HP Vantera Platform Configuration Guide

The Hewlett-Packard Vantera platform provides an open, distributed measurement and control platform. This platform improves operational effectiveness by connecting decision makers at all levels of any size enterprise to essential real-time operating information from plant processes.

An HP Vantera system consists of both hardware and software components. The hardware portion consists of standard PC and networking hardware, and a family of intelligent field devices. Together they enable the creation of intelligent, autonomous networks for a variety of applications such as energy cost management, building automation, and industrial automation.

The measurement and control hardware, as well as the applications, are distributable. With an HP Vantera system there is no central controller. Instead, any number of nodes can communicate via broadcast messaging on an Information Backplane. The messaging is independent of the number of nodes, thereby enabling systems to be easily scaleable and range in size from a few measurement and control points to very large systems with hundreds or thousands of nodes. Furthermore, the nodes may be physically dispersed within a building, site, region, or an entire enterprise.

Details of HP Vantera system components are followed by examples of end-to-end, sensor-to-executive business systems as shown in Figures 2, 3, and 4. Networking and configuration considerations for system software and workstations are also described in this guide.

HP Vantera Measurement and Control Nodes

The hardware portion of the HP Vantera platform consists of standard computer and networking hardware, and a family of intelligent field devices - also known as measurement and control nodes. HP Vantera nodes connect physical sensors or actuators with a microprocessor, core firmware (with downloaded "node applications"), memory and a networking interface. The result is a device that is capable of measurement and control, and of communicating between nodes as well as with other computing devices on an Information Backplane.

HP E3231A Discrete I/O Node
HP E3232A Analog/Discrete I/O Node

The HP E3231A and E3232A are high performance measurement and control nodes designed to operate autonomously over an Ethernet 10Base-T network. They utilize the communication services software's publish and subscribe method to send and receive measurement and control information between the nodes and the Information Backplane. Downloadable node applications provide enhanced functionality in stand-alone or networked applications. The standard I/O node application provides direct data access to each channel's input data and output values with easy scale conversion to the desired physical units.

Both nodes include six discrete inputs and four relay outputs. The HP E3232A has an additional four analog inputs and two analog outputs.

Opt 001 Load Profile Recorder Node Application

The Load Profile Recorder receives and records time series data generated by the utility meter's pulse-initiation outputs and stores the energy useage information within the HP E3231A node for easy retrieval to monitor energy usage

within a building, a site, a region or an entire enterprise. This enhanced energy services node application is fully supported by Southern Company's EnerLink™ load aggregation and real-time pricing software.

EnerLink supports communication with nodes via an Ethernet LAN or remotely via a modem pool. When using nodes equipped with the modem interface option, the required multipoint remote connectivity configuration is illustrated in Figure 5. It includes the HP 3231A with options 001 and 002. A Microsoft Windows NT™ workstation must have a copy of the HP E2715AA Communication Services and Southern Company's EnerLink product. Also required is the Cisco 2509 Access Server, US Robotics MP/8 8 analog v.34 modems, and the US Robotics Total Control MP Cable Kit.

Opt 002 PCMCIA Modem Interface

Provides an optional dial-up modem interface in conjunction with the Option 001 Load Profile Recorder Node Application. Compatible modems include the Xircom CreditCard Modem 28.8 (CM-28). The complete list of compatible modems is available from Hewlett-Packard.

HP Vantera Software

This middleware layer allows software applications running on standard computers to access the HP E3231A and E3232A nodes and future HP Vantera-compatible field devices. It presents a consistent model of the underlying field devices to higher levels of software. This object, or subject, model is enabled by HP Vantera's use of a publish/subscribe messaging model. Unlike point-to-point messaging, publish/subscribe enables simultaneous data sharing between a data source (publisher) and any system elements that need the data (subscribers). Furthermore, publish/subscribe messaging reduces network overhead by eliminating bottlenecks such as central hosts and explicit addressing. Whenever a specified event occurs, the publisher broadcasts a message on the network and each subscriber device reads and reacts depending on its application program.

In a given HP Vantera network, a software bus is used to interconnect applications and nodes independent of knowing where they are or how many there are in the network. This bus is also referred to as the Information Backplane. Figures 2 through 4 illustrate this concept and configurations utilizing HP Vantera software and hardware in networks of various sizes.

HP E2715AA Vantera Communication Services

These communication services are optimized for measurement and control applications and use a publish/subscribe messaging model that is scaleable, interoperable and efficient while reducing network overhead by eliminating bottlenecks. Communication services software should be configured as part of any application workstation that is used to share information with nodes or to other application workstations. Use the HP E2715AA when no communication beyond a subnetwork is required or when another application workstation in a subnetwork contains either the HP E2716AA or HP E2717AA. Figure 2 illustrates this concept. (Order media (HP E2725AA) and documentation separately)

HP E2716AA Vantera Communication and Subnet Router Services

The HP E2716AA includes the E2715AA Vantera Communications Services and a router daemon. These software routers convert broadcast messages to forward information to another router on an adjacent subnetwork. Refer to Figure 3. (Order media (HP E2725AA) and documentation separately)

HP E2717AA Vantera Communication and WAN Router Services

The HP E2717AA adds a router daemon that is optimized for wide-area connectivity to the HP E2715AA Vantera Communications Services which is included. These software routers convert broadcast messages to forward information to another router on an adjacent or non-adjacent subnetwork. Refer to Figure 4. (Order media (HP E2725AA) and documentation separately)

HP E2720AA Vantera Application Developer's Toolkit

The HP E2720AA includes APIs (application program interfaces), libraries, documentation and examples. With this toolkit you will learn how to write HP Vantera applications for Microsoft Windows NT™ to configure, manage and access the network. The HP E2715AA Vantera Communications Services is included.

HP Vantera System Management Tools

HP E2718AA Vantera Configuration and Administration Tool

Investigate and modify parameters in applications and nodes on a network with the HP E2718AA Vantera Configuration and Administration Tool. With the HP E2718AA you can initiate a process that discovers any nodes that have been added to (or taken from) the network. Only one HP E2718AA is required for each set of subnetworks that communicate with each other. (Order media (HP E2725AA) and documentation separately)

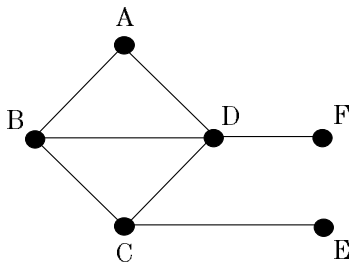
Networking and Configuration Considerations

Standard networking hardware (hubs, routers, bridges, etc.) is required to communicate between subnetworks in a system and connect the HP Vantera Information Backplanes of separate subnetworks. The HP Vantera software router daemons (HP E2716AA and E2717AA) do not replace hardware routers. Instead, they make it possible for HP Vantera communications to occur along existing networks by enabling publish/subscribe "subjects" to communicate without IP addressing used in point-to-point systems. Figures 2, 3, and 4 illustrate the following configuration considerations. Figures 1, 3 and 4 illustrate the concept of subnetwork adjacency.

Some points to consider when configuring an HP Vantera system:

- One HP Vantera Communication Services product (HP E2715AA, E2716AA, or E2717AA) per workstation is required.
- Networks using the HP E2716AA Vantera Communication and Subnet Router Services can talk (publish/subscribe information) to any number of adjacent physically connected subnetworks.
- The HP E2717AA Vantera WAN Router Services can talk between any number or subnetworks, regardless of how many there are or whether or not they are adjacent. The HP E2717AA is required on a subnetwork that will be used to forward information from one subnetwork to another.
- The HP E2716AA Subnet Router Services and HP E2717AA WAN Router Services can talk to each other provided that they are on adjacent subnetworks.
- Networks with two subnetworks or with multiple adjacent subnetworks require that one NT workstation per subnetwork have a copy of the HP E2716AA.
- In any network with multiple subnetworks, only one workstation per subnetwork is required to have a copy of the HP Vantera router services (i.e. HP E2716AA or E2717AA, as appropriate) installed. The other workstations on the subnetwork need only have a copy of the HP E2715AA Vantera Communication Services.
- Only one copy of the HP E2718AA Vantera Node Configuration and Administration Tool is required per network— regardless of the number of subnetworks.
- The HP E2720AA Vantera Application Developer's Toolkit is not required to occupy any workstation within a network or subnetwork.
- The optional Microsoft Windows 95® operating system can be used for the HP E2718AA if no other HP Vantera software is going to occupy the workstation.
- Multiple workstations running HP Vantera applications can exist in a single subnetwork.
- Communication over the Information Backplane can occur via Ethernet LAN (standard HP E3231A and E3232A). The workstations should, of course, be configured to match.

Figure 1. Subnetwork adjacency concept
A is adjacent to B and D
B is adjacent to A, C and D
C is adjacent to B, D and E
D is adjacent to A, B, C and F
E is adjacent to C
F is adjacent to D



Decision tree to configure subnetworks for HP Vantera Communication Services software products (assuming that all subnetworks in a network will communicate with each other):

1. Will the subnetwork communicate with another subnetwork that is not adjacent?
   - 1a. If YES: Could the subnetwork be required to forward information to an adjacent subnetwork?
     - 1aa. If YES: Configure an application workstation in this subnetwork to include the E2717AA.
     - 1ab. If NO: Configure an application workstation in this subnetwork to include the E2716AA.
   - 1b. If NO: Will the subnetwork communicate with any other adjacnet subnetworks?
     - 1ba. If YES: Configure an application workstation in this subnetwork to include the E2716AA.
     - 1bb. If NO: Configure an application workstation in this subnetwork to include the E2715AA.
2. Will the subnetwork include multiple application workstations?
   - 2a. If YES: Configure the remaining application workstation(s) in this subnetwork to include the E2715AA. Move on to the next subnetwork.
   - 2b. If NO: Move on to the next subnetwork.

Figure 2. Single Subnetwork

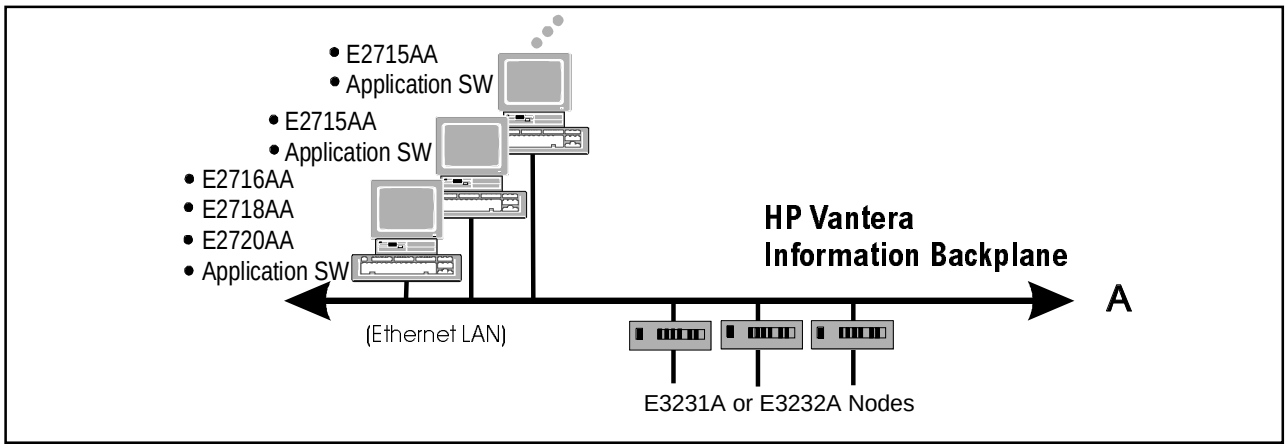


Figure 3. Network with Two or more Adjacent Subnetworks

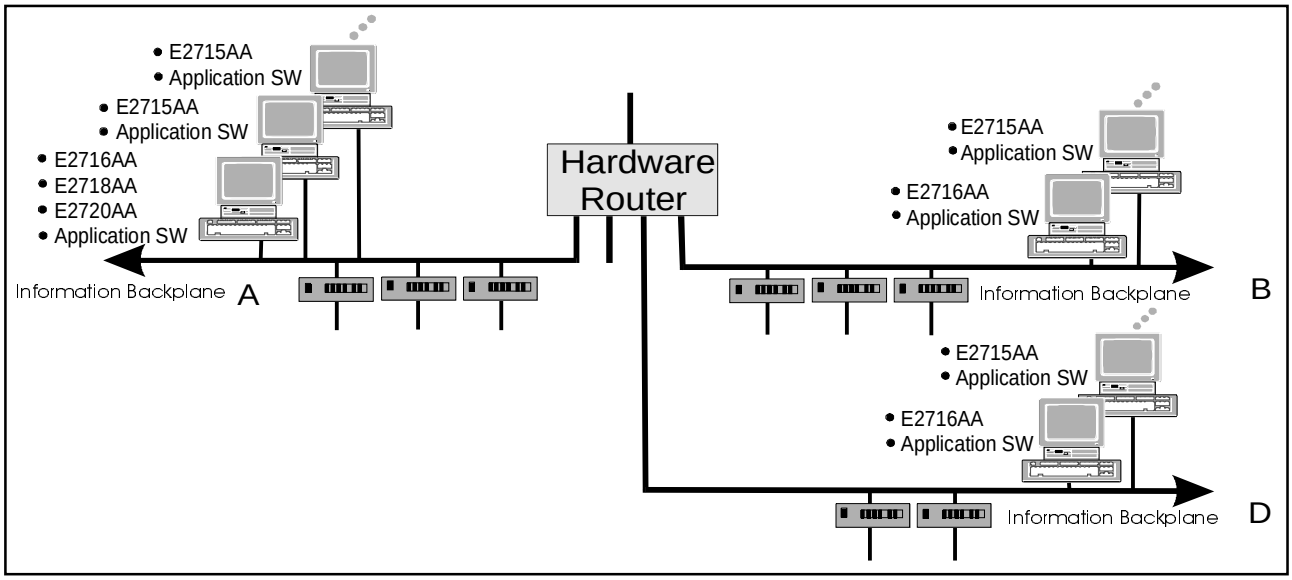


Figure 4. Network with non-Adjacent Subnetworks
(Subnetworks C and E are adjacent to each other, but neither is adjacent to A)

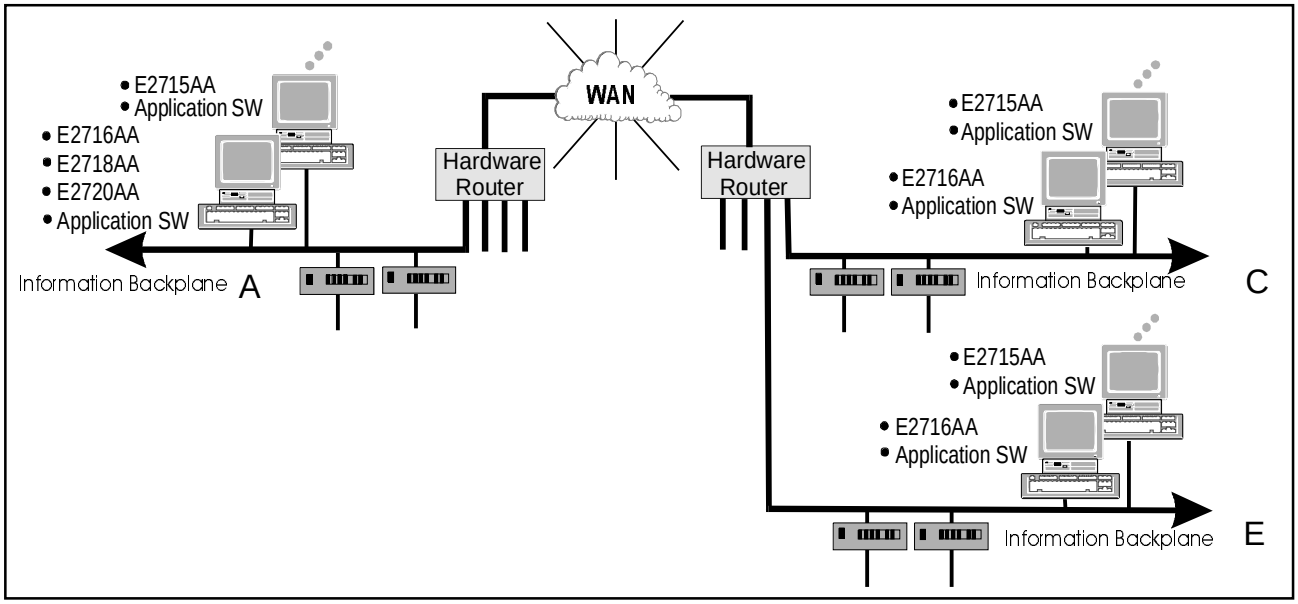
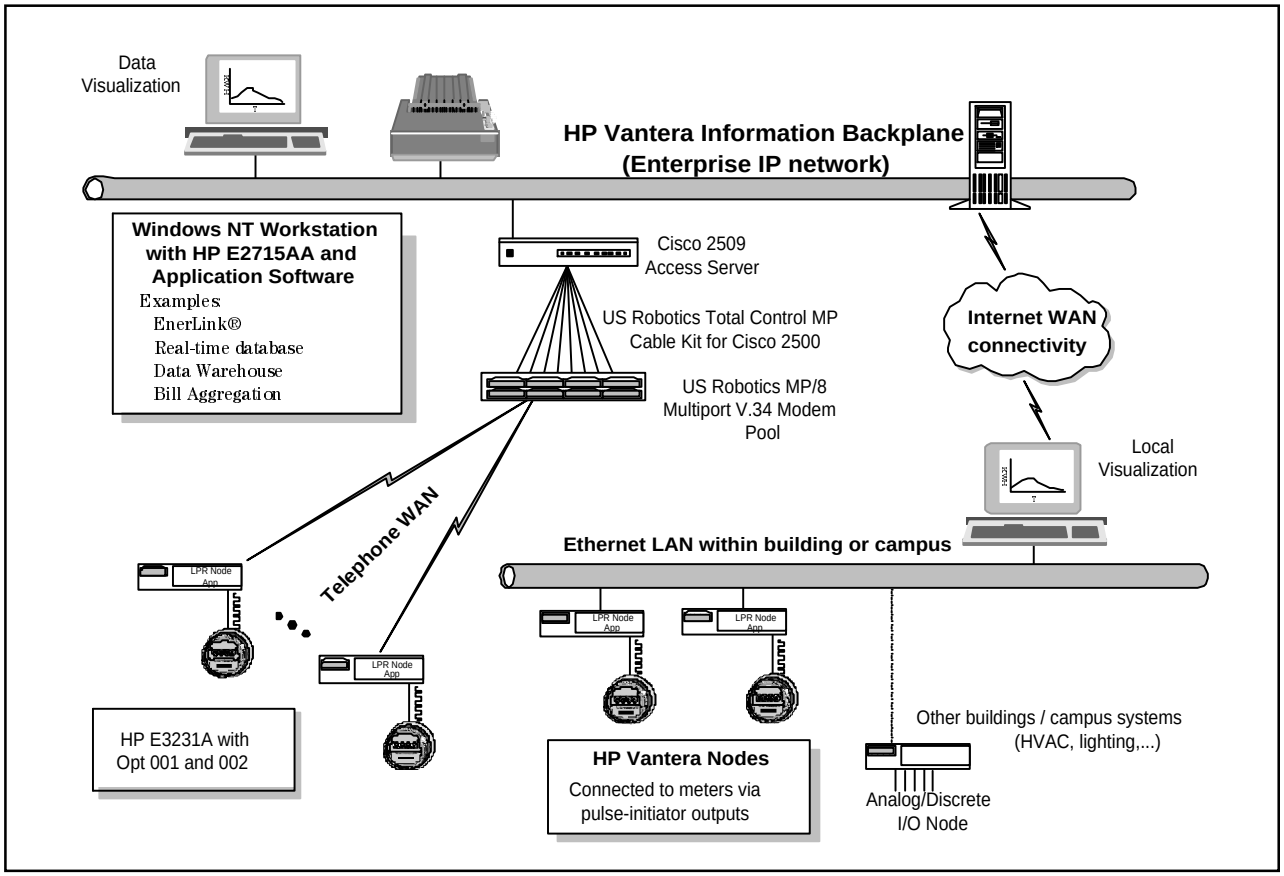


Figure 5: Enhanced Energy Services and Multipoint Remote Connectivity Configuration



HP Vantera Software Media and Documentation

HP E2725AA Vantera Software Media

Contains all software for the HP E2715AA, E2716AA, E2717AA, E2718AA, and E2720AA. Demonstrations and soft-manuals are included.

HP E2726A (Printed) Manual Set for HP E2715AA, E2716AA and E2717AA Vantera Communication Services and Routers

Hewlett-Packard also offers HP Vantera products for integrating real-time information and supervisory control systems with enterprise information and business planning systems.

HP RTAP (for UNIX or Microsoft Windows NT)

The HP Real-Time Applications Platform (RTAP, HP B277xA, or E4380A) is a powerful and flexible supervisory monitoring and control software product. Its real-time process database integrates mixed I/O sources such as digital control systems (DCSs), programmable logic controllers (PLCs), remote terminal units (RTUs), PCs and instruments. Customers commonly use RTAP as an automation base for value-added applications needed by their business. Typical applications include process monitoring and control, facilities monitoring, power delivery and substation automation.

On UNIX, RTAP visualizes real-time data in process schematics and alarm/trend/report displays using X-Windows and Motif. On Microsoft Windows NT, the user interface is based on standard Active-X™ software components and supports popular languages such as Visual BASIC™.

HP RTAP for Microsoft Windows NT Product Structure

HP E4380A	RTAP Server for Microsoft Windows NT
Opt 201	1k Database Capacity
208	8k Database Capacity
216	16k Database Capacity
403	Allen-Bradley DH/DH+ Scan Task
404	Modbus Scan Task
HP E4381A	RTAP PC Client Services
Opt 100	Configuration Tool
300	Alarm Display ActiveX Component
HP E4383A	RTAP Server Software Development Kit for Microsoft Windows NT
HP E4384A	RTAP for Microsoft Windows NT Manual
HP E4385A	RTAP for Microsoft Windows NT Software Development Kit Manual
HP E4386A	RTAP PC Client Manual
HP E4378A	RTAP for Microsoft Windows NT CD-ROM Media
HP B2771A	
Opt 701	RTAP Distribution Server
710	ODBC Server

Contact your local HP Sales Representative for UNIX or HP-UX configurations

HP E4380A RTAP Server for Microsoft Windows NT

This run time license is for a single computer and includes the basic server functionality. It is required for all RTAP systems.

Opt 201, 208 and 216 Database Capacities

These options provide licenses for 1k, 8k, and 16k database point increments, respectively.

Opt 403 Allen-Bradley DH/DH+ Scan Task

Provides a serial RS-232 interface to all Allen-Bradley PLCs supporting either Data Highway or Data Highway Plus protocols.

Opt 404 Modbus Scan Task

Provides a serial RS-232 interface to any device supporting the Modbus protocol. It supports both ASCII and RTU modes.

HP E4381A RTAP PC Client Services

The HP E4381A connects Microsoft Windows 95 and NT clients to RTAP servers on MS-Windows NT or UNIX. It includes ActiveX and ODBC interfaces and is required for all PC clients connecting to RTAP servers.

Opt 100 Configuration Tool

This tool is used for configuring RTAP on Microsoft Windows NT or UNIX servers, environments, databases, alarms and scan systems.

Opt 300 Alarm Display ActiveX Component

This ActiveX component is for filtering, displaying and acknowledging alarms.

HP E4383A RTAP Server Software Development Kit for Microsoft Windows NT

The HP E4383A is a software development kit (SDK) for creating and extending RTAP server applications.

HP E4384A RTAP for Microsoft Windows NT Manual

Hardcopy documentation for use with the HP E4380A to build real-time process data servers.

HP E4385A RTAP for Windows NT Software Development Kit Manual

Documentation for use with the HP E4383A to program RTAP server applications.

HP E4386A RTAP PC Client Manual

Documentation for use with the HP E4381A to interface Microsoft Windows 95 or PC NT client applications to RTAP servers.

HP E4378A RTAP for Microsoft Windows NT CD-ROM Media

Includes all RTAP for Microsoft Windows NT software.

HP B2771A Opt 701 RTAP to PC Distribution Server

Allows Microsoft Windows 95 and NT clients connectivity to RTAP on UNIX through an ActiveX interface. Requires data collection and processing license.

HP B2771A Opt 710 RTAP ODBC Server

Allows Microsoft Windows 95 and NT clients to access the RTAP real-time database on UNIX platforms through and ODBC interface.

HP Enterprise Link (for HP-UX or Microsoft Windows NT)

HP Enterprise Link (HP E2700A and E2702A) is a certified middleware product that integrates business planning systems such as SAP's R/3 with real-time manufacturing and monitoring systems. It integrates easily with SCADA/PIMS, distributed control, batch management, and lab information systems. Visual data integration between SAP's R/3 and real-time systems brings unparalleled productivity to customers who need to close the gap between the transactional and operational parts of their business.

HP E2702A Enterprise Link for Microsoft Windows NT

Software for integrating industrial control systems to enterprise business applications. Requires Data Server License (Opt 350). Order media and hardcopy documentation separately.

Opt 0BL Programming Reference Manuals

Hardcopy of Developer's Guide.

Opt 0BF User Environment Manuals

Hardcopy of User's Guide.

Opt 301 RTAP Communications Object

Provides connectivity from RTAP to enterprise business systems. Requires data server license (Opt 350).

Opt 350 Data Server for Enterprise Link

Provides configuration tools and server to link two Enterprise Link communication objects. Requires communication objects of applications which are to be integrated.

HP Enterprise Link for Microsoft Windows NT Product Structure

HP E2702A	HP Enterprise Link for Microsoft Windows NT
Opt 0BL	Programming Manuals
0BF	User Environment Manuals
301	HP RTAP Communications Object
350	Data Server for HP Enterprise Link
351	SAP PP-PI Communications Object
352	SQL Communications Object
AAF	Enterprise Link for Microsoft Windows NT CD-ROM Media

Contact your local HP Sales Representative for HP-UX configuration

Opt 351 SAP PP-PI Communications Object

Provides connectivity from SAP's PP-PI module to industrial control systems. Requires Opt 350.

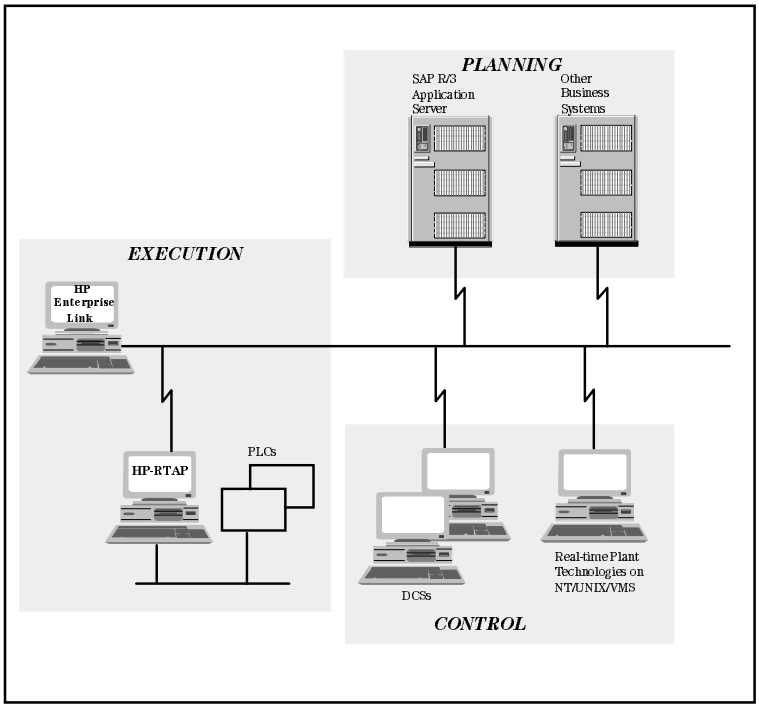
Opt 352 SQL Communications Object

Provides connectivity for SQL databases to industrial control systems. Requires Opt 350.

Opt AAF Enterprise Link for Microsoft Windows NT CD-ROM Media

Includes all Enterprise Link for Microsoft Windows NT software.

Figure 6. Link Process Control and Business Planning Systems with HP RTAP and HP Enterprise Link



HP Vantera Operating System and Minimum Computer Hardware Requirements

Development Workstation

Microsoft Windows NT™ 4.0
100 MHz Pentium Processor (or equivalent)
20MB free disk space
32MB RAM
16- or 32-bit Ethernet 10Base-T LAN interface (refer to the Microsoft Hardware Compatibility List for current information)

Application Workstation

Microsoft Windows NT™ 4.0
100 MHz Pentium processor (or equivalent)
20MB free disk space
24 MB RAM
16- or 32-bit Ethernet 10Base-T LAN interface (refer to the Microsoft Hardware Compatibility List for current information)

Portable System (HP Vantera Configuration and Administration PC only)

Microsoft Windows 95™
90 MHz Pentium processor (or equivalent)
20 MB free disk space
16 MB RAM

HP RTAP Hardware Requirements

RTAP runs in Microsoft Windows NT environments as well as in UNIX environments on HP, Sun, IBM and DEC hardware platforms. Requirements for HP-UX systems are a minimum of 32 Mbytes of memory, 150 Mbytes swap space per system, 500 Mbytes of total disk space and version 10.x of HP-UX operating system.

HP Enterprise Link Hardware Requirements

Enterprise Link runs on computers using HP-UX 10.x, such as HP 9000 C- and D- class Enterprise Servers. The D-class machines are recommended if automatic fault recovery on a backup system is needed. A minimum of 32 Mbytes of RAM is required (128 Mbytes recommended for optimal performance on larger systems). HP recommends at least 150 Mbytes of swap size, and at least 500 Mbytes of disk space. Also required are a medium- or high-resolution monitor, and a mouse or trackball.

Solving Customer Problems through Complete Solution Delivery

HP Vantera's Authorized Channel Partners and System Integrators as well as HP's Sales and Support Organizations are available to quickly and effectively design, implement and support the optimal end-to-end solution for your particular business needs.

HP Vantera Solution Partners Program

No single vendor can meet all the computing and measurement requirements of an organization. In fact, most businesses obtain the flexibility and functionality they need only by using products and services from multiple vendors. Hewlett-Packard's Vantera Solution Partners can help you develop and install an integrated solution that spans meters, transducers and measurement nodes to application software at the business level. A current listing of our partners can be obtained by contacting your local HP Sales Representative. Contact Hewlett-Packard or an approved system integrator for additional details and recommendations for configuring your system.

Support Services Options

Customers have come to trust Hewlett-Packard and associate our name with quality and commitment to service and customer satisfaction. Today Hewlett-Packard offers several HP Vantera hardware and software support products to fit your needs. We will provide an excellent level of customer satisfaction based on the ability to anticipate situations, obstacles and opportunities. Our support organization will assist our customers and partners to reduce the time-to-market of their solutions by providing training, consulting, updates, upgrades, development assistance services and system integration certification.

Software Support Services

Opt. H00	Primary Phone Support*
P00	Secondary Phone Support*
UAF	Manual and Software Updates (CD-ROM)
B2773A	Consulting ("KNOT" or Knowledge Transfer)

*Applies only to HP E2818AA, E2720AA, RTAP (B277xA and E4380A), Enterprise Link (E2700A and E2702A)

Related Products and Publications

The following publications are available from Hewlett-Packard.

HP E2715AA Vantera Communication Services	p/n 5965-6193E
HP E2716AA Vantera Subnet Router Services	p/n 5965-6193E
HP E2717AA Vantera WAN Router Services	p/n 5965-6193E
HP E2718AA Vantera Node Configuration and Administration Tool	p/n 5965-6189E
HP E2720AA Vantera Application Developer's Toolkit	p/n 5965-6193E
HP E3231A Discrete I/O Node and HP E3232A Analog/Discrete I/O Node	p/n 5965-6188E
HP E3231A Opt 001 Load Profile Recorder Node Application	p/n 5965-6191E
HP Vantera Product Family Brochure	p/n 5965-6190E
HP Vantera Solutions for Enhanced Energy Services	p/n 5965-6192E
HP RTAP for Microsoft Windows NT™	p/n 5965-5724E
HP RTAP version 6.60	p/n 5963-9998E
HP RTAP Solutions Catalog	p/n 5965-9991E
HP Enterprise Link Product Overview	p/n 5965-2997E
HP Vantera Channel Partner Program Datasheet	p/n 5965-7077E

For more information on Hewlett-Packard Test & Measurement products, applications or services please call your local Hewlett-Packard sales offices. A current listing is available via Web through AccessHP at http://www.hp.com.
If you do not have access to the internet please contact one of the HP centers listed below and they will direct you to your nearest HP representative.

United States:
Hewlett-Packard Company
Test and Measurement Organization
5301 Stevens Creek Blvd.
Bldg. 51L-SC
Santa Clara, CA 95052-8059
1 800 452 4844

Canada:
Hewlett-Packard Canada Ltd.
5150 Spectrum Way
Mississauga, Ontario
L4W 5G1
(905) 206 4725

Europe:
Hewlett-Packard
European Marketing Centre
P.O. Box 999
1180 AZ Amstelveen
The Netherlands
(31 20) 547 9900

Japan:
Hewlett-Packard Japan Ltd.
Measurement Assistance Center
9-1, Takakura-Cho, Hachioji-Shi,
Tokyo 192, Japan
Tel: (81-426) 56-7832
Fax: (81-426) 56-7840

Latin America:
Hewlett-Packard
Latin American Region Headquarters
5200 Blue Lagoon Drive
9th Floor
Miami, Florida 33126
U.S.A.
(305) 267 4245/4220

Australia/New Zealand:
Hewlett-Packard Australia Ltd.
31-41 Joseph Street
Blackburn, Victoria 3130
Australia
1-800-629-485

Asia Pacific:
Hewlett-Packard Asia Pacific Ltd
17-21/F Shell Tower, Times Square,
1 Matheson Street, Causeway Bay,
Hong Kong
Tel: (852) 2599-7777
Fax: (852) 2506-9285

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