

# XenSummit Asia

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## Skylark: Easy Cloud Computing

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# Outline

- Motivations
- Architecture
- Xen inside
- Future works
- Q&A



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# Motivations

- Easy Deployment (Multiple User Single Installation)
- Remote Computing (Desktop or App)
- Remote Data (Access at Any Time Any Where)
- Whole Workset Suspend/Restore



# How

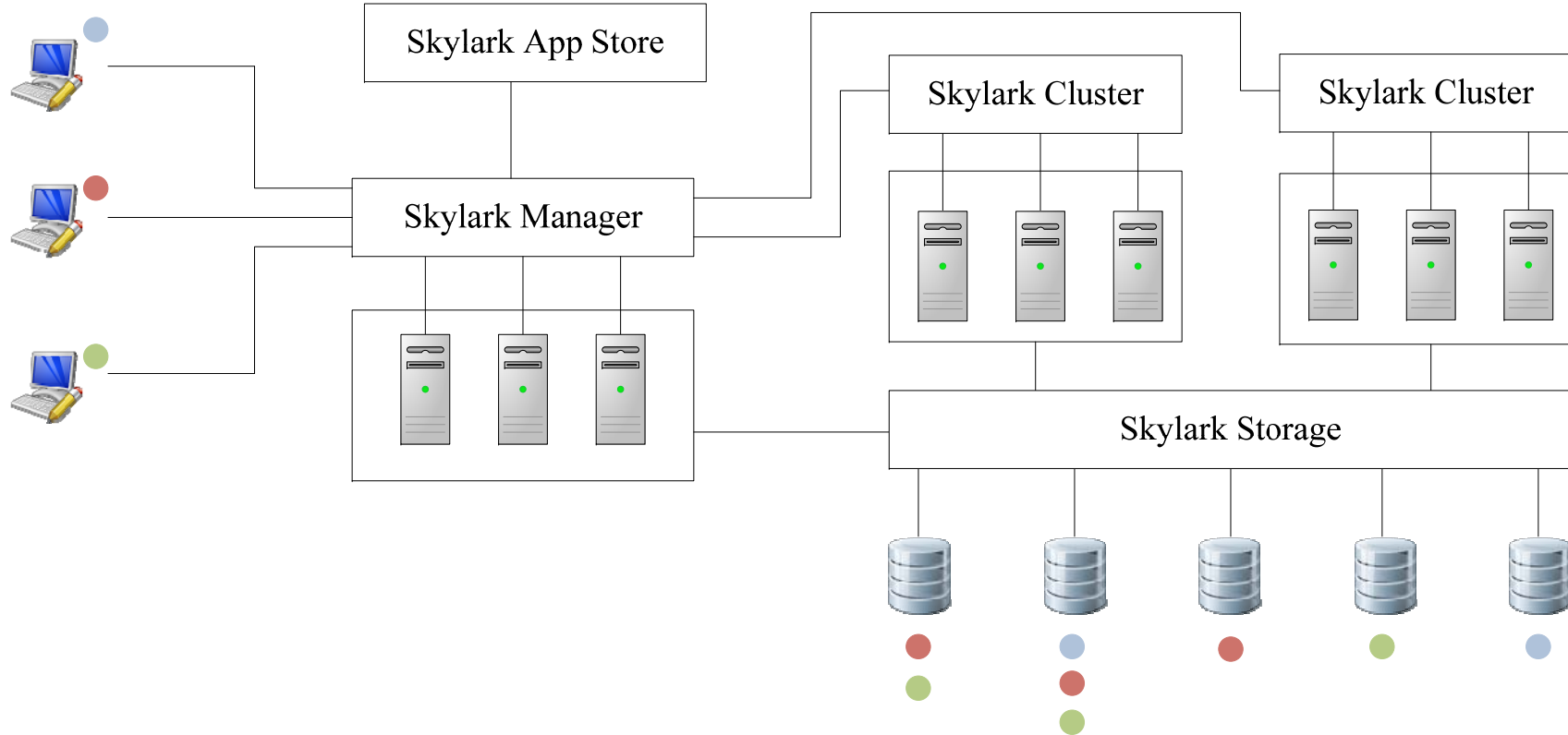
- Xen-based virtualization
- Fine-grained Resource Management
- Image File System
- Remote Virtual Desktop
- Dynamic configuration



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# Skylark Architecture

Skylark Client



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# Skylark Client

- Skylark users can start any application subscribed from Skylark Application Store and does not need to know whether it runs in Linux or Windows.



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# Skylark Manager

- App Management (Install / Remove)
- User Account Management
- Provide web API



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# Skylark Storage

- IFS (Image File System)
  - User can install applications to a VM and then share the VM to others. The shared VM is allowed to be accessed concurrently by dynamic clone.
- KFS (Kite File System)
  - User can access his/her private files from any VM (even though the VM is cloned) .
  - User can access his/her private files from web.



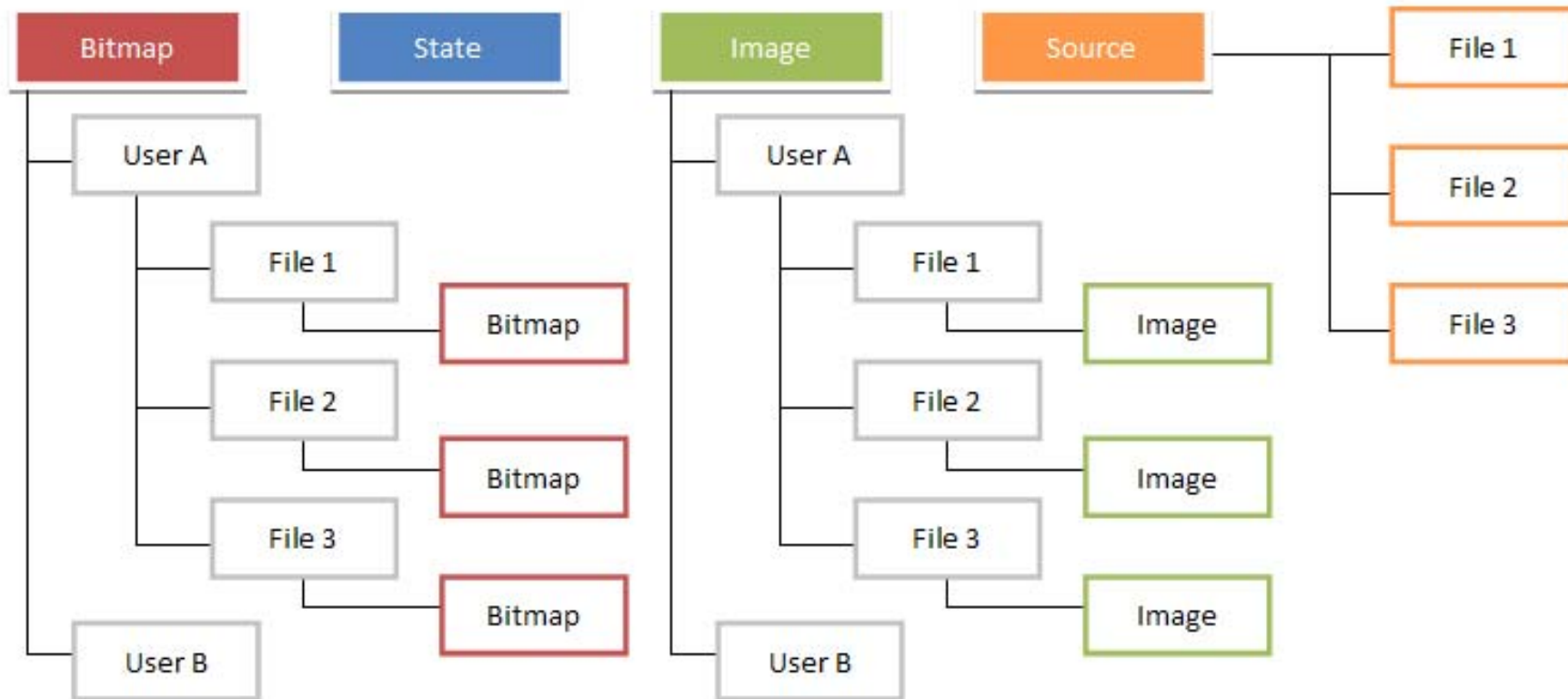


# Skylark Storage : IFS

- IFS is a versioning file system
  - Data privatization
    - Multiple User Single Installation Support
  - Data prefetching
    - Utilization of the data fetched by other users.
  - Data caching
    - Ramfs-style

# Skylark Storage : IFS

## The Architecture of IFS

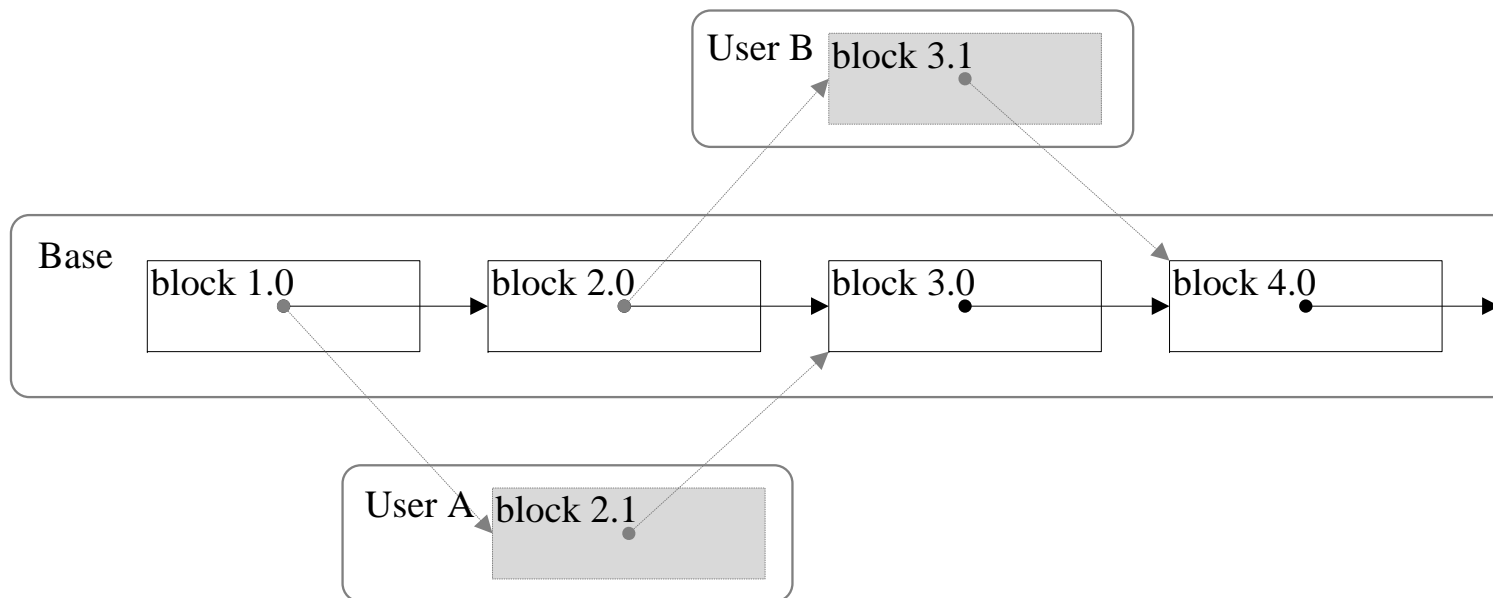


# Skylark Storage : IFS

## The dynamic clone of IFS

/mnt/ifs/userA@file1

/mnt/ifs/userB@file1



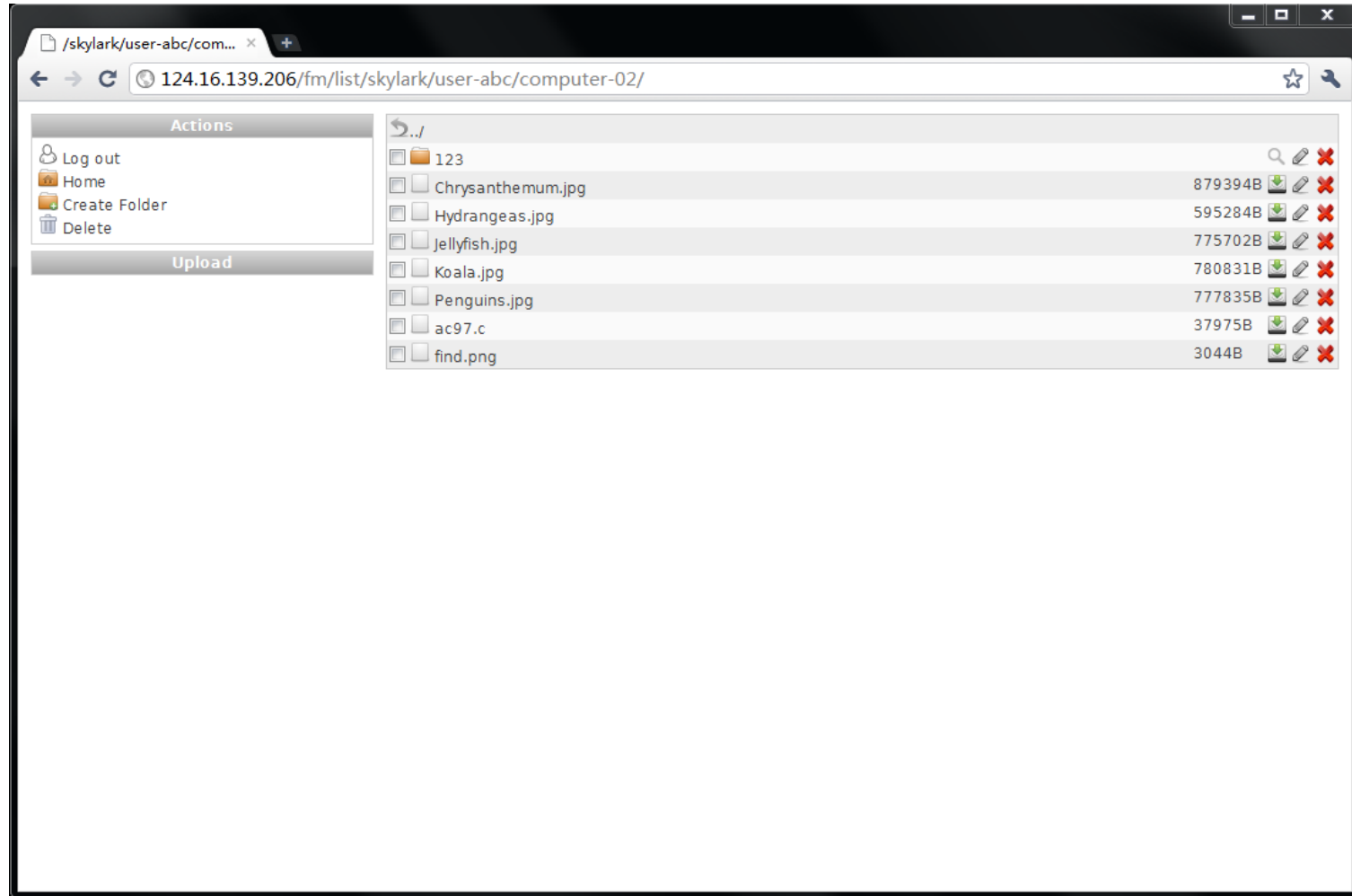


# Skylark Storage: KFS

- KFS (Kite File System)
  - Provide a user virtual disk.
  - Redirect file operations to data server.
    - rmdir , rename, mkdir, readdir, read, write...
  - Support web access of the user virtual disk.

# Skylark Storage : KFS

KFS



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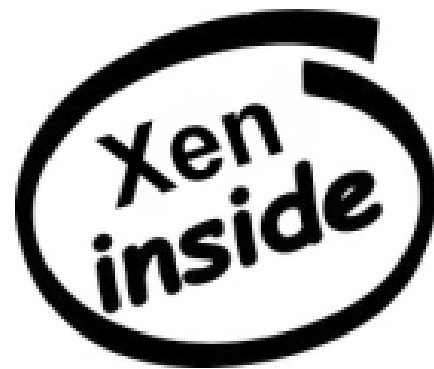


# Skylark Cluster

- Allocate VMs for users
- Schedule :
  - Approximate Load balance
  - Aggregate scheduling
    - More data can be shared
      - Accelerate read speed



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# spice4xen

Our spice4xen project added SPICE support for Xen.

SPICE is an open source remote computing protocol for virtual environment developed by Qumranet and acquired by Red Hat. Users can access the virtual desktop from different terminal in LAN and WAN using SPICE.

<http://code.google.com/p/spice4xen/>

By OSTeam of ISCAS



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# Xen-IFS

- Use the same snapshot that can be restored by different users to accelerate the system startup.
- No need to modify Xen.
  - Problems need to solve:
    - Name conflicts.
    - Hardware conflicts.
    - Address conflicts.



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# Xen-IFS

- Use filename to send additional information to file system.
- Dynamic configuration\*:
  - Set VM name
  - Set UUIDs
  - Set Ports (e.g., spiceport)

\*Do not change the size of snapshot.



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# Xen-IFS

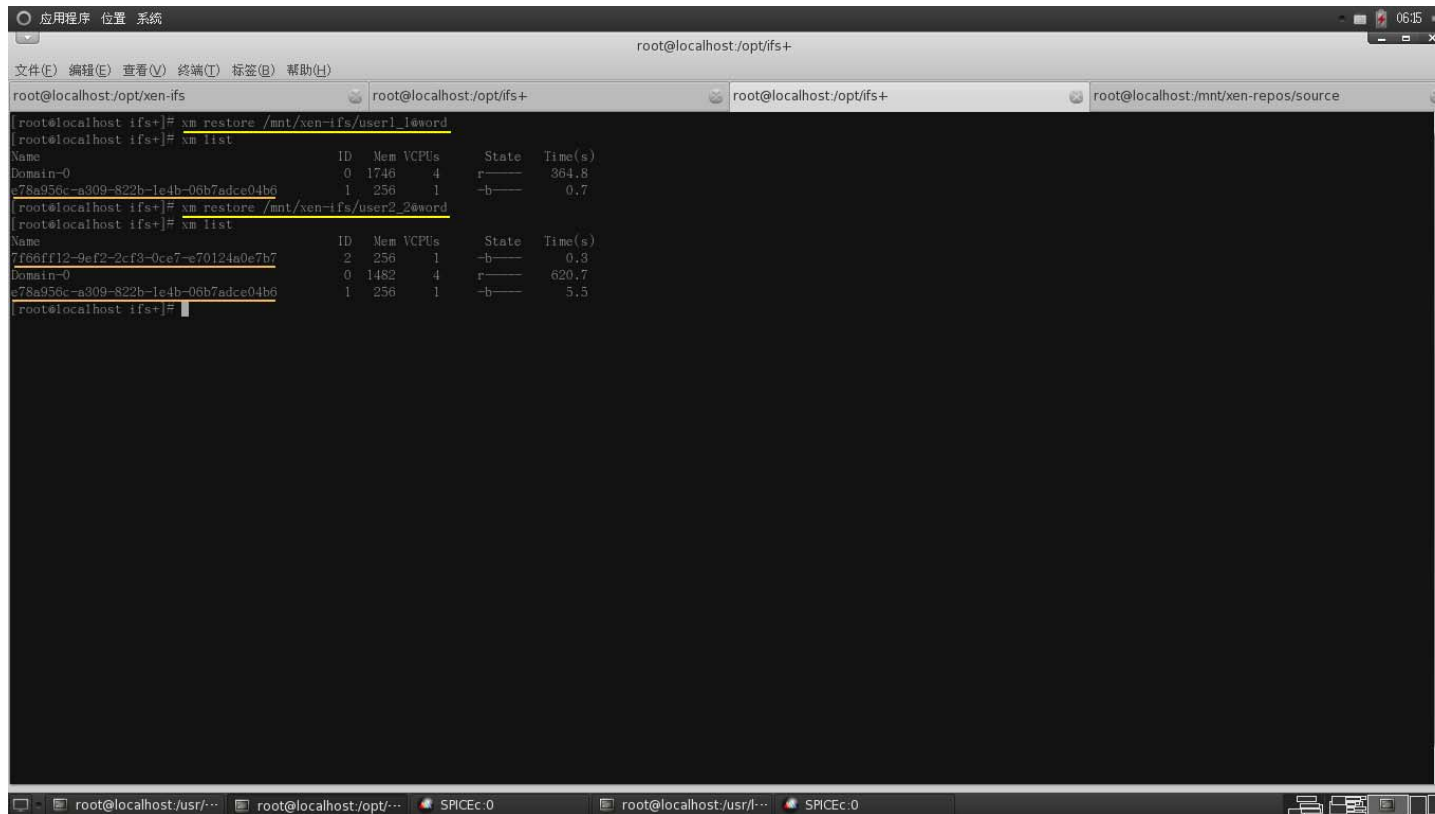
Use the same snapshot and the same disk image to restore VMs

```
LinuxGuestRecord(domain (domid 1) (cpu_weight 256) (cpu_cap 0) (bootloader ) (o
n_crash restart) (uuid bf31715a-5e77-4833-a53b-726ffledd83b) (bootloader_args )
(vcpus 1) (description ) (name e78a956c-a309-822b-1e4b-06b7adce04b6) (cpus ()))
(on_reboot restart) (on_poweroff destroy) (maxmem 256) (memory 256) (shadow_mem
ory 3) (vcpu_avail 1) (features ) (on_xend_start ignore) (on_xend_stop ignore) (
start_time 1309455923.84) (cpu_time 12.075568184) (online_vcpus 1) (image (hvm (
kernel ) (superpages 0) (videoram 4) (hpet 0) (stdvga 0) (loader /usr/lib/xen/bo
ot/hvmlloader) (spicehost 192.168.12.48) (spiceport 6201) (xen_platform_pci 1) (r
tc_timeoffset 0) (pci ()) (spiceagent_mouse 1) (spicepasswd password) (hap 1) (l
ocaltime 0) (timer_mode 1) (spice_disable_ticketing 1) (spicesv on) (spicejpeg_w
an_compression auto) (spicezlib_glz_wan_compression auto) (pci_msitranslate 1) (
oos 1) (apic 1) (spice 1) (usbdevice tablet) (spiceic auto_glz) (qxl 1) (spicepl
ayback 1) (display :0.0) (qxlnum 1) (vpt_align 1) (qxlram 64) (vncconsole 1) (se
rial pty) (vncunused 1) (boot cd) (pae 1) (viridian 0) (acpi 1) (vnc 1) (nograph
ic 0) (nomigrate 0) (usb 0) (tsc_mode 0) (guest_os_type default) (device_model /
usr/lib/xen/bin/qemu-dm) (pci_power_mgmt 0) (xauthority /tmp/.gdm8AKSXV) (isa 0)
(notes (SUSPEND_CANCEL 1))) (status 2) (state -b---) (store_mfn '1044476') (d
evice (console (protocol vt100) (location 3) (uuid 7681ee55-ed7e-46c7-875d-c4e4a
b696750))) (device (vbd (uuid 48ce4d40-fffb-478b-ae82-8a94a70a9fc6) (bootable 1)
(dev hda:disk) (uname 'file:/mnt/ifs/e78a956c-a309-822b-1e4b-06b7adce04b6@c47d1
870-67c6-cf95-3245-f128b5fde62a.img') (mode w) (backend 0) (VDI ))) (device (vbd
(uuid 99db4146-312a-407e-be8f-d2decb64a9e8) (bootable 0) (dev hdc:cdrom) (uname
'file:/mnt/ifs/e78a956c-a309-822b-1e4b-06b7adce04b6@c47d1870-67c6-cf95-3245-f12
8b5fde62a.iso') (mode r) (backend 0) (VDI ))) (device (vfb (vncunused 1) (vnc 1)
(uuid 65a5cfc9-c2b0-4c43-b7c1-0c2b9dd7376e) (location 127.0.0.1:5900))))
```

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# Xen-IFS

Use the same snapshot and the same disk image to restore VMs

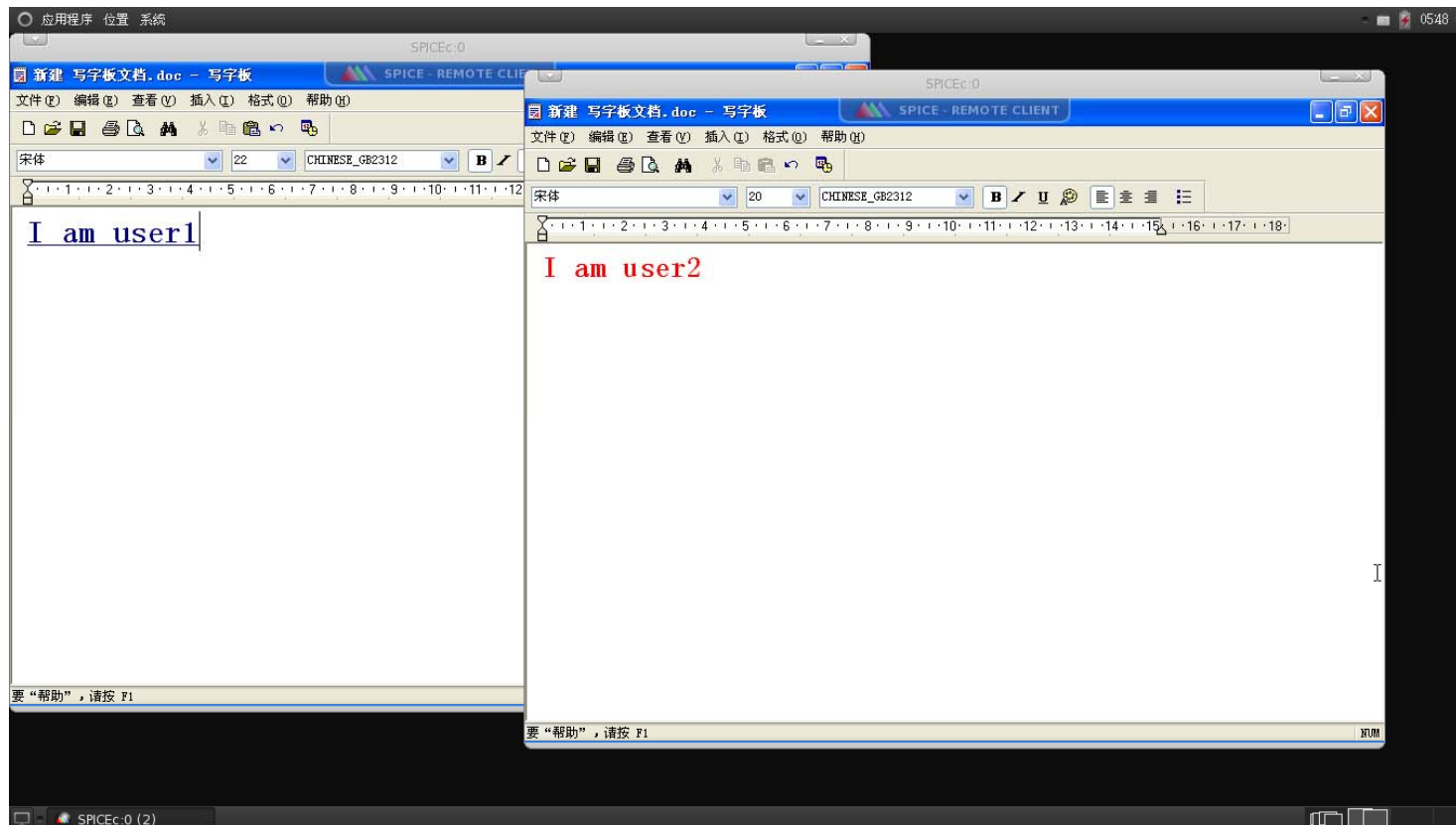


```
root@localhost:~/opt/xen-ifs# xm restore /mnt/xen-ifs/user1_1@word
root@localhost:~/opt/xen-ifs# xm list
Name                               ID   Mem  VCPUs  State  Time(s)
Domain-0                            0  1746    4    r----- 364.8
e78a956c-a309-822b-1e4b-06b7adce04b6  1   256    1    -b----- 0.7
root@localhost:~/opt/xen-ifs# xm restore /mnt/xen-ifs/user2_2@word
root@localhost:~/opt/xen-ifs# xm list
Name                               ID   Mem  VCPUs  State  Time(s)
7f66ff12-9ef2-2cf3-0ce7-e70124a0e7b7  2   256    1    -b----- 0.3
Domain-0                            0  1482    4    r----- 620.7
e78a956c-a309-822b-1e4b-06b7adce04b6  1   256    1    -b----- 5.5
root@localhost:~/opt/xen-ifs#
```

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# Xen-IFS

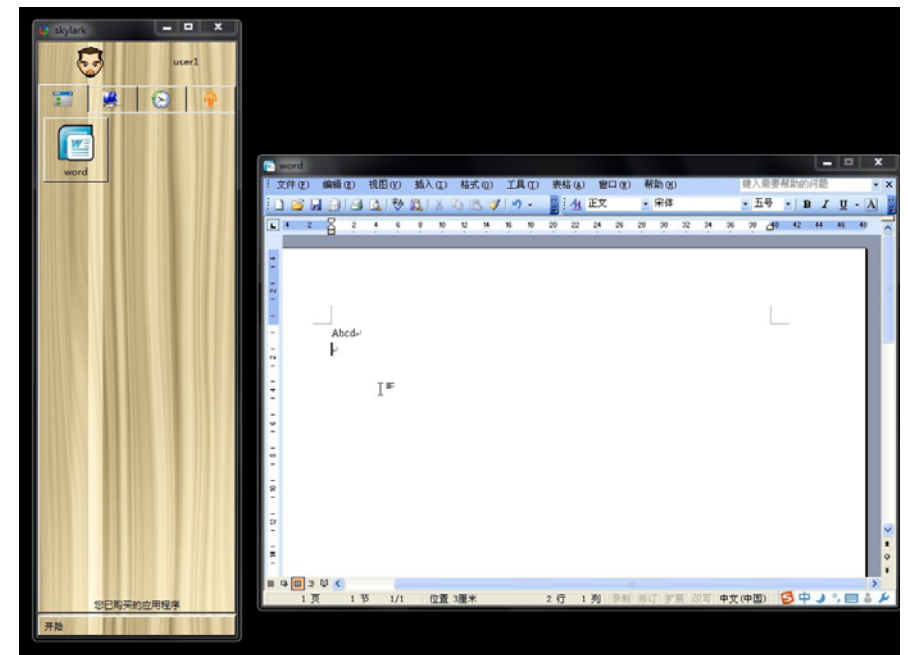
Use the same snapshot and the same disk image to restore VMs



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# Client Side Demo

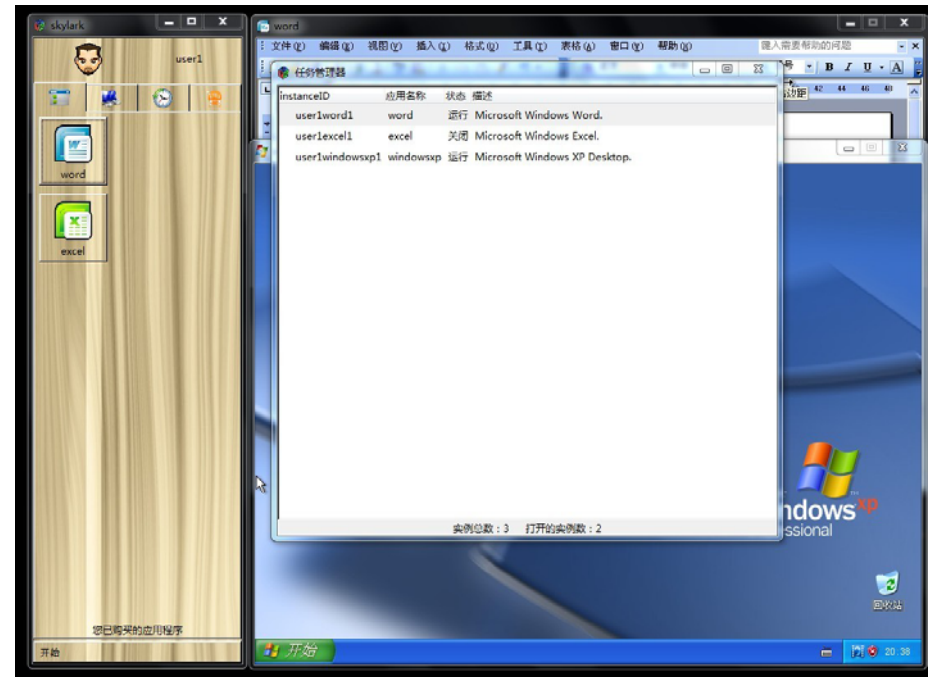
- Login
- Subscribe Word application from Skylark Appstore
- Click and Run



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# Client Side Demo

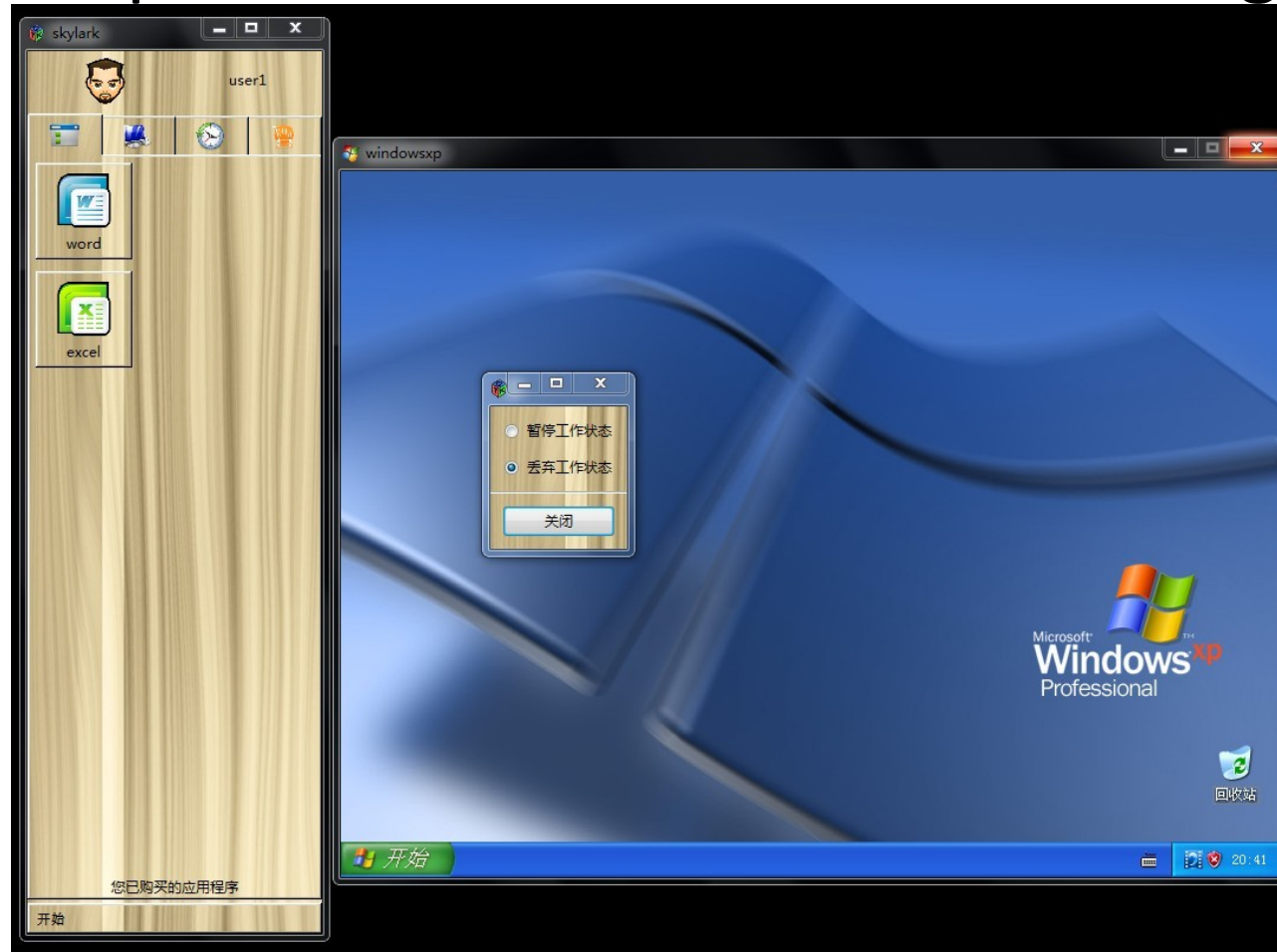
- Select an remote desktop and launch spice.
- Skylark Task Manager displays current active window.



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# Client Side Demo

- User can choose pause or exit the current working enviroment.



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# Future Works

- Skylark is still under heavy development.
- Tools:
  - One of our experiments: Sync Install
    - You can launch a setup program at client side, and the program will be installed to the remote VM automatically.
    - You only need to drag the setup program to a box. The setup operations can be redirected to the remote VM.



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## Contact

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Any suggestion is appreciate.



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