Foxboro Evo™ Process Automation System

Product Specifications

Foxboro®

by Schneider Electric

PSS 31H-4V90

Virtualization Server Host Hardware Model V90

Virtualization is a technology that allows consolidation of multiple workstations into a single server. This consolidation into a 4U rack-mounted package consumes fewer plant resources and is easier to install and maintain. The V90 Server can replace up to 10 workstations with performance equivalent to that seen with the individual computers.

FEATURES

The Foxboro Evo Model V90 Server features:

- A premium level system with high-end processor speed, up to 96 GB of memory, up to eight internal Redundant Array of Independent Disks (RAID5) with one hot swap drive, and redundant hot-swap power supplies
- The ability to host multiple virtual machines running Microsoft Windows Server® 2008 R2 Standard operating system
- Security protection provided by McAfee® VirusScan Enterprise
- Virtual machines on a V90:
  - Have the ability to host control processors and/or support data acquisition and monitoring functions as a Foxboro station
  - Can serve as a Foxboro Evo workstation or Control Core Services application platform and a human interface station
  - Can function as Remote Desktop Services servers to support up to 20 remote clients

- Can support security enhanced Foxboro Evo System software with optional McAfee® software packages: ePolicy Orchestrator, Host Intrusion Prevention, and Data Loss Prevention (Device Control), and Integrity Control (Solidcore).

- Virtual machines on a V90 are required to use McAfee MOVE Antivirus (MOVE AV) for security protection instead of McAfee VirusScan.
  - MOVE AV requires a dedicated Virtual Machine (VM) for MOVE AV Offload Scan Server that can protect up to 160 Virtual Machines.
  - McAfee ePolicy Orchestrator (ePO) is required to manage MOVE AV. The supported configuration requires that ePO be run on the same machine as a Domain Controller (DC). This machine may be physical or virtual.

NOTE

The McAfee® Virus Scan Enterprise Edition Version 8.8 Patch 4 Kit (K0201ER) is included with Model V90, however, it is not pre-installed/configured on the system. For additional McAfee security protection options, refer to PSS 31S-4McAfee.

OVERVIEW

The Model V90 server virtualization host is a 2U rack-mount server running Microsoft Windows Server 2008 R2 Enterprise operating system. Through the use of Microsoft Hyper-V hypervisor virtualization technology, the V90 is capable of hosting virtual machines running Microsoft Windows Server 2008 R2 Standard operating system. Virtual machines that are supported include:

- On-Control Network Foxboro Evo virtual machines; I/A Series software v8.8 and Foxboro Evo Control Core Services v9.0 or later
- On-Control Network Control Core Services virtual machines
- Off-Control Network virtual machines using the Foxboro provided virtual machine operating system image
- Any mix of the above three different virtual machine types.

The V90 server virtualization host using Microsoft Hyper-V hypervisor is the only server configuration supported for hosting Foxboro Evo system and Foxboro Evo Control Software virtual machines. The V90 is available as a user-configurable model code. CPU, RAM, and operating system selections are not offered because those hardware aspects of the V90 are derived based on the number of virtual machines selected.

V90 Physical Operating System Environment (POSE): Windows Server 2008 R2 Enterprise Operating System

The physical operating system environment (POSE) on the V90 server virtualization host is the Windows Server 2008 R2 Enterprise operating system. The pre-installed Windows Server 2008 R2 Enterprise operating system image on the V90 provides the foundation necessary to support hosting of virtual machines. The image includes:

- Microsoft Hyper-V hypervisor virtualization technology, which is required for creating, hosting, and managing virtual machines.
- Windows Server Backup feature, which is required for performing backups of an entire V90 server virtualization host (including all of the hosted virtual machines). Please note that a backup can be done live, without rebooting the V90 or any of the individual virtual machines.
- Operating system hardening:
  - Unnecessary services, software, and programs are removed

- Unneeded software ports are disabled
- Documentation on re-enabling services and ports as required by special circumstances
- Secure BIOS changes.

Since the V90's POSE Windows Server 2008 R2 Enterprise operating system's entire role is to support virtual machines, the only software permitted to be installed on it is software directly related to the health and support of virtual machines.

Therefore, Foxboro Evo System, Foxboro Evo Control Software, or third-party applications cannot be installed on the Windows Server 2008 R2 Enterprise operating system image shipped with the V90 server virtualization host.

The V90 server virtualization host's POSE operating system supports the following peripherals: mouse, alphanumeric keyboard, 23-inch or 40-inch flat panel LCD monitor (purchased separately), optional USB touchscreen (purchased separately with the monitor), and 1Gb copper / fiber network interface cards (four on-board NICs are included). The V90 server virtualization host does not support the use of serial GCIO annunciator keyboards, USB annunciator keyboards, remote graphics units, GPS time synch cards, or local printers.

V90 Virtual Operating System Environment (VOSE): Virtual Machines

The V90 Server virtualization host is shipped with a Foxboro-created virtual machine operating system image. By using the supplied virtual machine operating system image with the Microsoft HyperV hypervisor technology, V90's virtual operating system environments (VOSE) can be created. Each virtual machine created with the Foxboro supplied image has its own self-contained virtual operating system environment (VOSE) which includes the following:

- 64-bit Windows Server 2008 R2 Standard operating system; which is required for loading software applications onto the virtual machine.
- Latest version of Symantec System Recovery (SSR) software; which is required for performing individual virtual machine back-ups. Please note the procedure to do a back-up of a virtual machine using Symantec System Recovery is very similar to performing the procedure on a regular physical machine.
- Operating system hardening:
  - Unnecessary services, software, and programs are removed
  - Unneeded software ports are disabled
  - Documentation on re-enabling services and ports as required by special circumstances
  - Secure BIOS changes

McAfee VirusScan Enterprise software is not included on the virtual machine operating system image. Instead antivirus protection is provided by McAfee MOVE Antivirus software which is managed from McAfee's ePolicy Orchestrator (ePO).

Virtual machines can be used with I/A Series software v8.8, Foxboro Evo Control Core Services v9.0 or later, Foxboro Control Software (FCS) v4.0 or later, and Foxboro Evo Control Software v5.0 or later, and can also provide a platform for Foxboro, third-party, and user-written applications.

A virtual machine can:

- Host Foxboro Evo control stations
- Serve as an application platform
- Run Remote Desktop Services (formally known as Terminal Services)
- Connect to a thin client over the DCS Auxiliary Communications Network to provide human-machine interface (HMI) station functionality
- Function on Ethernet control systems

- Act as a McAfee MOVE AntiVirus Offload Scan Server
- Use security enhancements provided by the following McAfee software packages:
    - ePolicy Orchestrator
    - Host Intrusion Prevent
    - Data Loss Prevention (Device Control)

The virtual machines hosted by the V90 server virtualization host connect to the network through internal virtual switches that map virtual machines to the V90's physical 1Gb copper / fiber Ethernet ports. The virtual switch network can be configured to map network connectivity to:

- The Foxboro Evo Control Network
- The DCS Auxiliary Communications Network (ACN), a 1Gb Off-Control Network comprised of managed Ethernet switches that must not share any of the same network hardware (switches) with the control network
- Other auxiliary networks
- Any mix of the above three different network types

A virtual machine's network connectivity is configured independently from other virtual machines hosted by the same V90 server virtualization host. Each network utilizes a dedicated physical 1Gb copper / fiber Ethernet port. The control network has two dedicated 1Gb Ethernet ports while the DCS Auxiliary Communications Network (ACN) has one dedicated 1Gb Ethernet port.

With the exception of the Ethernet network ports, virtual machines are not allowed direct access to the V90 physical ports (serial, USB, etc.) Therefore, virtual machines only support peripherals that are connected through the network, such as thin clients and network printers. Virtual machines do not support the use of serial GCIO annunciator keyboards, USB annunciator keyboards, remote graphics units, GPS time synch cards, or local printers.

Virtual Machine Configurations

A V90 server virtualization host can host virtual machines with the following configurations:

- Single processor virtual machines
- Multi-processor virtual machines (only supported for Off-Control Network virtual machines or On-Control Network virtual machines with Control Core Services v9.1 or higher)
- A mix of single processor virtual machines and multi-processor virtual machines

Sizing

- A V90 server virtualization host can support up to 10 single processor virtual machines.
- A virtual machine running Microsoft Remote Desktop Services can support up to 20 simultaneous remote sessions. A limited number of remote sessions can be supported simultaneously by a V90 server virtualization host. Though each individual virtual machine can support up to 20 simultaneous remote sessions, collectively the V90 server virtualization host cannot support more than 40 simultaneous remote sessions due to bandwidth constraints of the V90's physical Ethernet ports.

Licensing

There are no Foxboro Evo system or Control Core Services licenses associated with the V90 server virtualization host itself. However, each virtual machine must have the proper Foxboro Evo system or Control Core Services license. Virtual machine Foxboro Evo system or Control Core Services licenses are identical to physical machine licenses.

For example, a single V90 server virtualization host could have ten Foxboro Evo system virtual machines. No S10 license is required for the V90 itself, however

ten S10 licenses would be required (one S10 per Foxboro Evo system virtual machine).

Optional High Availability for Critical Applications

The Foxboro Evo system has the option of running critical run-time applications such as the Foxboro Evo Control HMI, current Alarm Displays, and Historian (collectors and servers) in parallel on two separate machines. When this functionality is combined with virtualization to run on two physical V90 servers - separated geographically to prevent single failure from affecting both hosts – time, effort, and cost to restore system can be reduced.

MODEL V90 SERVER VIRTUALIZATION HOST

V90 BASE CONFIGURATION

The Model V90 server virtualization host base configuration includes:

- Microsoft Hyper-V R1 virtualization technology via pre-configured and installed Windows Server 2008 R2 Enterprise Edition physical operating system environment (POSE)
- Virtualization hosting support for four virtual machines with Microsoft Windows Server 2008 R2 Standard Edition operating system, 64-bit package (virtual operating system environment (VOSE))
- Intel Xeon Processor
- Dual head graphics card (digital support only)
- 48GB DDR-4 Registered Memory
- Two 300GB internal SAS hard drives in a RAID 1 configuration with four 600GB SAS hard drives in a RAID 5 (with one hot spare) configuration
  - Provides 1200 GB total available disk space for virtual machines
- Two copper or two fiber network interface PCIe cards for 1Gb connections to the control network
- Four integrated 10/100/1000Base-TX Ethernet ports; with one utilized for 1Gb connection to the DCS Auxiliary Communications Network (ACN)
- Internal SATA CD-RW/DVD drive
- Two rear USB 3.0 ports
- Two front USB 2.0 ports
  One front USB 3.0 port
- Redundant hot-swap power supplies
- Redundant hot-swap fans
- USB keyboard
- USB mouse

V90 Options

The Model V90 server virtualization host offers the following options:

- Expandable virtualization hosting support for up to ten Virtual Machines running Microsoft Windows Server 2008 R2 Standard operating system, 64 bit package
  - Dual CPU
  - 96GB registered memory

  - Two 300GB internal SAS hard drives in a RAID 1 configuration with five 600GB SAS hard drives in a RAID 5 (with one hot spare) configuration.
  - Provides 1800 GB total available disk space for virtual machines
- Up to six internal 600 GB hard drives in a RAID 5 (with one hot spare) configuration
  - Provides 2400 GB total available disk space for virtual machines
- 23" or 40” widescreen monitors with optional USB touchscreen
- Mounting rail kit
- Optional 2U cable management arm for easy rail mounting kit

Mounting Options

The V90 is a 2U high, rack mount server virtualization host which offers rail mounting as standard equipment. It can be placed in commercially available enclosures that have provisions for adequate ventilation and cooling to ensure the ambient temperature inside the enclosure does not exceed 95°F.

NOTE

Enclosures must accommodate a depth of at least 39.4 in (1000 mm) to allow space for air flow at the front and back of the unit plus cables at the back of the unit. Because of their depth, the V90 cannot be mounted in the standard enclosures, such as the Industrial Enclosure 32, Metal Enclosure 32, and Modular Industrial Workstations.

With dual PCIe video cards, the V90s can be located up to 15 ft from the monitor using direct connect and other human interface cables available from Foxboro.

As indicated by the CE logo, the V90 conforms to the applicable European Union Directives.

FUNCTIONAL SPECIFICATIONS (V90)

Processor Type
Intel Xeon

Memory
48 GB DDR-4 Registered Memory (default)

Devices Served

SAS PERIPHERALS
Two 300 GB internal system disk drives with four 600 GB system disk drives, with up to six optional 600 GB internal system disk drives

CONTROLLER PERIPHERALS
One SATA CD-RW/DVD drive

VIDEO DISPLAYS (UP TO 2)
23-inch LCD USB Touchscreen Monitor
23-inch LCD Monitor
40-inch LCD Overview Monitor.

INTERFACES TO EXTERNAL DEVICES
USB
Mouse
Alphanumeric Keyboard
Up to two optional touchscreen monitors
Audio speakers

Internal Diagnostics
Self-checking performed at power-up

Video

OUTPUT TYPE
Dual-head DisplayPort/DVI PCIe video card

SCREEN PRESENTATION
Refresh Rate
Up to 85 Hz
Colors
32 bit
Resolution
Widescreen (16:9) (Supported by 23-Inch LCD Monitor)
Up to 1920x1080 pixels

Ethernet Interface Communications
Two PCIe Ethernet network interface cards providing Ethernet ports (10/100/1000Base-TX) for 1 Gb connection to The Foxboro Evo Control Network.

Four Integrated Ethernet ports (10/100/1000Base-T) for one 1 GB connection to DCS Auxiliary Communications Network (ACN).

Power Supplies
Two redundant, hot-swap, 800 W auto-switching input power supplies, each with a separate power cord.

Power Requirements

INPUT POWER
100-240 V ac, 50 to 60 Hz, auto ranging

POWER PARAMETERS
100-120 V ac, 13.32A maximum
200-240 V ac, 6.65A maximum

INRUSH CURRENT
30 A power supply for 20 ms

HEAT DISSIPATION
3207 BTU/hr (at 100 V ac),
3701 BTU/hr (at 200 V ac)

Cooling
Hot swappable, redundant I/O and processor fans. Each redundant power supply contains a fan.

Temperature Specification may be extended up to 40°C (104°F) with the optional High Temperature DL380 Gen9 High Performance Fan Kit, Foxboro Part Number P0928NE. This fan kit does increase the fan noise of the machine.

ENVIRONMENTAL SPECIFICATIONS (V90)

Processor Operating

TEMPERATURE
10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft); no direct sustained sunlight. Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed.
System performance may be reduced if operating with a fan fault or above 30°C (86°F).

RELATIVE HUMIDITY
10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.

MAXIMUM VIBRATION
0.26 G at 5 to 350 Hz in operational orientations

SHOCK
Half sine shock in all operational orientations of 31 G +/-5% with a pulse duration of 2.6 ms +/-10%

ALTITUDE
3050 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min).

Processor Storage

TEMPERATURE
-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).

RELATIVE HUMIDITY
5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, noncondensing.

MAXIMUM VIBRATION
1.54 G rms at 10 Hz to 250 Hz in all orientations

SHOCK
Half sine shock on all six sides of 71 G +/-5% with a pulse duration of 2 ms +/-10%. Square wave shock on all six sides of 27 G with velocity change @ 235 in/sec. or greater.

ALTITUDE
-16 to 10,600 m (-50 ft to 35,000 ft)

Processor Environmental

LOCATION
UL/UL-C listed as suitable for use in ordinary locations and meets ordinary safety standards for fire and shock hazards.

CONTAMINATION
Class G1 (Mild) as defined in ISA Standard S71.04

REGULATORY COMPLIANCE (V90)

Safety Certifications

US, CANADA
UL® and cUL Listed

EU
EN60950

EMC

USA
FCC CFR47 Part 15 Class A

CANADA
ICES Class A ICES-003

EU
EN55022 (CISPR22) CLASS A, EN55024, EN61000-3-2, EN61000-3-3

OTHER REGIONS
CNS13438; GB9254; K22; K24

NOTE: Product conformance to cited product specifications is based on sample (type) testing, evaluation, or assessment. This product or family of products is eligible to bear the appropriate compliance logos and statements.

PHYSICAL SPECIFICATIONS (V90)

Dimensions and Mass

KEYBOARD

Height
35 mm (1.4 in)
Width
445 mm (17.5 in)
Depth
150 mm (5.9 in)
Mass
1.8 kg (4.0 lbs)

CHASSIS

Maximum outside dimensions with bezel and feet

Height
87.3 mm (3.44 in) with bezel
Width
445 mm (17.5 in)
Depth
680 mm (26.75 in)
Rack Weight
23.6 kg (51.5 lbs) maximum configuration

REFERENCE DOCUMENTS

For more information regarding the thin client product offering, please refer to the following documents. The latest revisions are available through the Global Customer Support Center at *https://support.ips.invensys.com*.

Topic	Document Part No.	Document Title
V90 Server Virtualization Host	B0700GM	*Hardware and Software Specific Instructions for Model V90 Server Virtualization Host (DL380 Gen9) (Windows Server 2008 R2 Enterprise Operating System)* Row 7: Supported Monitors
Virtualization	PSS 21S-8A9 B3	*Overview of Hypervisor Technology – Microsoft Hyper-V Hypervisor*
	B0700VM	*Virtualization User's Guide*
DCS Auxiliary Communications Network (ACN) Configuration	B0700CA Rev P or later	*The Foxboro Evo Control Network Operation, and Switch Installation and Configuration Guide*
Thin Client Hardware and Configuration	PSS 21H-4U13 B4	*Thin Clients*
	B0700VN	*Thin Client User's Guide*
Remote Server Connections and Required Microsoft Licenses	B0700VM	*Virtualization User's Guide,* see "Site Planning"
Virtual Machine Antivirus Security	B0700GP	*McAfee MOVE Antivirus Product Installation and Configuration Guide*

Foxboro®

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