Agenda

Where are we today

Where are the gaps

Bridging those gaps
HPS Virtualization— The Journey So Far..

- >200 installed Experion Virtual systems
- VEP locations in 4 regions around the world
- 400 Systems running inside of the VEP
- >1700 Hosts (nodes that run virtual machines) sold
- Over 3000 VMs running inside of the VEP
Virtualization Ready HPS Applications

- **Process Controllers**: Any sized process control C200/C300 system
- **SCADA**: Any sized Experion SCADA system
- **Advanced Solutions**: Full range of HPS Advanced Solutions Products (AAM, DVM, Business Flex etc)
- **Small Systems**: Experion HS/LS

*Broad range of virtualization support across the portfolio*
Feeling left out?

We are working to have everyone included
Connectivity and Display Density

TPS and Quad Screen Applications
Performance and Reliability Improvements

**Fault Tolerance**

**Performance Improvements**
TPS Virtualization
Challenge

LCNP4
Introducing the ETN Node

LCN Chassis

- LCN I/O
- K4LCN
- Module Bus

ETNI

- FTE I/O

Cisco Switch

- FTE

Virtual Machine

Emulators

- FTE

LCNP4

ESXi Server
- vSphere Management
- Domain Controller
- ACE/IP
- Experson PKS Server
- PHD

ETNI

- K4

ETN/IO
Hardware Components of ETN Cont’d

ETNI Card

ETN IO Card
(Same as EPN IO Card)
Choice of where to mount the ETNI

Leave it in your Stations
• Easy option for getting started
• Great option for virtualizing stations

Move them to the instrumentation room
• Consolidate LCN runs
• Reduce heat/power in control room
Nodes Supported and Dependencies

Dependencies

- Experion Version: R431
- TPN Version: R685.2
- K4 version – K4LCN16
  - (K4LCN8 is a stretch depending on the result of testing)
TPS Virtualization Benefits

Future proofing TPS investment

New station connectivity options

Reduction in heat and noise

Simplified System Management

Improved Hardware Sustainability

Higher Availability

Get LCN out of control room

Benefits of virtualization coming soon to TPS
Quad Thin Clients
Challenge

- Existing thin client dual monitor only
- WYSE OS while highly secure, provided limited expansion options.
- Dual monitor support has prevented some from being able to virtualize.
Next Generation Thin Client Solution

- Based on Dell Wyse Z90DE7
- Custom Windows 7 Embedded OS
- Single through to Quad screen monitor options
- Network redundancy using Redundant Port Protector

<table>
<thead>
<tr>
<th>Supported Features</th>
<th>New Thin Client</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual Video (TP-THNCL2)</td>
<td>✓</td>
</tr>
<tr>
<td>Quad Video (TP-THNCL3)</td>
<td>✓</td>
</tr>
<tr>
<td>Honeywell IKB, OEP Interface</td>
<td>✓</td>
</tr>
<tr>
<td>4K Monitor support (Orion Console)</td>
<td>✓</td>
</tr>
<tr>
<td>Honeywell Console furniture mounting</td>
<td>✓</td>
</tr>
</tbody>
</table>

A Comprehensive Solution Supporting Various Hardware Platform Peripherals
One Thin Client for all your console needs
Fault Tolerance
The Balance with Consolidating

Scope of Loss

Hardware Performance
Redundancy types

**Redundancy Type**

- **Unprotected Hardware**
- **Hardware Redundancy**
- **High Availability**
- **Software Redundancy**
- **Fault Tolerance**

**Examples**

- **Future Experion Virtualization Solutions Offering**
- **Experion Server Redundancy**
- **Premium Platform**
- **R320 or R720 Dell Workstations**
- **Experion Server Redundancy**
- **Future Experion Virtualization Solutions Offering**

Honeywell Proprietary
Redundancy types cont’d

Coverage

Application
OS
VM
Hardware

Availability

Fault Tolerance
Application Redundancy
High Availability

None
Seconds
Minutes
What is Fault Tolerance (FT)?

Allows protected virtual machines that are running on a host to be transparently switched over to another in the event of a host failure.
Why Fault Tolerance?

**Continuous Availability**

- Zero Downtime
- Zero Data loss
- Zero loss of TCP communications

*Independent of the Application Software*
Example Use Case Scenarios

- Customer wants to virtualize stations with zero downtime in the event of hardware failure.
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Station operations replicated in real time
Example Use Case Scenarios

- Customer wants to virtualize stations with zero downtime in the event of hardware failure.

![Diagram showing Blade A and Blade B, with a red cross indicating failure and an arrow pointing to Blade B with 'Zero data loss No loss of view' text.](image-url)
Example Use Case Scenarios

- Improving the availability of an ACE node

Blade A → ACE operations replicated in real time to a backup node → Blade B
Example Use Case Scenarios

- Improving the availability of an ACE node

Blade A  Transparent failover to backup in the event of an ACE failure  Blade B
Fault Tolerance Demo
Tech Preview
Performance and Capacity
Challenge

More CPU capacity than disk capacity

CPU

Resources

Disk

Resources
Higher Capacity Storage for Premium Platform

- Two 12-Disk Storage Modules
- Disk performance increases linearly with the number of drives.
- Improved VM consolidation
- Increased usable disk space
- Reduce the number of chassis required on some jobs
- Expected release late 4Q 2014
Higher Capacity Storage for Premium Platform

2x6 drive Storage, current configuration

~2x disk IOPs and ~3x usable disk Space

2x12 drive Storage, future configuration

Improved Consolidation
Expanding the reach of virtualization

More power, more flexibility to more people
Come and see all of these things in the demo room