DCS Development Systems in a Virtualized Environment
Scott Thompson – Systems Consultant
Introduction

• Challenges in supporting multiple DCS revisions
• Our Solution
• Benefits
• Your Benefits
Challenges in Supporting Multiple Systems

- Flexibility
  - Support many different customer systems
    - Currently have ~80 Customer DCS databases loaded
    - ~10 Envox NT/Control Desktop databases
  - Support many different DCS revisions
    - 16 different DCS versions
    - 5 different Windows versions (including service packs)
    - 2+ new systems in development (two more Windows Versions, Windows 7 & Server 2008 SP2)
Challenges in Supporting Multiple Systems

• Faster Turnaround
  • Reset back to base-line after testing

• Robustness
  • How fast can the system be recovered if something breaks
Challenges in Supporting Multiple Systems – Physical Hardware

• Flexibility
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    • Currently have ~80 Customer DCS databases loaded
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Large number of computers
Challenges in Supporting Multiple Systems – Physical Hardware

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At least 18 computers
Challenges in Supporting Multiple Systems – Physical Hardware

- Faster Turnaround
  - Reset back to base-line after testing
  Restore from image (1-3 hours)

- Robustness
  - How fast can the system be recovered if something breaks
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Challenges in Going Virtual

- Will the development software work on a virtual computer?

- How stable will it be?

- ESX and ESXi don’t support USB devices, how do I get the USB hardlock connected?

- How do I best save the system already running on the hardware I’m re-using?
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Challenges in Going Virtual

• Will the development software work on a virtual computer?
  – In our case - Yes

• How stable will it be?
  – Similar to physical machine installation

• ESX and ESXi don’t support USB devices, how do I get the USB hardlock connected?
  – USB Over Network ESX(i) 4.1

• How do I best save the system already running on the hardware I’m re-using?
  – VMWare Converter
Challenges in Going Virtual

• Still need a Windows computer to manage the ESX(i) computers

• The USB Over Network server needs to be installed on a Windows or Linux computer
Challenges in Supporting Multiple Systems – Virtualized

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5 physical computers, many virtual
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Challenges in Supporting Multiple Systems - Virtualized

• Faster Turnaround
  • Reset back to base-line after testing
  Restore to snapshot (5 minutes)

• Robustness
  • How fast can the system be recovered if something breaks
  Restore to snapshot (5 minutes)
REM Development Network

• 73 Servers (real and virtual)
  – 16 physical stand-alone servers (application dedicated)
  – 5 VMWare Servers (running on Server 2003)
    • 17 virtual machines
  – 4 ESXi v4.x machines
    • 31 virtual machines
      – 21 Pro+ (600 DST – 12,000 DST)
      – 2 Batch Executives (for ~12,000 DST systems each)
      – 2 Batch Historians
      – Iconics Server
      – Mimic Server
      – Thin Manager Server
      – Syncade Server
      – Control Desktop Server (Windows NT 4)
      – Virtual CIOC
REM Development Network

- Used existing hardware
- Upgraded RAM for three ESXi servers
- Additional hardware cost to add 19 virtual machines was ~$340.
REM Development Network

- 19 licenses for Server 2003/Server 2008
  - $14,440
  - If buying physical machine, cost is buried in hardware cost
- VMWare ESXi
  - $0
- Windows TS CALS
  - $0 (pre-existing)
- USB Over Network
  - $600 for 8 USB devices
REM Development Network

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REM Benefits

• Reduced hardware footprint
  – 3 vs. 19

• Reduced power usage
  – 750W vs. 4750W

• Reduced A/C load
  – 8,091 BTU/hr vs. 51,243 BTU/hr
  – < 1 ton vs. 5 ton

• Increased flexibility
  – Computers that support NT hard to find

• Decreased setup time for new system
  – Can have a new virtual computer on-line < 1hr.
REM Benefits

• Lower testing risk
  – Take snapshots before installing something untested or installing updates
  – Easily revert to the snapshot if something doesn’t work correctly
Large Plant DCS Development System Example – Physical Hardware

- Configuration Server, Batch/Continuous Historian, Batch Executive, Operator Station RT Server, Virtual Controllers Application Station (3)
  - Configuration Server - 1 R710 - $7200
  - Historian, Batch Executive - 2 R710 - $14400
  - Operator Station RT Server – 1 R710 - $7200
  - Virtual Controllers – 3 R710 - $21600
  - $50,400
Large Plant DCS Development System Example – Virtualized

- Configuration Server, Batch/Continuous Historian, Batch Executive, Operator Station RT Server, Virtual Controllers Application Station (3)
  - Host Server - $7200
  - 16 GB RAM upgrade - $1400
  - Configuration Server – 1 OS License - $750
  - Historian, Batch Executive - 2 OS Licenses - $1500
  - Operator Station RT Server – 1 OS License - $750
  - Terminal Server License (4 users) - $320
  - Virtual Controllers – 3 OS Licenses - $2350
  - $14,270
## Large Plant DCS Development System Example

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<th>With Virtualization</th>
<th>Savings</th>
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