuk.edu.tw/~wuch/course/csf641/demo/>

PlanetLab

An open platform for developing, deploying, and accessing planetary-scale services

- 864 nodes at 447 sites (May 25, 2008)
- <http://www.planet-lab.org/>



User's Documents on PlanetLab

- User's Guide
 - <http://www.planet-lab.org/doc/guides/user>
- FAQ
 - <http://www.planet-lab.org/FAQ>
- PlanetLab Documentation
 - <http://www.planet-lab.org/tutorial>

Welcome to PlanetLab



[About](#) | [Status](#) | [Support](#) | [Documentation](#) | [Community](#) | [Software](#)

PlanetLab

- ▼ **About**
 - ▶ Consortium
 - Federation
 - History
 - Sponsors
 - Sites
 - Projects
- Status
- ▼ **Support**
 - Site Assistant

PlanetLab 4.2 Upgrade Schedule

The PlanetLab 4.2 Upgrade is underway! At the end of the upgrade all machines will be re-installed and include the following new features:

- Reference image changed from Fedora Core 4, to Fedora 8.
- Upgrade kernel from 2.6.12 to 2.6.22.19 and VServer from 2.0 to 2.3
- SMP support!
- Adding Vsys as a replacement for Proper
- Upgraded PlanetFlow
- Allow multiple VServer reference images
- New kernel features (ipv6, fuse, chopstix, kvm) available for the future.

PlanetLab login

E-mail: *

Password: *

[Forgot your password?](#)

[Create an account](#)

<http://www.planet-lab.org/>

General Steps to Work on PlanetLab

1. Join PlanetLab

- 1a. Create an account
- 1b. Verify account registration
- 1c. Wait for PI's approval

2. Upload public key

- 2a. Generate public key and private key
- 2b. Login to PlanetLab
- 2c. Upload public key to PlanetLab

3. Login to a PlanetLab node

- 3a. Preparation of PI
 - Create a slice
 - Add people to the slice
- 3b. Manage Slice - add nodes
- 3c. Login

1a. Create an Account

Account Registration | PlanetLab - Windows Internet Explorer
https://www.planet-lab.org/db/persons/register.php

PlanetLab
An open platform for developing, deploying, and accessing planetary-scale services

About | Status | Support | Documentation | Community | Software

PlanetLab

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 - Services
 - User Tools

Home

Account Registration

Your **E-mail** address must be able to receive e-mail and will be used as your PlanetLab username.

Do not select the **Principal Investigator** or **Technical Contact** roles unless you have spoken with the current PI of your site, and you intend to assume either or both of these roles.

First name: *
P2P

Last name: *
NUK

Title:

E-mail: *
nukp2p@gmail.com

Password: *

Telephone:

Site: *
National University of Kaohsiung

Additional Roles:
Technical Contact

PlanetLab login

E-mail: *

Password: *

Log in

[Forgot your password?](#)

[Create an account](#)

Announcements

- [PlanetLab 4.2 Upgrade Schedule](#)
The PlanetLab 4.2 Upgrade is underway! At the end of the upgrade all machines will be re-install...
- [Federation](#)
PlanetLab is engaged in a federation trial with the OneLab Project. The plan is to migrate European ...
- [Site Assistant](#)
PlanetLab Operations is developing a new tool, called Site A...
- [ROADS Workshops](#)
A series of international workshops on Real Overlays and Distributed Systems (
- [PlanetLab Upgrade](#)
We have recently upgraded PlanetLab to Version 4.0. Part of the upgrade involved revamping this

Search Register

Account Registration: 'National University of Kaohsiung' Site

1b. Verify Account Registration

Verify account registration 收件匣 | x

★ PlanetLab Support 寄給我

顯示詳細資料 12:33 (0 分鐘以前) 回覆

Please verify that you registered for a PlanetLab account with the username nukp2p@gmail.com by visiting:

<https://www.planet-lab.org:443/db/persons/register.php?id=17339&key=7qEtSnGtn8Jfl%2BMLqNknS0PfiGKyzpdZHqD3eZ2iNE%3D>

If you did not register for a PlanetLab account, please ignore this message, or contact PlanetLab Support <support@planetlab.org>

The screenshot shows a web browser window titled "Account Registration | PlanetLab - Windows Internet Explorer". The address bar contains the URL: <https://www.planet-lab.org/db/persons/register.php?id=17339&key=7qEtSnGtn8Jfl%2BMLqNknS0PfiGKyzpdZHqD3eZ2iNE%3D>. The page content includes the PlanetLab logo and navigation links (About, Status, Support, Documentation, Community, Software). A central "Account Registration" section displays a green confirmation message: "Your e-mail address has been verified. The PI(s) at your site have been notified of your account registration and are responsible for enabling your account." Below this, there are fields for "First name" (P2P), "Last name" (NUK), "Title", "E-mail" (nukp2p@gmail.com), "Telephone", "Site" (National University of Kaohsiung), and "Additional Roles" (Technical Contact). On the right, there is a "PlanetLab login" section with "E-mail" and "Password" fields, a "Log in" button, and a "Forgot your password?" link. Below the login section is an "Announcements" section with several news items.

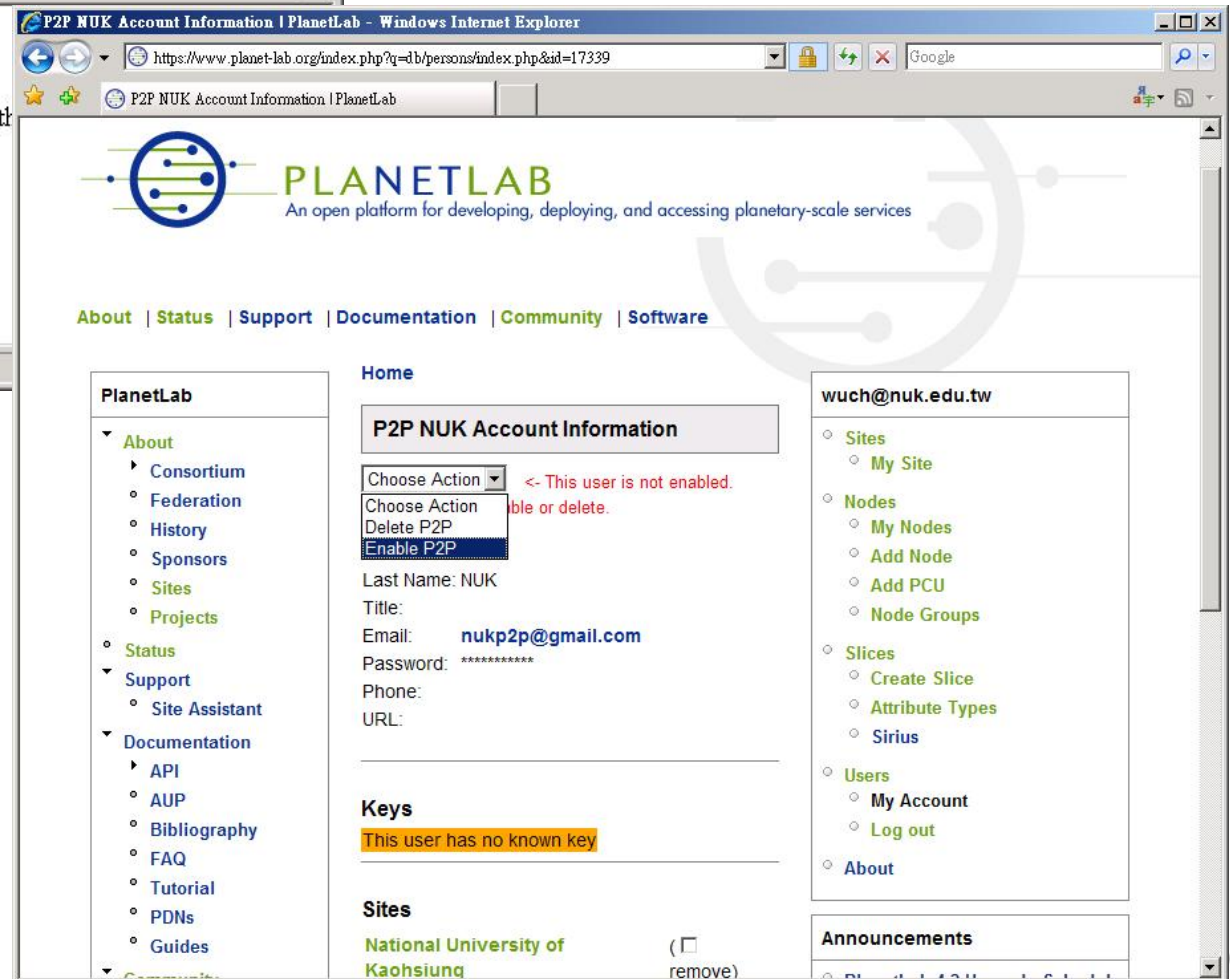
1c. Wait for PI's Approval - Enable Users



P2P NUK <nukp2p@gmail.com> has signed up for a new PlanetLab account at National University of Kaohsiung and has requested the roles: user.

To deny the request or enable the account, visit:

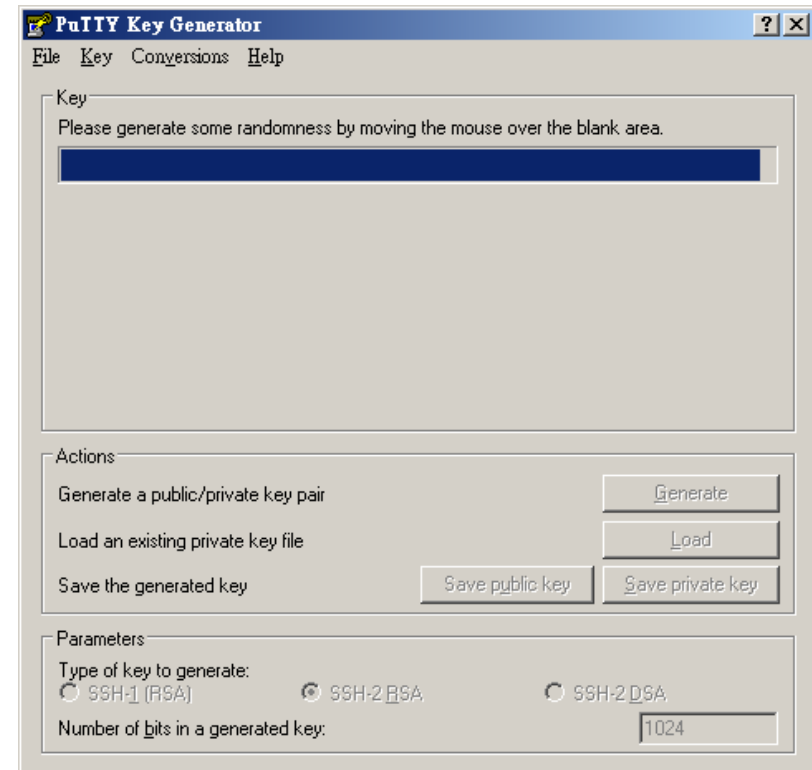
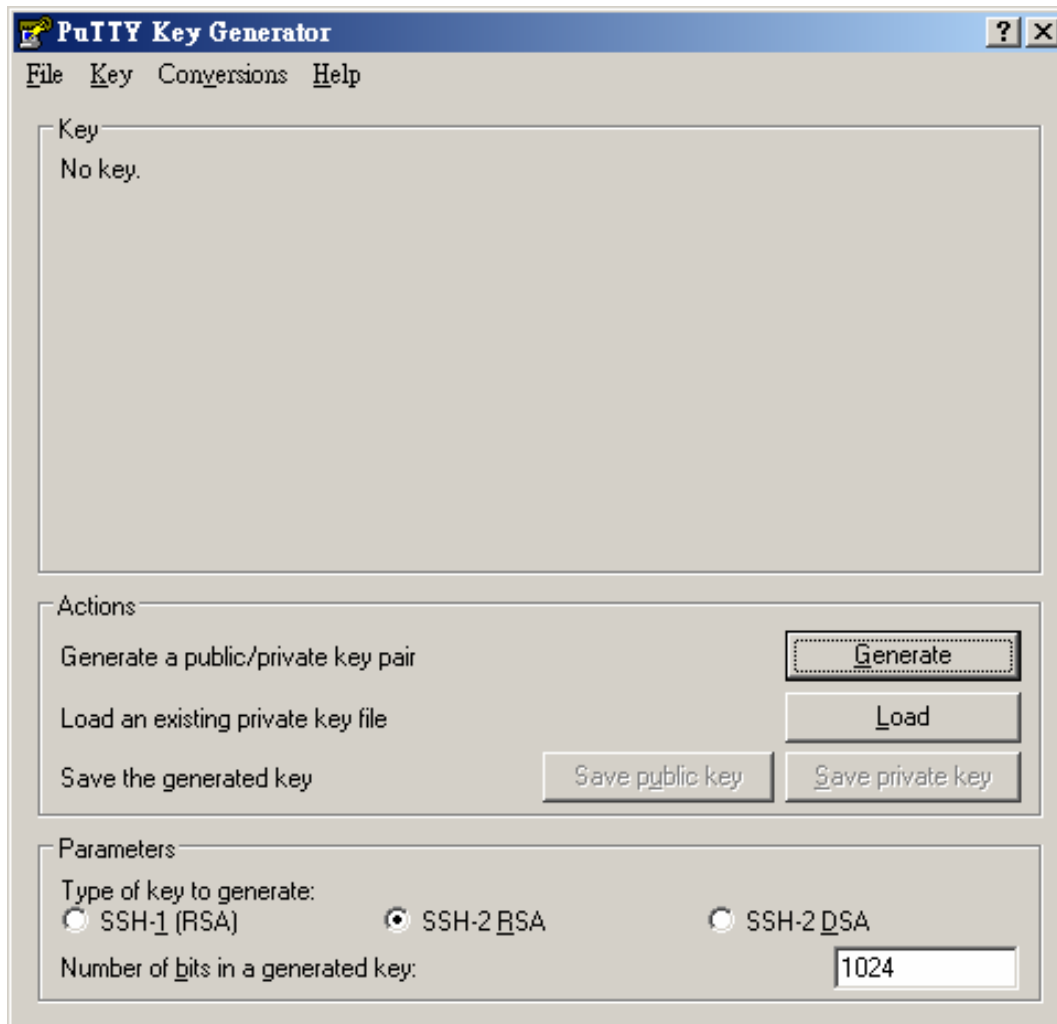
<https://www.planet-lab.org/443/db/persons/index.php?id=17339>



General Steps to Work on PlanetLab

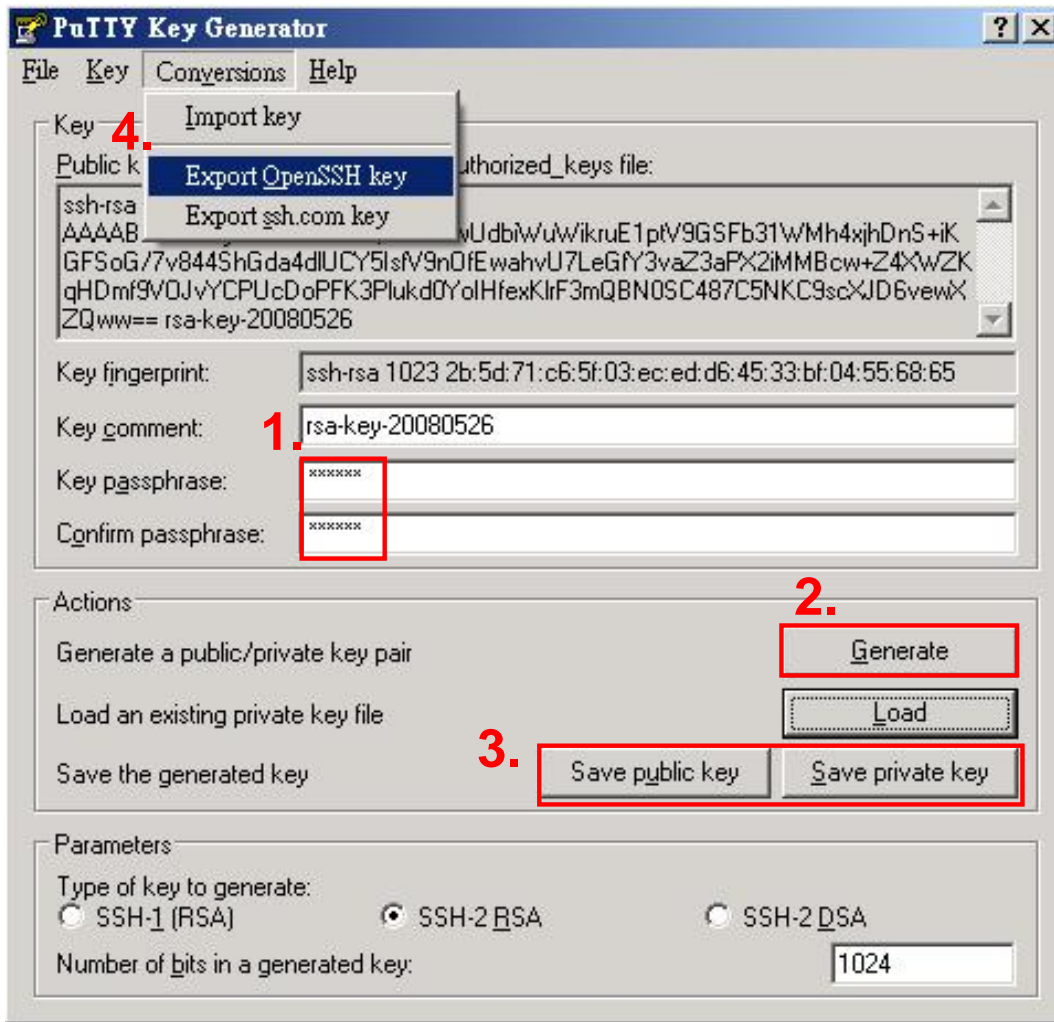
1. Join PlanetLab
 - 1a. Create an account
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2. Upload public key
 - 2a. Generate public key and private key
 - 2b. Login to PlanetLab
 - 2c. Upload public key to PlanetLab
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2a. Generate Public/Private Keys by PuTTYGen



- Download and Invoke PuTTY Key Generator (puttygen.exe)
 - <http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html>

2a. Generate Keys (cont.)



1. Choose 'Key passphrase'

- Like password

2. Click 'Generate'

3. Save the keys

- nukp2p-public.key
- nukp2p-private.ppk

4. Export to OpenSSH key

- nukp2p-private
- (used under Linux/Cygwin)

The public key file (nukp2p-public.key) generated by PuttyGen need be converted to OpenSSH format (nukp2p-public.pub) – manual editing

2a. Generate Keys - Edit the Public Key File

```
----- BEGIN SSH2 PUBLIC KEY -----  
Comment: "rsa-key-20080526"  
AAAAB3NzaC1yc2EAAAABJQAAAIBwUdbiWuWikruE1ptU9GSFb31WMh4xjhDnS+iK  
GFSog/7v844ShGda4d1UCY5IsfU9n0fEwahuU7LeGfY3vaZ3aPX2iMMBcw+Z4XWZ  
KqHDmf9U0JvYCPUcDoPFK3Plukd0YoIHFexK1rF3mQBN0SC487C5NKC9scXJD6ve  
wXZQww==  
----- END SSH2 PUBLIC KEY -----  
  
1. nukp2p-public.key 7,29 全部  
ssh-rsa AAAAB3NzaC1yc2EAAAABJQAAAIBwUdbiWuWikruE1ptU9GSFb31WMh4xjhDnS+iK  
GFSog/7v844ShGda4d1UCY5IsfU9n0fEwahuU7LeGfY3vaZ3aPX2iMMBcw+Z4XWZKqHDmf9U0JvYCPUcDoPFK3Pl  
ukd0YoIHFexK1rF3mQBN0SC487C5NKC9scXJD6vewXZQww== nukp2p@gmail.com  
  
nukp2p-public.pub 1,225 全部  
"nukp2p-public.key" [unix] 7L, 294C
```

1. Change to 'ssh-rsa'
2. Change to your login name i.e. nukp2p@gmail.com
3. Merge all lines into a single line

Top: original file (nukp2p-public.key)
Bottom: result file (nukp2p-public.pub)

2a. Generate Keys by ssh-keygen

- Use `ssh-keygen` on Linux or Cygwin:
 - `ssh-keygen -t rsa -f mykeyfile`
 - Ask for a passphrase:
 - similar to a password
 - good for 10-30 characters long
 - can be a phrase with a series of words, punctuation, numbers, whitespace, or any string of characters
 - Two files: a private key named *mykeyfile* and a public key named *mykeyfile.pub*

```
$ ssh-keygen -t rsa -f nukp2p
```

Generating public/private rsa key pair.

Enter passphrase (empty for no passphrase):

Enter same passphrase again:

Your identification has been saved in *nukp2p*.

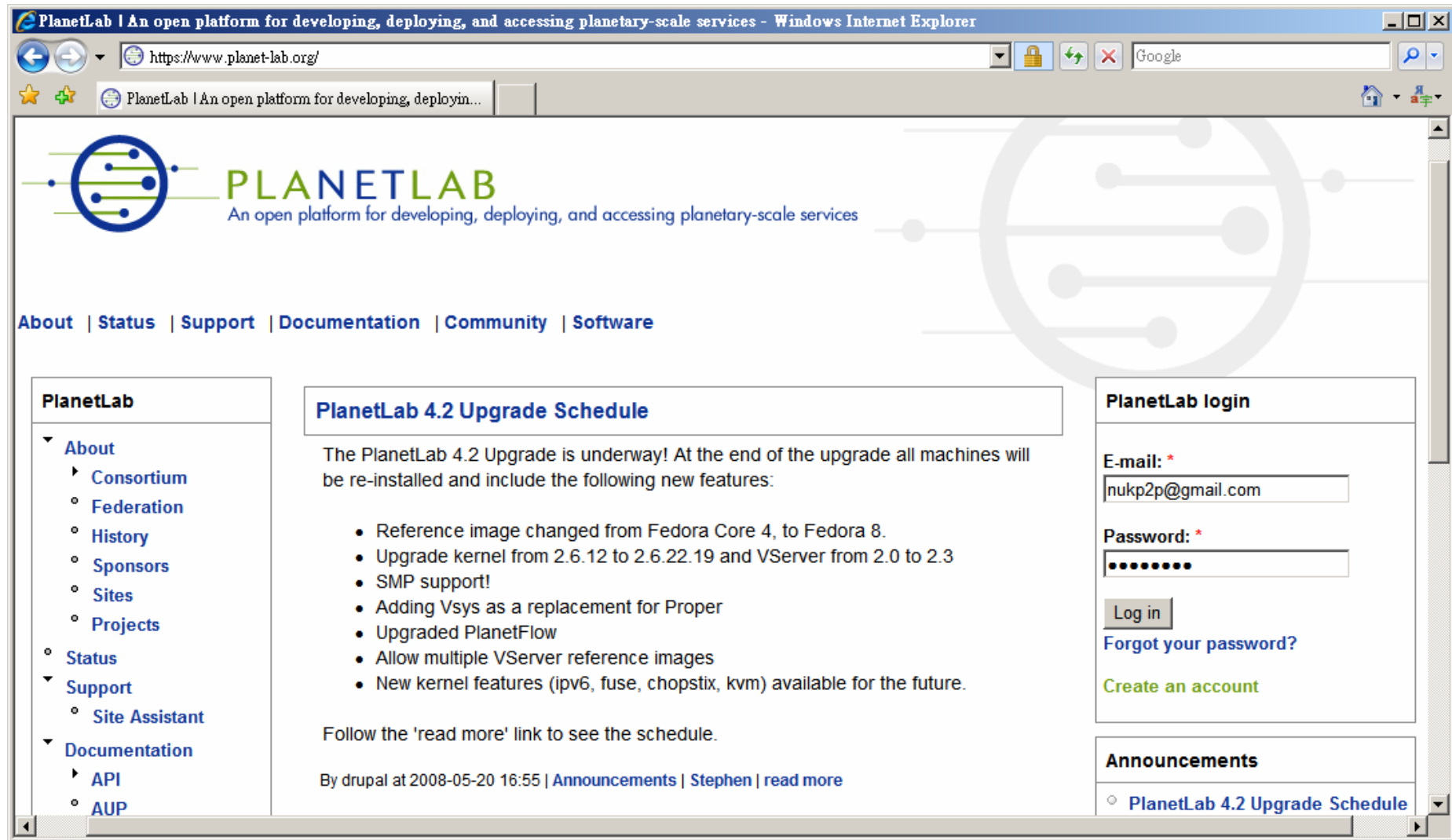
Your public key has been saved in *nukp2p.pub*.

The key fingerprint is:

6f:fe:5d:aa:43:f2:94:81:f8:36:f8:08:2a:51:69:28 **wuch@thetop**

Make sure the email address is correct before uploading: **nukp2p@gmail.com**

2b. Login to PlanetLab



The screenshot shows the PlanetLab website in a Windows Internet Explorer browser window. The address bar displays <https://www.planet-lab.org/>. The page features the PlanetLab logo and tagline: "An open platform for developing, deploying, and accessing planetary-scale services". Navigation links include About, Status, Support, Documentation, Community, and Software.

PlanetLab

- About
 - Consortium
 - Federation
 - History
 - Sponsors
 - Sites
 - Projects
- Status
- Support
 - Site Assistant
- Documentation
 - API
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PlanetLab 4.2 Upgrade Schedule

The PlanetLab 4.2 Upgrade is underway! At the end of the upgrade all machines will be re-installed and include the following new features:

- Reference image changed from Fedora Core 4, to Fedora 8.
- Upgrade kernel from 2.6.12 to 2.6.22.19 and VServer from 2.0 to 2.3
- SMP support!
- Adding Vsys as a replacement for Proper
- Upgraded PlanetFlow
- Allow multiple VServer reference images
- New kernel features (ipv6, fuse, chopstix, kvm) available for the future.

Follow the 'read more' link to see the schedule.

By drupal at 2008-05-20 16:55 | [Announcements](#) | [Stephen](#) | [read more](#)

PlanetLab login

E-mail: *

Password: *

[Forgot your password?](#)

[Create an account](#)

Announcements

- PlanetLab 4.2 Upgrade Schedule

<http://www.planet-lab.org/>

2b. Login to PlanetLab - My Account

The screenshot shows a web browser window displaying the PlanetLab user account page. The browser title is "P2P NUK Account Information | PlanetLab - Windows Internet Explorer" and the address bar shows "https://www.planet-lab.org/db/persons/index.php?id=17339".

The page layout includes a left sidebar with a navigation menu for PlanetLab, a central content area, and a right sidebar with user-specific information and announcements.

PlanetLab Navigation Menu:

- About
 - Consortium
 - Federation
 - History
 - Sponsors
 - Sites
 - Projects
- Status
- Support
 - Site Assistant
- Documentation
 - API
 - AUP
 - Bibliography
 - FAQ
 - Tutorial
 - PDNs
 - Guides
- Community
 - Courseware
 - Mailing Lists
 - Meetings
 - Presentations
- Software
 - Developers
 - Services
 - User Tools

Search: A search box with a "Search" button is located at the bottom of the left sidebar.

Home Section:

- P2P NUK Account Information:** A box containing a "Choose Action" dropdown menu.
- Profile Information:** First Name: P2P, Last Name: NUK, Title: (empty), Email: nukp2p@gmail.com, Password: (masked), Phone: (empty), URL: (empty).
- Update account information:** A link to update the profile.

Keys Section:

- Keys:** A section indicating "This user has no known key" and a link to "Manage Keys".

Sites Section:

- Sites:** A list of sites, currently showing "National University of Kaohsiung" with a "remove" checkbox and a "Remove Sites" button.

Roles Section:

- Role:** The user's role is listed as "user".

Slices Section:

- Slices:** The user's slice is listed as "nuk_p2p".

Right Sidebar:

- nukp2p@gmail.com:** A menu of links for the user's account, including Sites (My Site), Nodes (My Nodes), Slices (Sirius), Users (My Account, Log out), and About.
- Announcements:** A list of recent announcements, including "PlanetLab 4.2 Upgrade Schedule", "Federation", "Site Assistant", "ROADS Workshops", and "PlanetLab Upgrade".

Footer: A link to "Back to person list" is located at the bottom of the main content area.

2c. Upload the Public Key to PlanetLab

PlanetLab Account Information | PlanetLab - Windows Internet Explorer

https://www.planet-lab.org/db/persons/index.php?id=17339

PlanetLab

- About
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 - Developers
 - Services
 - User Tools

Search

Home

P2P NUK Account Information

Choose Action

First Name: P2P
Last Name: NUK
Title:
Email: nukp2p@gmail.com
Password: *****
Phone:
URL:

[Update account information](#)

nukp2p@gmail.com

- Sites
 - My Site
- Nodes
 - My Nodes
- Slices
 - Sirius
- Users
 - My Account**
 - Log out
- About

Keys

This user has no known key

[Manage Keys](#)

Announcements

- PlanetLab 4.2 Upgrade Schedule
The PlanetLab 4.2 Upgrade is underway! At the end of the upgrade

1. Click 'My Account'
2. Click 'Manage Keys'
3. Upload new key
4. See the key

People | PlanetLab - Windows Internet Explorer

https://www.planet-lab.org/db/persons/keys.php?id=17339

PlanetLab

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- Status
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 - Site Assistant
- Documentation
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 - Bibliography
 - FAQ

Search

Home

People

Keys

Type	Key	Remove
ssh-rsa	AAAAAB3NzaC1yc2EAAAABJQAAAIBwUdbiWuWikruE1ptV9GSFb31WMh4xjhDnS+iKGFSoG/7v844ShGda4dIUCY5isfV9nOfEwahvU7LeGfY3vaZ3aPX2iMMBcw+Z4XWZKqHdMf9VOJvY	<input type="checkbox"/>
ssh	CPUcDoPFK3Plukd0YoIHfexKirF3mQBN0SC487C5NKC9scXJD6vewXZQww== nukp2p@gmail.com	<input type="checkbox"/>

[Remove keys](#)

Upload new key:

[Back to person](#)

nukp2p@gmail.com

- Sites
 - My Site
- Nodes
 - My Nodes
- Slices
 - Sirius
- Users
 - My Account
 - Log out
- About

Announcements

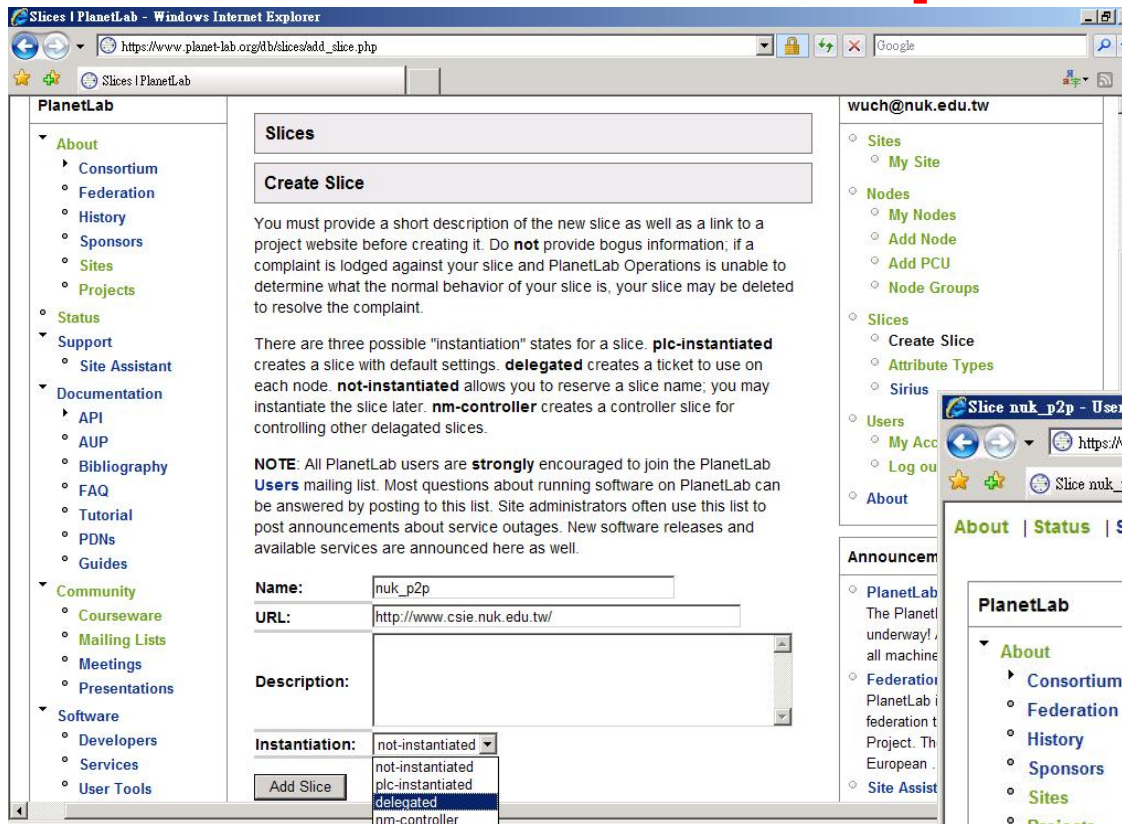
- PlanetLab 4.2 Upgrade Schedule
The PlanetLab 4.2 Upgrade is

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General Steps to Work on PlanetLab

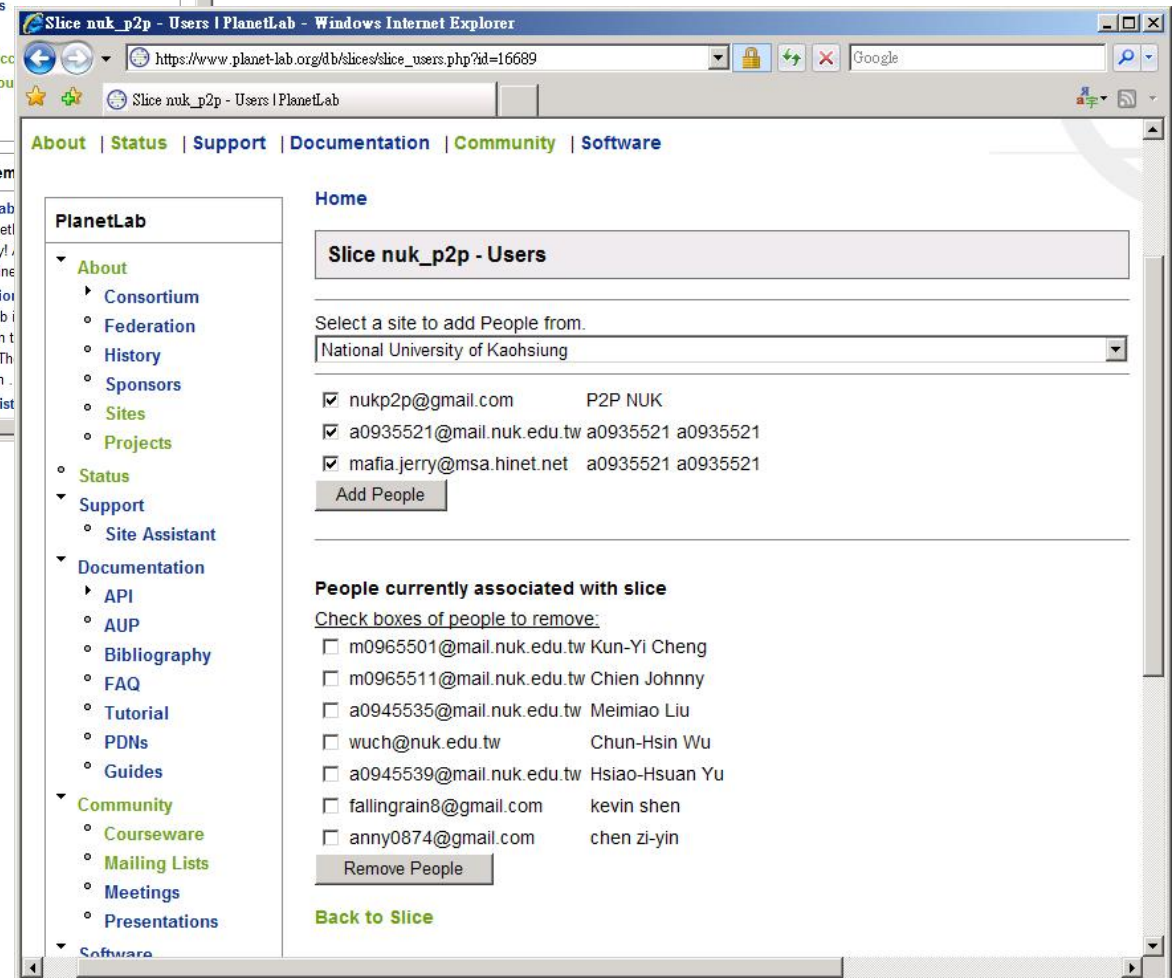
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 - 3a. Preparation of PI
 - Create a slice
 - Add people to the slice
 - 3b. Manage Slice - add nodes
 - 3c. Login

3a. Preparation of PI



The screenshot shows the PlanetLab 'Create Slice' page in a Windows Internet Explorer browser. The page title is 'Slices | PlanetLab - Windows Internet Explorer'. The address bar shows 'https://www.planet-lab.org/d/b/slices/add_slice.php'. The left sidebar contains a navigation menu with categories like About, Support, Documentation, and Community. The main content area is titled 'Slices' and 'Create Slice'. It contains instructions on how to create a slice, including a note about the 'instantiation' states: 'not-instantiated', 'plc-instantiated', and 'delegated'. Below the instructions are input fields for 'Name:' (filled with 'nuk_p2p'), 'URL:' (filled with 'http://www.csie.nuk.edu.tw/'), and 'Description:'. There is also a dropdown menu for 'Instantiation:' with 'not-instantiated' selected. An 'Add Slice' button is at the bottom.

Create a Slice



The screenshot shows the PlanetLab 'Add People to Slice' page in a Windows Internet Explorer browser. The page title is 'Slice nuk_p2p - Users | PlanetLab - Windows Internet Explorer'. The address bar shows 'https://www.planet-lab.org/d/b/slices/slice_users.php?id=16689'. The left sidebar is similar to the previous screenshot. The main content area is titled 'Slice nuk_p2p - Users'. It contains a dropdown menu for 'Select a site to add People from:' with 'National University of Kaohsiung' selected. Below this are three checked entries for adding people: 'nukp2p@gmail.com P2P NUK', 'a0935521@mail.nuk.edu.tw a0935521 a0935521', and 'mafia.jerry@msa.hinet.net a0935521 a0935521'. An 'Add People' button is present. Below this is a section titled 'People currently associated with slice' with a sub-section 'Check boxes of people to remove:' containing several unchecked entries with their email addresses and names. A 'Remove People' button is at the bottom. A 'Back to Slice' link is also visible.

Add People to Slice

3b. Manage Nodes – by PI

The screenshot shows a web browser window with the URL <https://www.planet-lab.org/db/slices/index.php?id=16689>. The page title is "Slice details for nuk_p2p | PlanetLab". The main content area is titled "Home" and displays "Slice details for nuk_p2p". A dropdown menu is open, showing the following options: "Choose Action", "Renew nuk_p2p", "Manage Nodes" (highlighted), "Manage Users", and "Delete nuk_p2p". The slice details include: "Expiration: Jun 5, 2008", "Instantiation: delegated", and "Site: National University of Kaohsiung". The left sidebar contains a navigation menu for PlanetLab, including sections like "About", "Status", "Support", "Documentation", and "Community". The right sidebar shows a user profile for "wuch@nuk.edu.tw" with a list of links for "Sites", "Nodes", "Slices", "Users", and "About". At the bottom right, there is an "Announcements" section with a link to "PlanetLab 4.2 Upgrade Schedule".

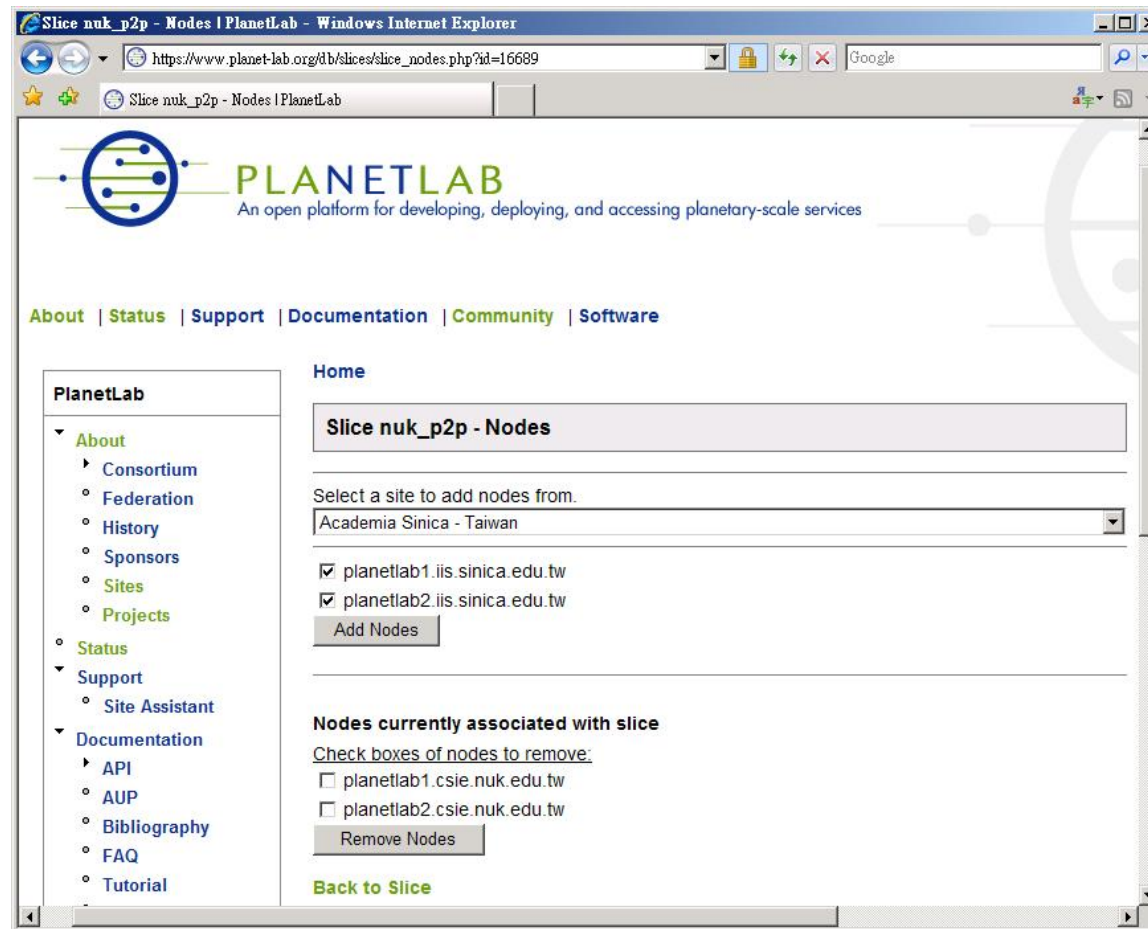
3b. Manage Nodes – by Users

The screenshot shows a web browser window titled "Slice details for nuk_p2p | PlanetLab - Windows Internet Explorer". The address bar contains the URL "https://www.planet-lab.org/db/slices/index.php?id=16689". The page content is organized into three main columns:

- PlanetLab (Left Column):** A navigation menu with categories: About (Consortium, Federation, History, Sponsors, Sites, Projects), Status, Support (Site Assistant), and Documentation (API, AUP, Bibliography, FAQ, Tutorial).
- Home (Middle Column):** Displays "Slice details for nuk_p2p". A dropdown menu is open over the "Choose Action" button, listing "uk_p2p", "Renew nuk_p2p", and "Manage Nodes" (which is highlighted). Below the menu, the following details are shown:
 - URL: http://www.csie.nuk.edu.tw/
 - Expiration: Jun 5, 2008
 - Instantiation: delegated
 - Site: National University of KaohsiungAdditional options include "Update Information", "Add a Slice Attribute", and a link "Back to slice list".
- nukp2p@gmail.com (Right Column):** A user profile menu with options: Sites (My Site), Nodes (My Nodes), Slices (Sirius), Users (My Account, Log out), and About.

At the bottom right, there is an "Announcements" section with a link to "PlanetLab 4.2 Upgrade Schedule" and a brief description of the upgrade process.

3b. Manage Nodes - Add Nodes



The screenshot shows a web browser window titled "Slice nuk_p2p - Nodes | PlanetLab - Windows Internet Explorer". The address bar displays the URL "https://www.planet-lab.org/db/slices/slice_nodes.php?id=16689". The page features the PlanetLab logo and tagline: "An open platform for developing, deploying, and accessing planetary-scale services".

Navigation links include: [About](#) | [Status](#) | [Support](#) | [Documentation](#) | [Community](#) | [Software](#)

PlanetLab

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Home

Slice nuk_p2p - Nodes

Select a site to add nodes from.

Academia Sinica - Taiwan

planetlab1.iis.sinica.edu.tw
 planetlab2.iis.sinica.edu.tw

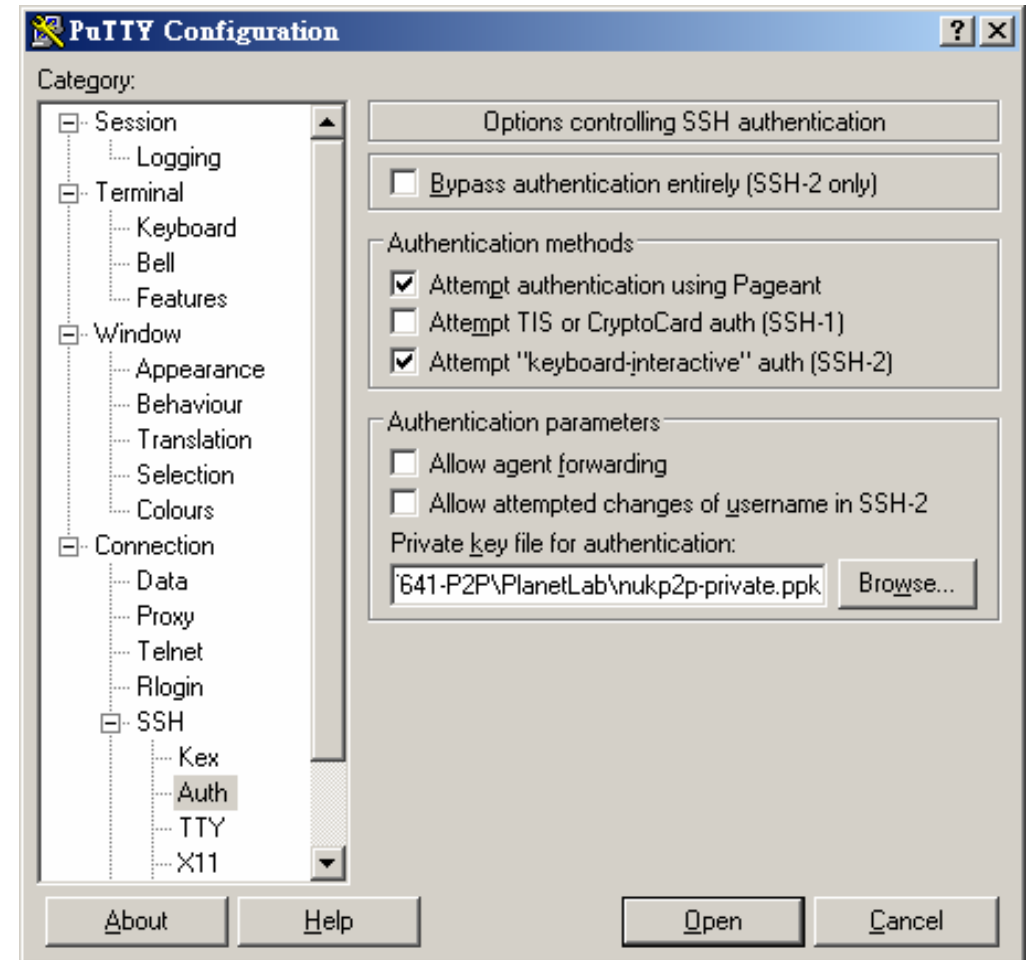
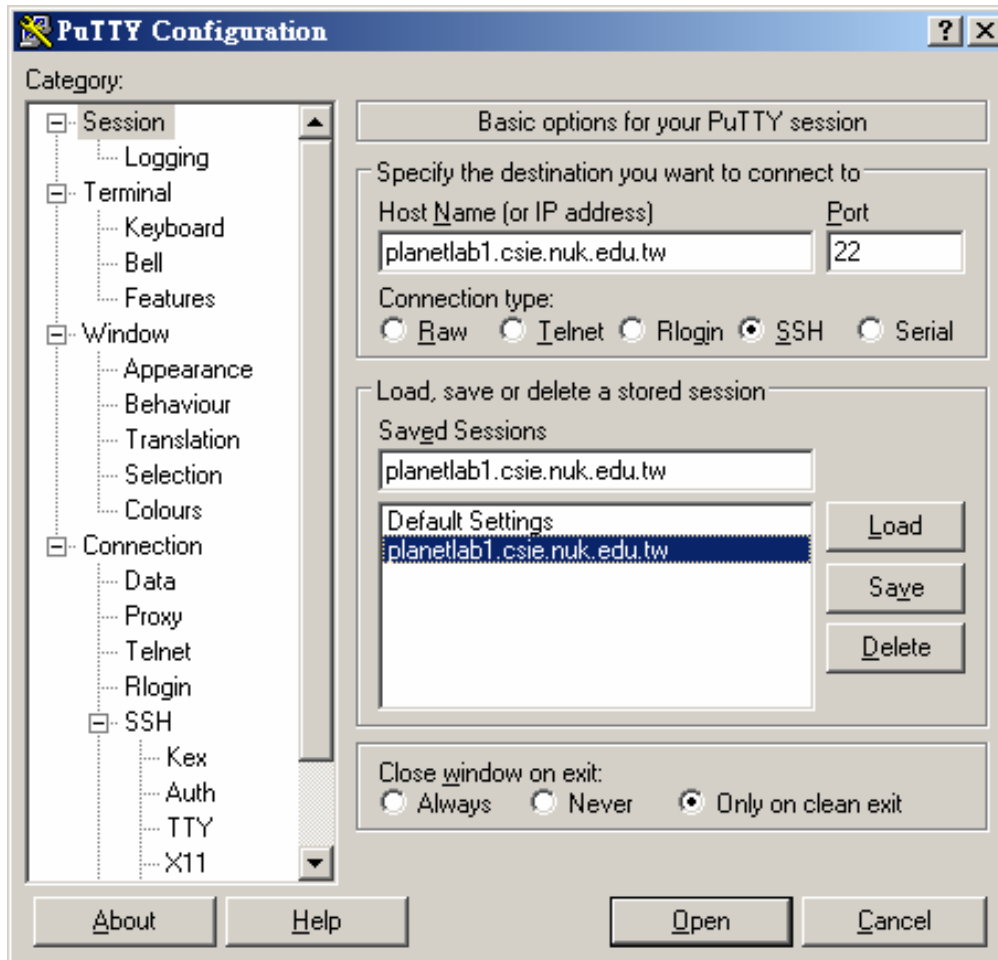
Nodes currently associated with slice

Check boxes of nodes to remove:

planetlab1.csie.nuk.edu.tw
 planetlab2.csie.nuk.edu.tw

[Back to Slice](#)

3c. Login by PuTTY / PieTTY



<http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html>
<http://www.csie.ntu.edu.tw/~piaip/pietty/>

3c. Login by ssh under Linux/Cygwin

- Login to the host

```
ssh -I nuk_p2p -i nukp2p_private planetlab1.csie.nuk.edu.tw
```

- Copy file to the host

```
scp -i nukp2p_private localfile  
nuk_p2p@planetlab1.csie.nuk.edu.tw:.
```