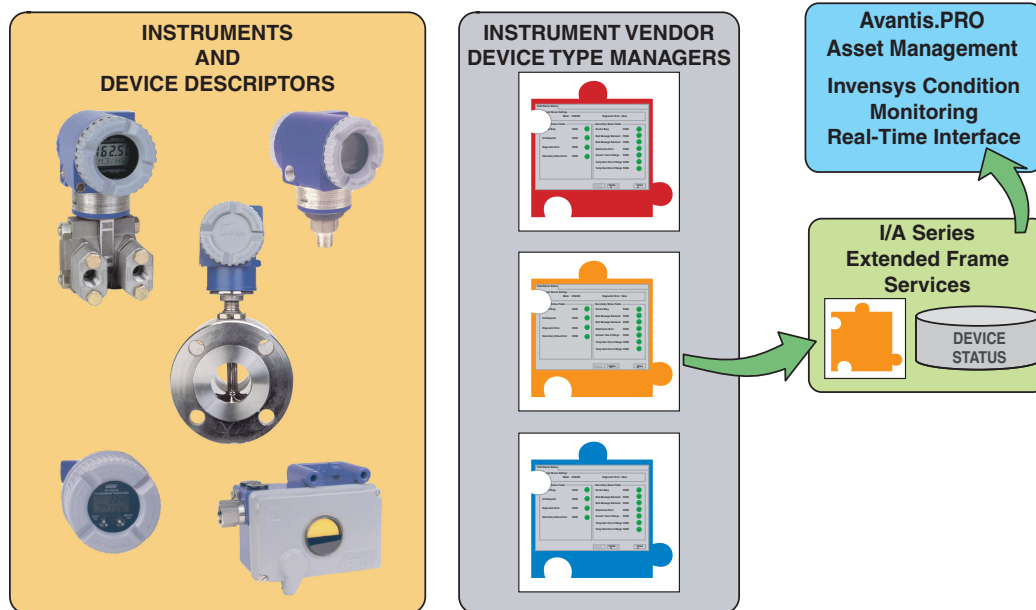


Extended Frame Services for HART® and FoxCom™ Devices



I/A Series® Extended Frame Services provides FDT compliant services to acquire instrument maintenance information for enterprise asset management software such as Avantis.PRO and other Computer Maintenance Management software.

OVERVIEW

Extended Frame Services (EFS) provides FDT compliant data collection services to link instrument maintenance information, provided by the HART® Device Manager or FoxCom™ Device Manager, to Invensys Condition Monitoring. Desired information from HART® and FoxCom™ devices may be scanned by EFS and stored in a relational database with a predefined, documented data structure and table definition.

In turn, EFS communicates selected asset management data, such as device identification information, device health status, and DTM supplied cycle counts for valve positioners to the Invensys Conditioning Monitoring application. The Invensys Condition Monitoring application monitors this asset management data within EFS and creates a work order within Avantis.PRO when a device malfunctions.

EFS communicates selected asset management data to Invensys Condition Monitoring and Avantis.PRO. If there is no requirement to communicate asset management data to Invensys Condition Monitoring and Avantis.PRO, the EFS becomes an optional component which is not selected.

Examples of asset management information that can be gathered and communicated by EFS include:

- ▶ Manufacturer ID
- ▶ Device Type
- ▶ Device Type ID
- ▶ Bus category
- ▶ Date of manufacture
- ▶ Version
- ▶ Device health status
- ▶ Valve travel supplied by DTM
- ▶ Four HART process variables
- ▶ Extended device status

The HART Device Manager and the FoxCom Device Manager provide configuration and maintenance capabilities for HART devices and FoxCom devices respectively.

The HART Device Manager for the I/A Series system consists of these components:

- ▶ PACTware® Field Device Tool which is an FDT compliant frame
- ▶ Device Type Managers (DTMs) which support HART devices
- ▶ I/A Series HART Communication DTM which is I/A Series software to link PACTware software to the system and devices

LIFECYCLE MANAGEMENT

A comprehensive configuration and maintenance tool-set for total life cycle plant asset management of field devices is provided through the combination of tools that include:

- ▶ The HART Device Manager and the FoxCom Device Manager for configuration, calibration and maintenance support for HART devices and FoxCom devices, respectively
- ▶ Extended Frame Services – for periodic data collection from the field devices and for interfacing to Invensys Condition Monitoring (ICM)
- ▶ Invensys Condition Monitoring (ICM - an optional component of Avantis.PRO) – provides performance-based preventive maintenance, condition-based monitoring, and predictive alerts by using I/A Series function blocks and the AIM*Historian.
- ▶ Avantis.PRO – for planning and scheduling of asset management functions, including preventive maintenance, materials management, supply chain management, and work order management

SUPPORTED INSTRUMENT TYPES AND PROTOCOLS

Extended Frame Services interfaces to the devices through I/A Series Communication DTMs. Invensys Foxboro provides DTMs for its HART and FoxCom instruments. Many other manufacturers of HART instruments also supply DTMs for those instruments. If the instrument vendor does not supply a DTM for their instrument, contact Invensys for a list of available DTMs. In most cases, Invensys Foxboro can supply a DTM converted from a HART DD.

COMPLIANCE TO FDT 1.2 STANDARD

Extended Frame Services works in conjunction with Device Type Managers, and Communication DTMs that are compliant to the latest FDT V1.2 standard. The FDT standard arose from the need to have vendor-independent engineering and maintenance tools for field devices, while also supporting multiple fieldbus types. Rather than standardizing the description language for a device, FDT standardizes the interfaces within the programs that deal with the device description. These standard program interfaces are independent of the specific fieldbus communication technology.

FIELDBUS INDEPENDENT DEVICE SCANNING

The communication DTMs, which are created on a per fieldbus type, provide a layer of software that insulates the higher level programs from the details of how to communicate through the system and fieldbus to the end device. This enables programs, such as Extended Frame Services, to be written once for a variety of fieldbuses.

OPEN COMPUTER MAINTENANCE MANAGEMENT SOFTWARE INTERFACE

Extended Frame Services provides the capability to gather device maintenance information. Since Extended Frame Services is based on a client-server architecture having a server resident scan database, multiple users of device information create only a single communication load to the field device and its I/O interface. Invensys Condition Monitoring can make a wide variety of requests to get information through Extended Frame Services.

A partial list of the types of requests follows:

- ▶ Get device status from the scan database
- ▶ Provide a list of all parameters in the device as exposed by the device DTM

- ▶ Get the value of an individual parameter from the scan database
- ▶ Get the identity of the I/O interface module connected to the device
- ▶ Return a list of devices in the database

DATABASE ACCESS

Extended Frame Services may be used with the following database engines:

- ▶ Microsoft Access™ database
- ▶ SQL Server 2000® database
- ▶ SQL Server 2005® database

The SQL Server 2000 database or the SQL Server 2005 database is preferred for better performance on larger applications.

Extended Frame Services stores a copy of fresh scan data each scan period. The scanning module that is a part of EFS lets users set up the period and identity of the devices to scan, as shown in Figure 1.

I/A SERIES COMMUNICATION DTMS

Communication DTMs provide the channel for Extended Frame Services, and other FDT compliant communications, to communicate through the system to the device. I/A Series systems offer communication DTMs for both HART and FoxCom devices. Communications pass through the I/A Series Control Network, Control Processors, and FBMs. The HART FBMs and FoxCom FBM types provide the physical connectivity to the field devices. Communication DTMs are contained within the Device Manager Component's CD-ROM, along with the Extended Frame Services component software.

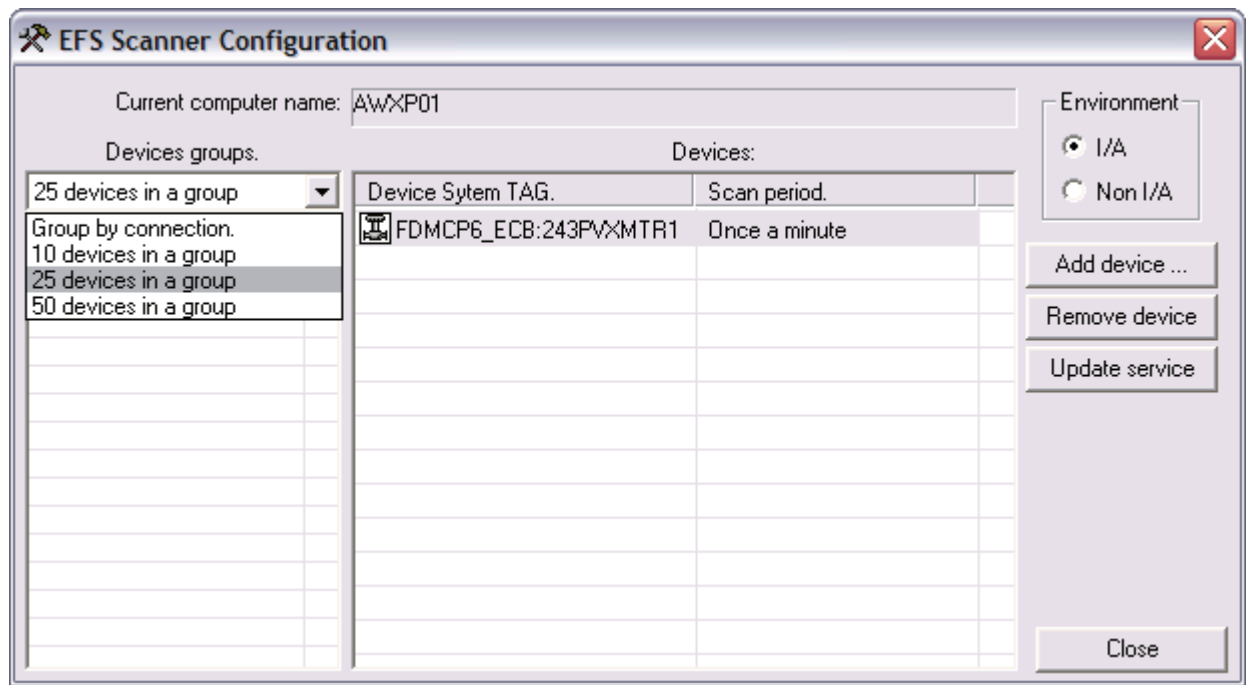


Figure 1. Configuring EFS for Devices to Scan

NETWORK ARCHITECTURES FOR EXTENDED FRAME SERVICES

Licenses for Extended Frame Services are available in both an EFS Server and EFS Client version. The EFS Server is used on the computer that stores the EFS database.

Figure 2 shows a typical configuration where EFS Server is installed on a server class computer, with SQL Server 2005 database, located on the Enterprise Network. In this configuration, I/A Series Communication DTMs are installed on the EFS Clients on the I/A Series redundant control network.

Figure 3 shows a configuration where EFS Server is installed on the I/A Series Windows XP® workstation located on The MESH control network. Optionally, EFS Server may be installed on an I/A Series server running with the Windows Server 2003® operating system on The MESH control network.

Figure 4 shows an alternate configuration, where EFS Server is installed on an I/A Series workstation with Windows XP located on the Redundant Control Network. In this case, EFS server uses the Microsoft Access database, and Communication DTMs are also installed on the EFS Server.

When EFS Server is installed on-platform as in Figure 4, the control processor is typically hosted by another I/A Series® Workstation. However, EFS Server may also be installed on the control processor host. EFS software may be used on systems having mixtures of UNIX® and Windows workstations.

EFS Client software may be installed on any Windows compatible workstation meeting the hardware requirements identified in the Hardware and Software Requirements section discussed later in this document. An EFS Client typically accesses direct device information using the Communication DTM of the HART Device Manager and resides on

the I/A Series platform. An EFS Client may also access scan database information from the EFS Server and may reside on the I/A Series Redundant Control Network or the Enterprise Network, and allow any device information to be shared anywhere across the plant enterprise.

ICM software can be installed on any computer having either EFS Server or EFS Client software.

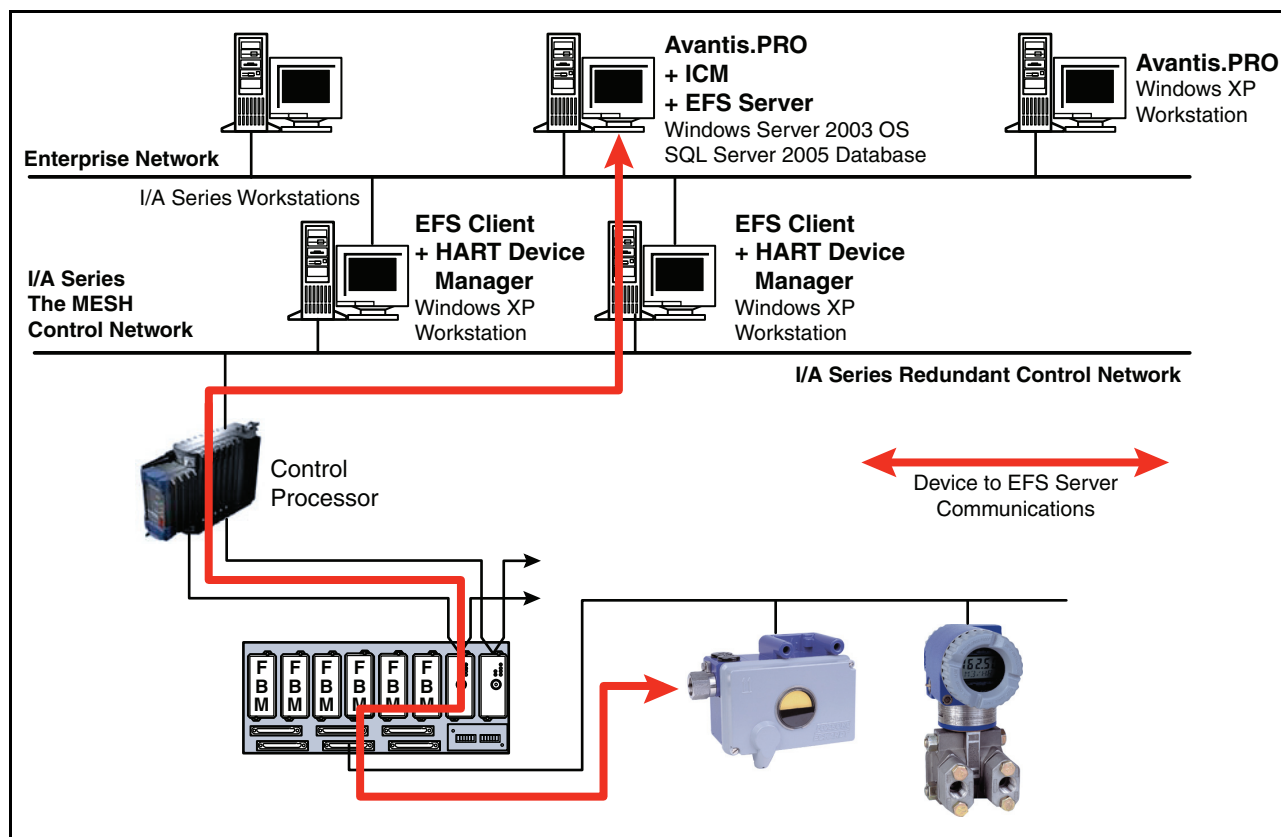


Figure 2. Typical EFS Configuration with EFS Server on Enterprise Network

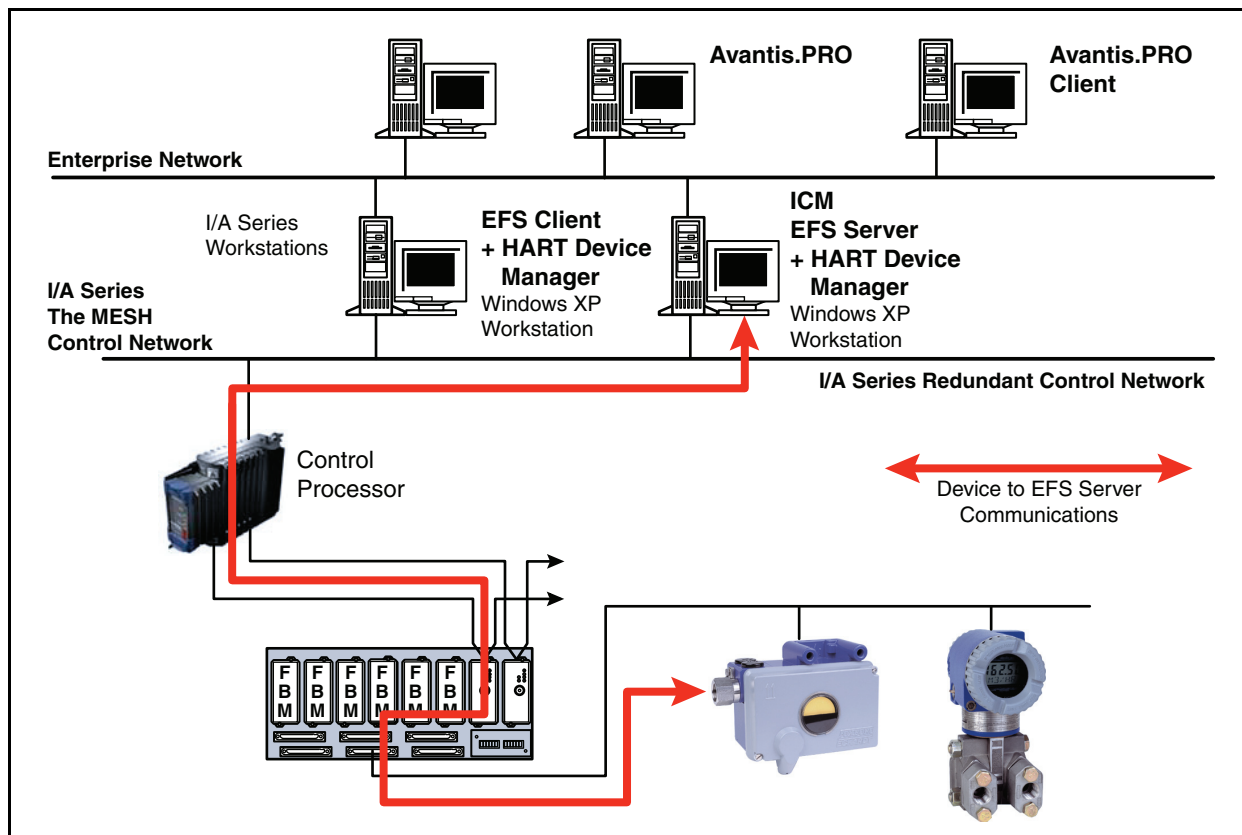


Figure 3. EFS Configuration with EFS Server on Platform

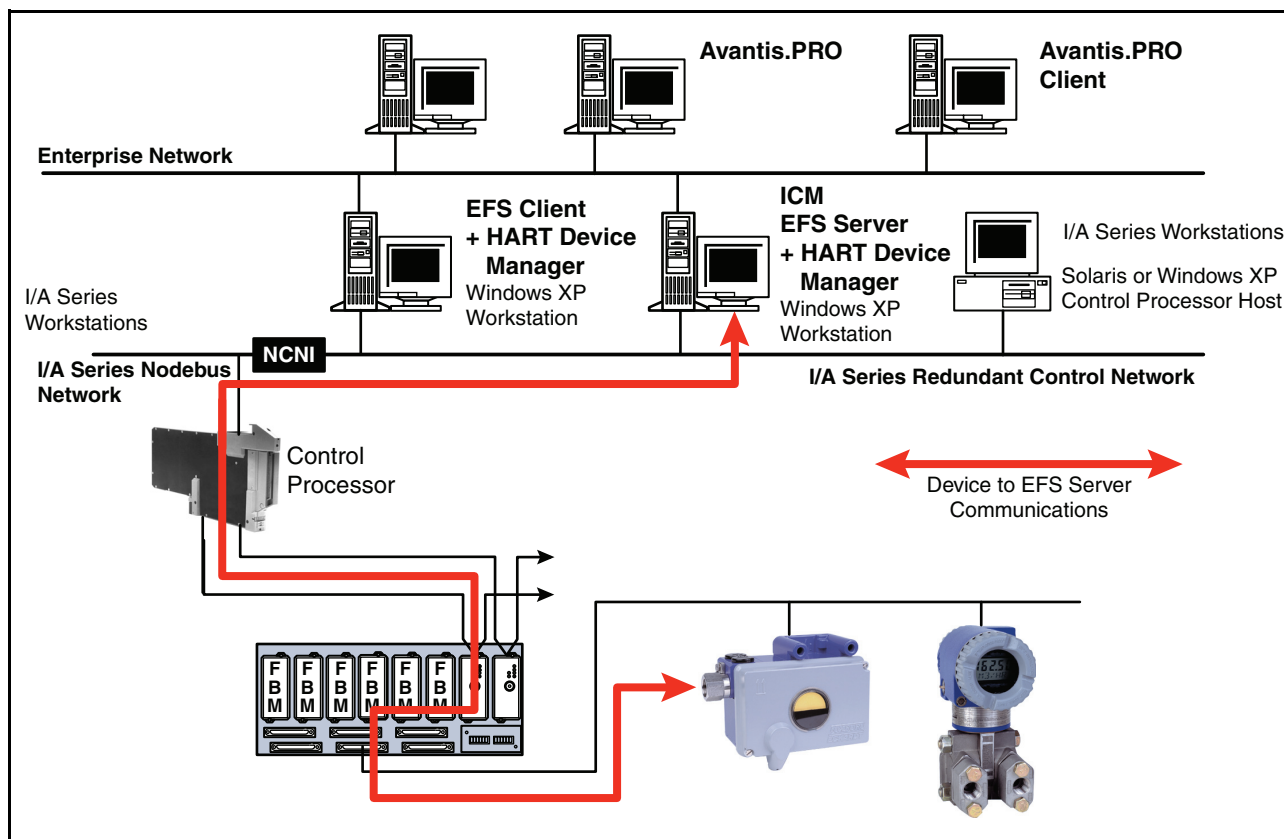


Figure 4. Alternate EFS Configuration with EFS Server on the I/A Series Network

HARDWARE AND SOFTWARE REQUIREMENTS

On I/A Series Platform

EFS CLIENT - PREFERRED

Model H92, P92 or greater Workstation on the I/A Series redundant control network, with I/A Series Base Workstation Suite at V7.0 or greater.

EFS CLIENT - ALTERNATE

Windows XP® Professional workstation on a redundant I/A Series control network with V7.0 or later software

EFS SERVER - PREFERRED

The preferred configuration is OFF platform.

EFS SERVER - ALTERNATE

Model H90, P90, H91 or P91 Server (Windows Server 2003 operating system) and SQL Server 2005 database on The MESH control network, or Model H92 and P92 Workstations (Windows XP Professional operation system) with V7.0 or later software.

NOTE

I/A Series Communication DTMs must be installed on one of the on-platform computers with EFS software, and also a second Ethernet Interface to the Enterprise Network.

Off Platform

EFS CLIENT

Windows XP Professional

EFS SERVER - PREFERRED

Server Class computer with Windows Server 2003 operating system and SQL Server 2005 database.

EFS SERVER - ALTERNATE

Windows XP Professional with Microsoft Access.

NOTE

Minimum hardware requirements include 512 MB of main memory, hard disk with at least 500 MB of space for installation, CD-ROM drive, and 100 MHz TCP/IP switched Ethernet Interface.

NOTE

The PACTware FDT Frame application is supported on the Microsoft Windows XP platform. It is not supported on the Windows Server 2003 platform.

Invensys Operations Management
5601 Granite Parkway Suite 1000
Plano, TX 75024
United States of America
<http://iom.invensys.com>

Global Customer Support
Inside U.S.: 1-866-746-6477
Outside U.S.: 1-508-549-2424 or contact
your local Invensys representative.
Website: <http://support.ips.invensys.com>

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