VIRTUALIZATION FOR INDUSTRIAL AUTOMATION

Frank Hill, Director Business Development

April 2015
Today's Technology Waves Change Everything

Ø Virtualization
Ø Thin clients
Ø Mobile computing
Ø The internet of things
Ø Big data
Industrial Applications Must Not Stop

When it stops, who’s there to fix it?
Stratus Technologies

Delivers the highest uptime for server based applications using patented technologies combined with proactive availability management and monitoring services to provide Always - On processing

- Patented, time-tested technologies for over 34 years
- 560 employees
- Global sales and support
- Highest customer retention
- Always-on Culture
- Manufacturing has grown into our largest industry segment!

Stratus Technologies = 99.999%+ Uptime = ALWAYS-ON
Companies around the World Depend on Stratus

Always-on processing environment for their critical applications!
Stratus Industrial Automation Experience

Manufacturing is our largest and fastest growing industry

Stratus industrial application partnerships
The Virtualization Wave

Percentage of x86-Architecture Workloads Running in VMs

Virtualization Benefits

Server consolidation

Legacy OS Support

Lifecycle Management
- Reusing VMs to simplify deployment
- Software upgrades
- Disaster recovery
- Future hardware upgrades
- Test environments

Thin Clients
Consolidation With Virtualization Increases Risk

“If you put all your eggs in one basket make sure you use a strong basket or you’ll end up with a mess.”
Typical VMware HA (High Availability) Architecture

Challenges with clusters:
1) Design time
   - 15-16 engineering days
   - Required specialty certifications / experience
     - CCNA - Cisco
     - VCP - VMware
     - Storage experienced engineers
   - Approval from IT
2) Fabrication/test time
   - 7-8 days
   - Requires trained technician
3) Support
   - Multi-vendor
   - Technical Skill Set
Fault-Tolerant Hardware Option

You don’t need:
- vCenter Server
- Multiple Licenses
- Second server
- Redundant switches
- External storage
- VMware Essentials Plus License ($4,000)

- Simple
- Lower Cost
- Higher Availability
Stratus Fault-Tolerant Servers

- Fully redundant hardware
- Plug-and-play
- Operational simplicity
- No failover time
- No data loss
- Hot-swappable components
- Single System - Single License
- 24/7/365 support service
- Typical configurations cost $18,000 to $60,000
ActiveService™ Architecture: Automatic Availability

Component fails. System ISOLATES fault and notifies Stratus that a CPU has failed.

System automatically orders CORRECT replacement part.

Hot-pluggable components are EASY to replace.

System synchronizes with replacement component.

Normal processing continues throughout process!
## Product Specifications

<table>
<thead>
<tr>
<th></th>
<th>2710</th>
<th>4710</th>
<th>6410</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Processors</strong></td>
<td>1-socket</td>
<td>1-socket</td>
<td>2-socket</td>
</tr>
<tr>
<td><strong>Core per processor</strong></td>
<td>Six-core</td>
<td>Ten-core</td>
<td>Ten-core</td>
</tr>
<tr>
<td><strong>Memory Slots</strong></td>
<td>8 DIMM Slots</td>
<td>8 DIMM Slots</td>
<td>16 DIMM Slots</td>
</tr>
<tr>
<td><strong>Maximum System Memory</strong></td>
<td>64 GB</td>
<td>256 GB</td>
<td>512 GB</td>
</tr>
<tr>
<td><strong>Embedded Ports</strong></td>
<td>6 Gb SAS, 4 x USB 2.0 (3 rear, 1 front), 2 x COMM, VGA, DVD R/W (front)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ethernet ports</strong></td>
<td>2 x 1 GbE, 1 x VTM 1 GbE</td>
<td>2 x 1 GbE, 1 x VTM 1 GbE</td>
<td>2 x 1 GbE, 2 x 10 GbE, 1 x VTM 1 GbE</td>
</tr>
<tr>
<td><strong>PCI Slots</strong></td>
<td>2 x PCIe x4 Gen 2</td>
<td>2 x PCIe x4 Gen 2</td>
<td>2 x PCIe x4 Gen 2</td>
</tr>
<tr>
<td><strong>Disk Slots</strong></td>
<td>8 x 2.5” HDD/SSD SAS Disks</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Form Factor</strong></td>
<td>4U Rack</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Optional Embedded Slots/ GbE Ports</strong></td>
<td>Not Available</td>
<td>2 x PCIe x8 Gen 2</td>
<td>Included Standard</td>
</tr>
</tbody>
</table>

Note: All I/O options specified in logical count, physical count is 2 times numbers specified.
# ftServer 2710 Configuration

## Configured System

<table>
<thead>
<tr>
<th>Marketing ID</th>
<th>Description</th>
<th>Qty</th>
<th>Unit List</th>
<th>Net Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2710-1S</td>
<td>ftServer 2710 Rack mountable, 1-way, DMR, 2.1 GHz six-core processor</td>
<td>1</td>
<td>7,022.00</td>
<td>7,022.00</td>
</tr>
<tr>
<td>S0739-CAL</td>
<td>Client Access License for Windows 2012 (5 user CAL version)</td>
<td>1</td>
<td>229.00</td>
<td>229.00</td>
</tr>
<tr>
<td>S0749A-DG-SE-SE</td>
<td>Microsoft Windows Server 2012 R2 Standard Edition Media Kit</td>
<td>1</td>
<td>1,045.00</td>
<td>1,045.00</td>
</tr>
<tr>
<td>AUL-EC-S0768B</td>
<td>Automated Uptime Layer for VMware-based Class C ftServer Systems, Release 5.1</td>
<td>1</td>
<td>8,607.00</td>
<td>8,607.00</td>
</tr>
<tr>
<td>M255</td>
<td>8 GB DIMM - DDR3 1600 Mhz 1.35V</td>
<td>8</td>
<td>229.00</td>
<td>1,832.00</td>
</tr>
<tr>
<td>D345E</td>
<td>300GB 15K RPM SAS 2.5-inch disk drive</td>
<td>2</td>
<td>549.00</td>
<td>1,098.00</td>
</tr>
<tr>
<td>D349</td>
<td>1.2 TB 10K SAS 2.5-inch HDD</td>
<td>4</td>
<td>599.00</td>
<td>2,396.00</td>
</tr>
<tr>
<td>V115F</td>
<td>ftServer USB Keyboard/Mouse</td>
<td>1</td>
<td>125.00</td>
<td>125.00</td>
</tr>
</tbody>
</table>

**Total Product Price:** 22,354.00

## One-Time Services Fees

<table>
<thead>
<tr>
<th>Marketing ID</th>
<th>Description</th>
<th>Qty</th>
<th>Unit List</th>
<th>Net Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>C51N0175</td>
<td>ftServer 2710 Jumpstart System Installation ESX</td>
<td>1</td>
<td>3,695.00</td>
<td>3,695.00</td>
</tr>
</tbody>
</table>

**Total One-Time Services Price:** 3,695.00

**Total Configuration Selling Price:** 26,049.00

## Recurring Services

<table>
<thead>
<tr>
<th>Marketing ID</th>
<th>Description</th>
<th>Qty</th>
<th>Unit List</th>
<th>Net Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2710-1S</td>
<td>ftServer 2710 Rack mountable, 1-way, DMR, 2.1 GHz six-core processor</td>
<td>1</td>
<td>2,700.00</td>
<td>2,700.00</td>
</tr>
<tr>
<td>S0769-ESL</td>
<td>VMware vSphere 5 Essentials Kit for 3 hosts</td>
<td>1</td>
<td>648.00</td>
<td>648.00</td>
</tr>
</tbody>
</table>

**1 Year Services Total:** 3,348.00

- Single 6-core (6 processors)
- Hyper-Threading
- (1) MS Windows Server License (for 2 VMs) with 5 CAL
- 32 GB Memory
- 2.7 TB usable mirrored storage
- 2 Ethernet Ports
- Keyboard
- On-site Jumpstart training and installation
- Platform Support level of recurring services
# ftServer 4710 Configuration

<table>
<thead>
<tr>
<th>Quote ID:</th>
<th>125999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quote Name:</td>
<td>4710 EXAMPLE VMWARE</td>
</tr>
<tr>
<td>Effective Date:</td>
<td>16-Apr-15</td>
</tr>
</tbody>
</table>

**Configured System**

<table>
<thead>
<tr>
<th>Marketing ID</th>
<th>Description</th>
<th>Qty</th>
<th>Unit List</th>
<th>Net Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>P4710-1S</td>
<td>ftServer 4710 Rack mountable, 1-way, DMR, 2.5 GHz, 10-core processor</td>
<td>1</td>
<td>10,300.00</td>
<td>10,300.00</td>
</tr>
<tr>
<td>S0739-CAL</td>
<td>Client Access License for Windows 2012 (5 user CAL version)</td>
<td>3</td>
<td>229.00</td>
<td>687.00</td>
</tr>
<tr>
<td>S0749A-DG-SE-SE</td>
<td>Microsoft Windows Server 2012 R2 Standard Edition Media Kit</td>
<td>3</td>
<td>1,045.00</td>
<td>3,135.00</td>
</tr>
<tr>
<td>AUL-EB-S0768B</td>
<td>Automated Uptime Layer for VMware-based Class B ftServer Systems, Release 5.1</td>
<td>1</td>
<td>17,449.00</td>
<td>17,449.00</td>
</tr>
<tr>
<td>M265</td>
<td>16 GB DIMM - DDR3 1600 Mhz 1.35V</td>
<td>8</td>
<td>369.00</td>
<td>2,952.00</td>
</tr>
<tr>
<td>AS391</td>
<td>Disk Drive Blank for ftServer family</td>
<td>12</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>D345E</td>
<td>300GB 15K RPM SAS 2.5-inch disk drive</td>
<td>2</td>
<td>549.00</td>
<td>1,098.00</td>
</tr>
<tr>
<td>D349</td>
<td>1.2 TB 10K SAS 2.5-inch HDD</td>
<td>2</td>
<td>599.00</td>
<td>1,198.00</td>
</tr>
<tr>
<td>AK599</td>
<td>PCIe Riser Kit</td>
<td>1</td>
<td>1,000.00</td>
<td>1,000.00</td>
</tr>
<tr>
<td>V115F</td>
<td>ftServer USB Keyboard/Mouse</td>
<td>1</td>
<td>125.00</td>
<td>125.00</td>
</tr>
</tbody>
</table>

**Total Product Price:** 37,944.00

**One-Time Services Fees**

| Installation   | ftServer 4710 Jumpstart System Installation ESX                               | 1   | 4,695.00     | 4,695.00     |

**Total One-Time Services Price:** 4,695.00

**Total Configuration Selling Price:** 42,639.00

**Recurring Services**

| Service Level Chosen: Platform Support with Subscription (VMware) [PSV3000S] |
|---------------------------------------------------------------|------------------|------------------|------------------|
| Marketing ID | Description                                                   | Qty | Unit List     | Net Total     |
| P4710-1S     | ftServer 4710 Rack mountable, 1-way, DMR, 2.5 GHz, 10-core processor | 1   | 3,192.00      | 3,192.00      |
| S0769-ESSL   | VMware vSphere 5 Essentials Kit for 3 hosts                     | 1   | 648.00        | 648.00        |

**1 Year Services Total:** 3,840.00

- Single 10-core (10 processors)
- Hyper-Threading
- (3) MS Windows Server License (for 6 VMs) with 15 CAL $3,822
- 64 GB Memory
- 3 TB usable mirrored storage
- 4 Ethernet Ports
- Keyboard
- On-site Jumpstart training and installation
- Platform Support level of recurring services
## ftServer 6410 Configuration

**Quote ID:** 126000  
**Quote Name:** 6410 EXAMPLE VMWARE  
**Effective Date:** 15-Apr-15

### Configured System

<table>
<thead>
<tr>
<th>Marketing ID</th>
<th>Description</th>
<th>Qty</th>
<th>Unit List</th>
<th>Net Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>P8410-2S</td>
<td>ftServer 6410 Rack mountable, 2-way, DMR, two 2.5 GHz ten-core processors</td>
<td>1</td>
<td>15,248.00</td>
<td>15,248.00</td>
</tr>
<tr>
<td>S0739-CAL</td>
<td>Client Access License for Windows 2012 (5 user CAL version)</td>
<td>3</td>
<td>229.00</td>
<td>687.00</td>
</tr>
<tr>
<td>S0749A-DG-DC-DC</td>
<td>Microsoft Windows Server 2012 R2 Datacenter Edition Media Kit</td>
<td>1</td>
<td>7,049.00</td>
<td>7,049.00</td>
</tr>
<tr>
<td>S0769-ESSL</td>
<td>VMware vSphere 5 Essentials Kit for 3 hosts</td>
<td>1</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>AUL-EA-S076B</td>
<td>Automated Uptime Layer for VMware-based Class A ftServer Systems, Release 5.1</td>
<td>1</td>
<td>30,711.00</td>
<td>30,711.00</td>
</tr>
<tr>
<td>M256</td>
<td>16 GB DIMM - DDR3 1600 MHz 1.35V</td>
<td>16</td>
<td>369.00</td>
<td>5,904.00</td>
</tr>
<tr>
<td>D345E</td>
<td>300GB 15K RPM SAS 2.5-inch disk drive</td>
<td>2</td>
<td>1,096.00</td>
<td>1,096.00</td>
</tr>
<tr>
<td>D349</td>
<td>1.2 TB 10K SAS 2.5-inch HDD</td>
<td>6</td>
<td>559.00</td>
<td>3,354.00</td>
</tr>
<tr>
<td>V115F</td>
<td>ftServer USB Keyboard/Mouse</td>
<td>1</td>
<td>125.00</td>
<td>125.00</td>
</tr>
</tbody>
</table>

**Total Product Price:** 64,416.00

### One-Time Services Fees

**Installation**

<table>
<thead>
<tr>
<th>Marketing ID</th>
<th>Description</th>
<th>Qty</th>
<th>Unit List</th>
<th>Net Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSIN0187</td>
<td>ftServer 6410 Jumpstart System Installation ESX</td>
<td>1</td>
<td>5,895.00</td>
<td>5,895.00</td>
</tr>
</tbody>
</table>

**Total One-Time Services Price:** 5,895.00

**Total Configuration Selling Price:** 70,311.00

### Recurring Services

**Service Level Chosen:** Platform Support with Subscription (VMware) [PSV3000S]

<table>
<thead>
<tr>
<th>Marketing ID</th>
<th>Description</th>
<th>Qty</th>
<th>Unit List</th>
<th>Net Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>P8410-2S</td>
<td>ftServer 6410 Rack mountable, 2-way, DMR, two 2.5 GHz ten-core processors</td>
<td>1</td>
<td>3,996.00</td>
<td>3,996.00</td>
</tr>
<tr>
<td>S0769-ESSL</td>
<td>VMware vSphere 5 Essentials Kit for 3 hosts</td>
<td>1</td>
<td>648.00</td>
<td>648.00</td>
</tr>
</tbody>
</table>

**1 Year Services Total:** 4,644.00

- • Dual 10-core (20 processors)
- • Hyper-Threading
- • MS Datacenter License (unlimited VMs) with 15 CAL $7,736
- • 128 GB Memory
- • 3.9 TB usable mirrored storage
- • 4 Ethernet Ports
- • Keyboard
- • On-site Jumpstart training and installation
- • Platform Support level of recurring services
System Example

Diagram showing the relationships between different servers and workstations:
- AOS 1
- Historian
- Information Server
- Galaxy Repository
- AOS 2
- I/O Server
- Intelligence
- Workflow
- Operator Workstations
System Example

AOS 1
- Historian
- Information Server
- Galaxy Repository

AOS 2
- I/O Server
- Intelligence
- Workflow

Operator Workstations
Pinellas County, Florida USA - Water Treatment Plants

Site Control Room

Wireless Remote Control Vehicles

Human Machine Interface Clients

Wonderware Water Treatment Solution

VM
VM
VM
VM
VM

HMI
Historian
SCADA
Data Analyst
Maintenance Calibration

VMware vSphere

Programmable Logic Controllers

Pinellas County Map
Stratus Contact:
Frank Hill
Director BD & Channel Team Lead
Manufacturing, Utilities, O&G
+1 267-261-3733
frank.hill@stratus.com
Example: NiSource - Columbia Pipeline Group

Columbia Pipeline Group delivers over 1 trillion cubic feet of natural gas per year of natural gas to across 16 USA states through 15,000 miles of natural gas pipeline and 37 storage fields.

- Stratus® ftServer® systems
- VMware vSphere™ virtualization
- Platform support services
- FactoryTalk® Software

- ftServers replaced four Dell servers in 80 compressing stations
- Each ftServer hosts 5 VMs including FactoryTalk® View and Historian
- Eliminated downtime, lowered costs, and simplified support
- [http://www.stratus.com/Library/Resources/Columbia-Pipeline-Video-Case-Study](http://www.stratus.com/Library/Resources/Columbia-Pipeline-Video-Case-Study)

Uptime = Operational Simplicity