SNS Control Systems

Using VMware to manage EPICS SoftIOCs

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OUTLINE

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- Are they Important?
- How do we manage them now?
- How do we plan to manage them?
- Conclusion and Future Plans

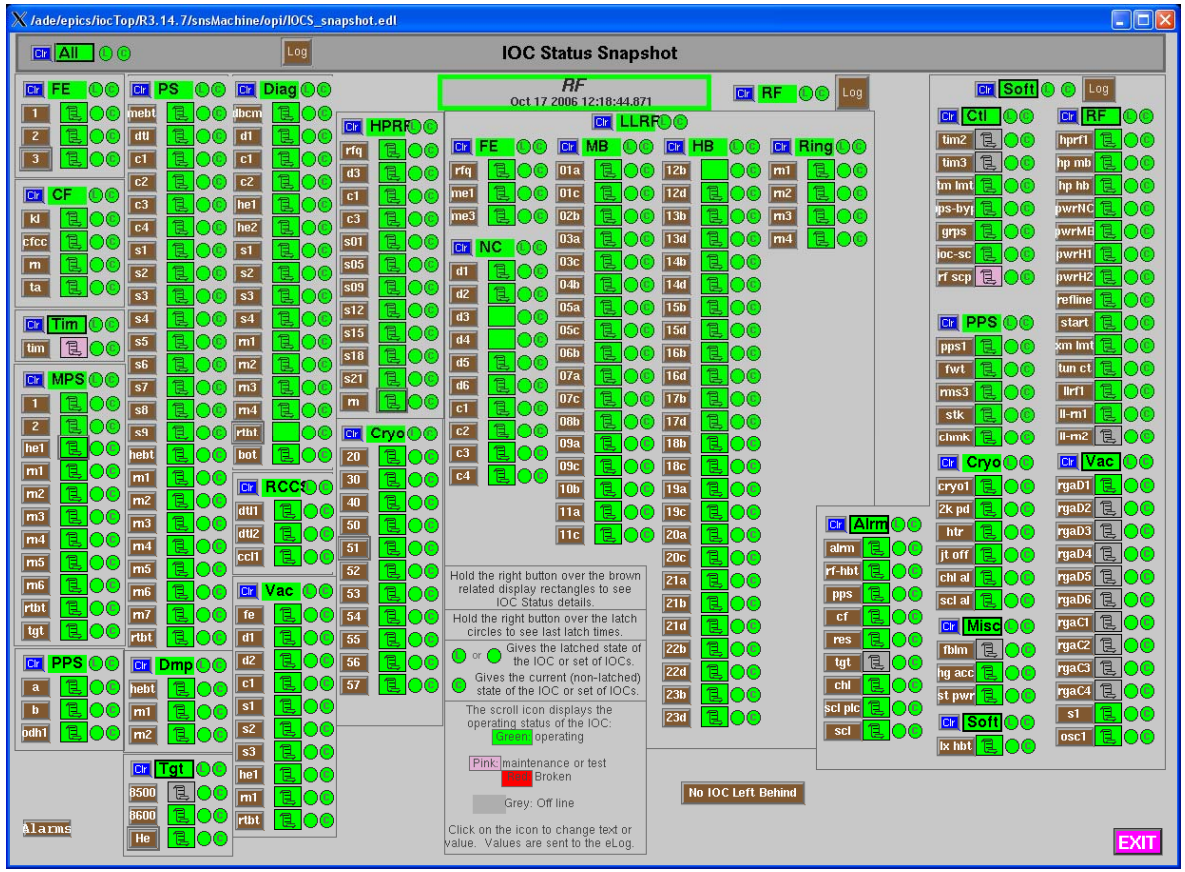
Introduction

- The SNS began using SoftIOCs to keep track of VME based ioc health nearly 4 years ago.
- Today, we have over 45 SoftIOCs online, with more added almost each day.
- We now require near 100 percent reliability from more than a few SoftIOCs.
- Management of SoftIOCs has become very important, and much more difficult.

Example Control System SoftIOCs

- ics-ioc-linux-pps-bypass_startup.cmd
- ics-tim-ioc-linux-lmt_startup.cmd
- ics-ioc-linux-eng-scores_startup.cmd
- ics-mps-ioc-linux1-st.cmd
- ics-diag-ioc-linux1_st.cmd
- pps-ioc-lxalrm-all_startup.cmd
- cryo-ics-ioc-linux1_st.cmd
- cryo-ics-ioc-linux-jtoff_st.cmd
- cryo-ics-ioc-linux-pumpdown_st.cmd
- cryo-ics-ioc-linux-heater_startup_dev.cmd
- cryo-ics-ioc-linux-sclalrm_st.cmd
- cryo-ics-ioc-linux-chlalrm_st.cmd

Sample SoftIOC Application



How we currently manage our SoftIOCs.

- Server seperation by subsystem
  - Accelerator SoftIOC server
  - CRYO SoftIOC server
  - RF SoftIOC server
- Custom front end for IOC Console
  - Procserv
    - tcpip port based telnet server emulation written by David Thompson
- Port Management by the seat of our pants.
- Unix init.d for restart at boot.

Some issues with current management

- Engineer's sometimes don't ask before they add new SoftIOCs.
  - We get port duplicates.
  - Server reboot won't autostart SoftIOCs.
  - Resources on servers are abused.
- It is difficult to do maintenance on our servers.
  - Users don't want to stop their SoftIOCs.
  - We can't easily transfer a SoftIOC from one server to another.

Our solution for the near future is VMware.

- What is VMware?
- How much does it cost?
- How does it work?
- Is is reliable?
- Can I get support for it?
- Will it work for me? ……

VMware basics

- VMware is software that allows a single computer to host several “Virtual” machines.
- These virtual machines have virtual disks.
- They have virtual network adapters with virtual MAC addresses and virtual hostnames.
- They have the ability to host real applications.
- They behave the same as non-virtual hosts.

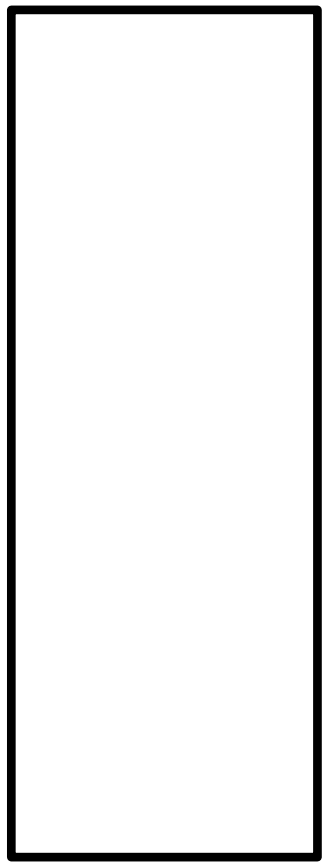
The Good Stuff

- It is possible to make a “snapshot” of a virtual machine that has information about all process and resources associated with the virtual machine.
- Process IDs, and even network threads are preserved.
- This means it is possible to “MOVE” the virtual machine from one partition to another.
- This can be done very quickly. (seconds)

More Good Stuff…

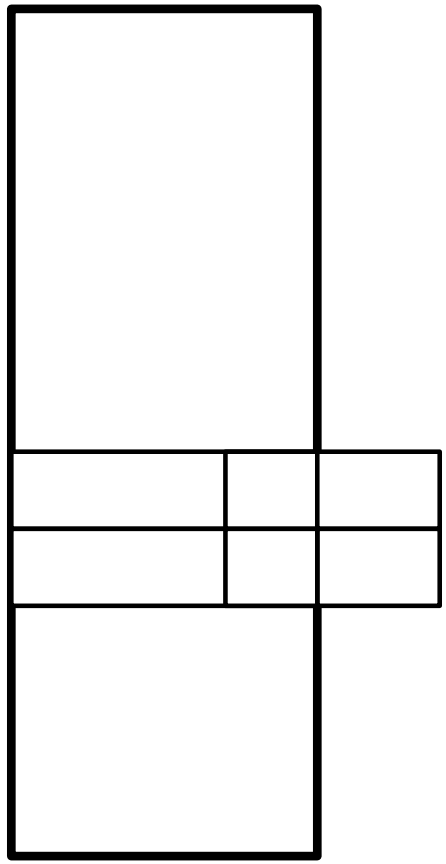
- The virtual network information, mac, ip, hostname, will follow the partition.
- We can also move virtual machines between physical hosts!

Example with a single host.



Server 1

Example with a single host.



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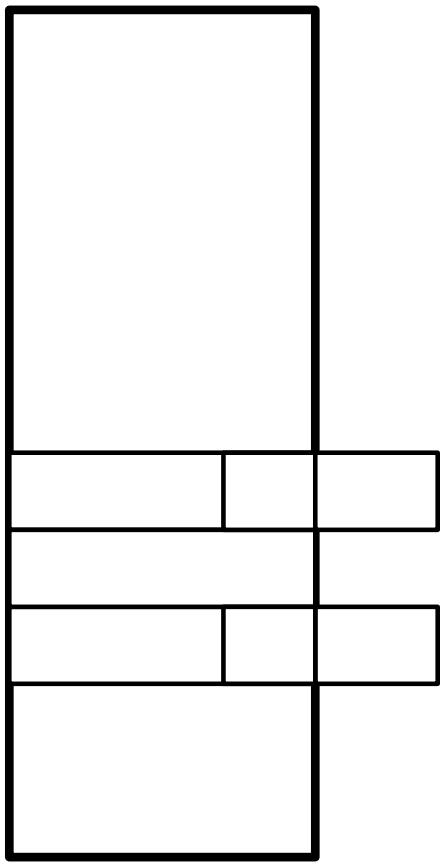
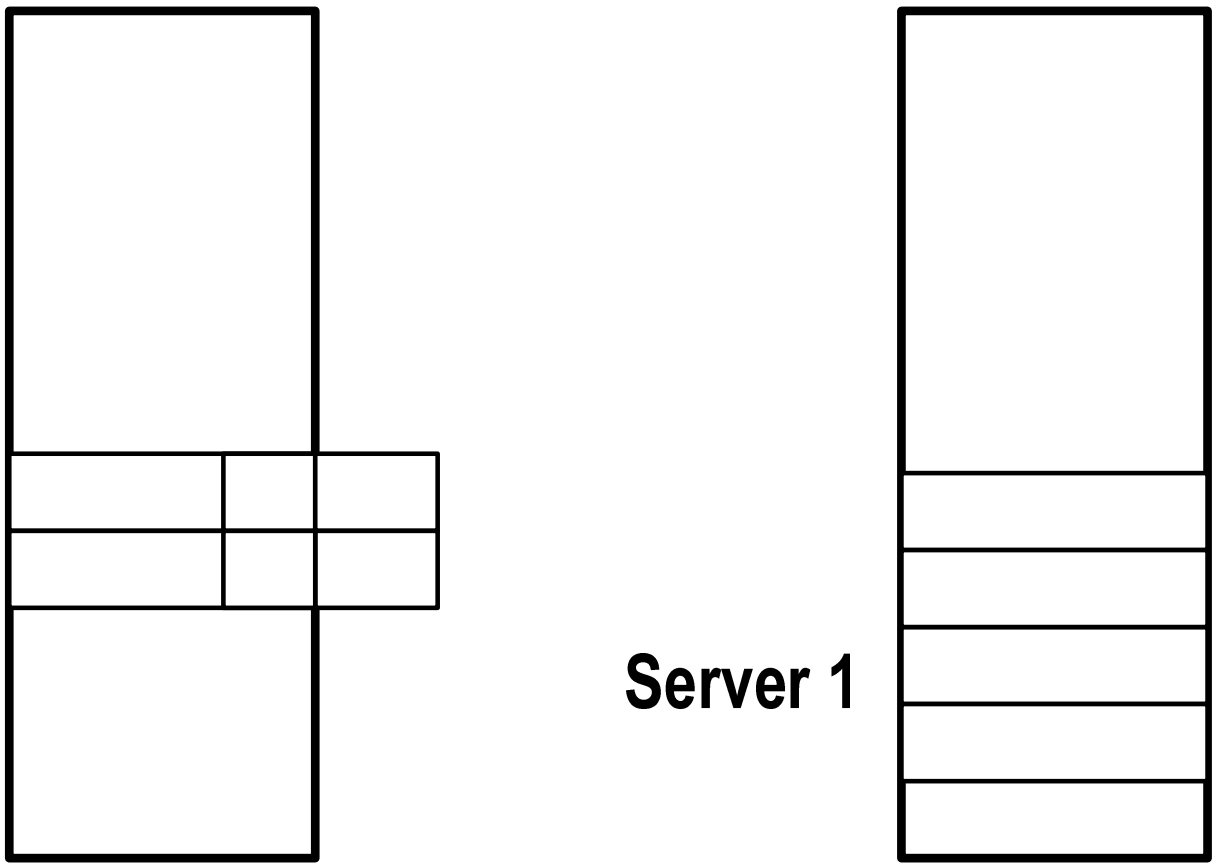
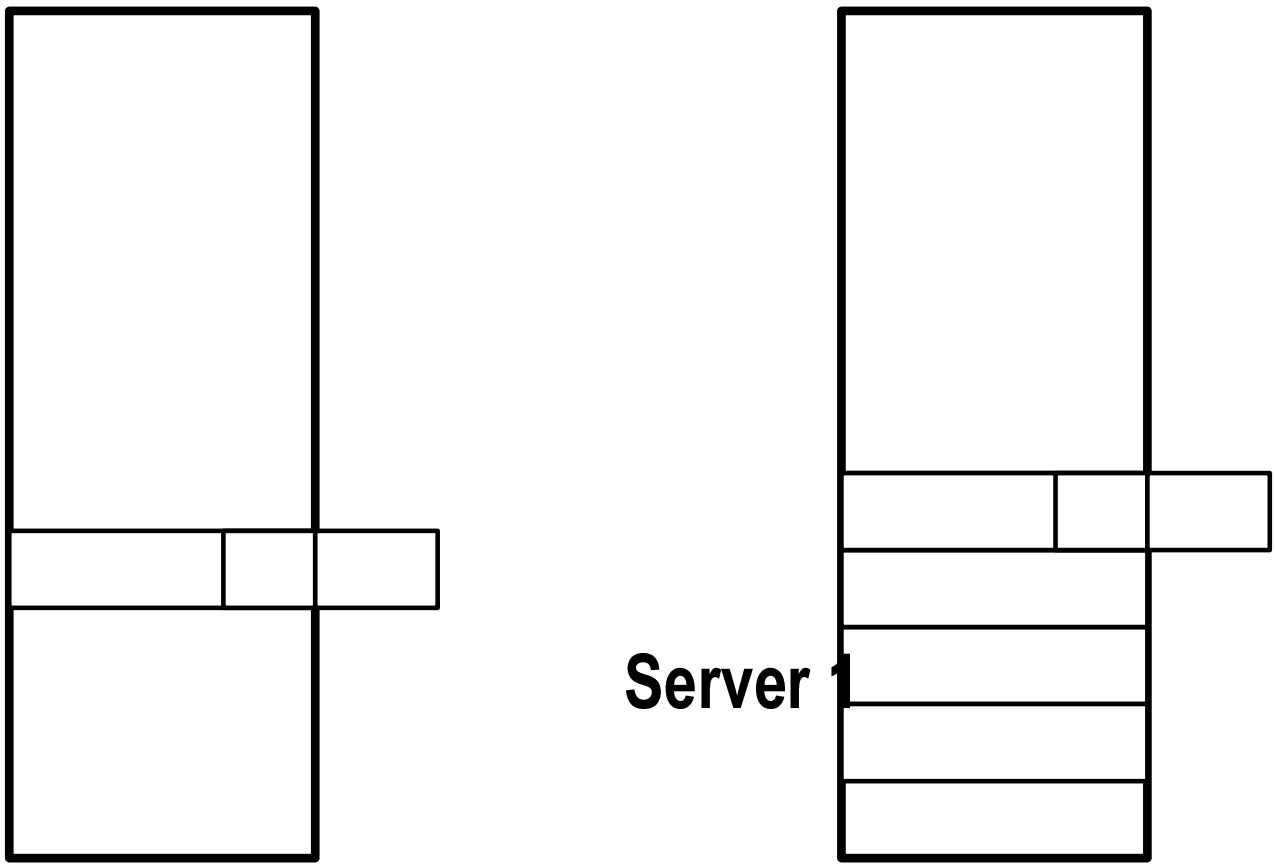


Server 1

Example with multiple servers.



Example with multiple servers.



VMware and SoftIOC considerations

- How will SoftIOCs be distributed?
  - How many SoftIOCs per VM?
  - One VM for each SoftIOC?
- How do we manage application availability?
  - NFS, GFS, GPFS, SAN
- How do we attach to the ioc Console?
  - Custom Application?
  - Virtual serial port?
  - Screen?

How much does it cost?

- Two primary sources for VMware.
  - Xen Virtual Machine Monitor
    - Free, but difficult to configure.
    - Getting better all the time.
    - If you have time and resource, this is the way to go.
    - http://www.cl.cam.ac.uk/research/srg/netos/xen/
  - VMware by EMC
    - GSX is free, but missing features.
    - ESX was about $250 per server at last check.
    - Support is great.
    - If you need it NOW, this is the way to go.
    - http://www.vmware.com

Conclusion

- Virtual Machines make SoftIOC management easier.
- Virtual Machines make SoftIOCs more reliable.
- Virtual Machines are inexpensive.
- Possibilities are numerous for this technology.
- Remember, your mileage may vary….