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- Do not play with matches
- Wear Sunscreen.
- Don’t worry. Be Happy.

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Hewlett-Packard

Agenda

- OpenVMS eBusiness integration strategy
- current landscape of eBusiness and integration
- OpenVMS eBusiness integration directions and strategy
- customer implementations of the OpenVMS eBusiness integration strategy
- major findings
- additional information and resources

OpenVMS Integration Strategy

Enrich the strengths of the OpenVMS operating system with an infrastructure that allows application, middleware, and data integration in a global, multi-platform environment

Create the solution to your integration problem,

extending your ROI as you modernize your business,

and building on an industrial strength operating system

current landscape of eBusiness and integration

New challenges in the IT world

- **Industry directions**
  - availability, security, J2EE based Web services & integration with existing applications are now *critical* requirements
  - server consolidation is on the minds of all customers
  - multi-site, long distance clusters are crucial
- **Application integration means more environments are "mission critical"**
  - demands on existing applications are greater
- **Business groups demanding**
  - reduced IT costs, reduced risk, higher levels of service, more with less
  - extend the life of existing systems
  - 100% application availability – including scheduled times for planned server maintenance
  - "out of the box" solutions that address customer requirements

What's Possible?

- Data integration
  - extracting or inserting data directly to databases
- Legacy integration
  - Webifying legacy applications
- Application integration
  - sending messages to applications through EAI tools
- B2B integration
  - integrating with suppliers or partners
- Business process integration
  - managing business processes across application and organizational boundaries
- Mobile integration
  - integrating with mobile and wireless devices

OpenVMS eBusiness integration products and directions

OpenVMS Business Continuity

Excellence in Cluster/DT Features and Services

OpenVMS Features

- **OpenVMS Clustering**
  - Rolling Upgrades
  - Built-in Failover model
  - Centralized cluster management
- **Fibre Channel Storage**
  - Direct access to remotely located storage
  - Distances to 600km
  - Hardware Mirroring (DRM)
- **Inherent Disaster Tolerance Capabilities**
  - Distances to 500 miles
  - Mirroring via Host Based Volume Shadowing

+

HP Service Offerings

- **Service Offerings at increasing levels**
  - Bronze/Silver/Gold Support Contract
  - Business Continuity Consulting Services (BCS)
  - Disaster Tolerant Cluster Services (DTCS)

=

Excellence in Disaster Tolerance

- **Rapid Business Recovery**
  - Virtually undetectable failover from one site to another
  - Application Failover in minutes
  - Data Access Recovery in seconds

In a Disaster, Your Business Stays Running !

OpenVMS e-Business and Integration Products and Technology

- **Web servers and browsers**
  - Secure Web Server (Apache)
    - PHP, Perl, Tomcat (JSP)
  - Secure Web Browser (Mozilla)
- **Web Services**
  - Simple Object Access Protocol (SOAP) Toolkit
  - XML Technology (parsers and stylesheet processors)
- **Legacy integration**
  - BridgeWorks
  - TP Web Connector
  - TP Desktop Connector
- **Application servers**
  - BEA WebLogic Server (J2EE)
  - Tomcat
  - Xoology Concerto
- **Directory services**
  - Enterprise Directory (LDAP)
- **Development tools**
  - Java SDK (J2SE)
  - 3GLs
    - C, C++, Fortran, COBOL, Basic, Pascal, Ada
  - NetBeans IDE
- **Security**
  - Kerberos
  - LDAP ACME agent
  - CDSA (Common Data Security Architecture)
  - GnuPG
  - SSL (Secure Socket Layer)
  - Stunnel (Secure Tunnel)
  - SSH (Secure Shell)
- **Middleware**
  - ACMS (TP)
  - COM
  - Reliable Transaction Router (RTR)
  - 2AB orb2 (CORBA ORB), iLock (ORB security)
  - Attunity Connect (data access)
  - BEA MessageQ (messaging), Tuxedo (TP)
  - CA CoolGen
  - Ericom Host Publisher (terminal access)
  - IBM WebSphere MQ (messaging)
  - OCI TAO (open source CORBA ORB)
  - SpiritSoft SpiritWave (JMS-messaging integration), JCache
  - Tibco Rendezvous and SmartSockets (messaging)
  - WRQ Verastream (terminal adapter and integration broker)

OpenVMS – Secure By Design

OpenVMS has a strong integrated core security model.

This model evolves to encompass the latest in security standards.

Encryption

Keeping data secure…

..on the system

- CDSA (Common Data Security Architecture)
- GnuPG

…across the network

- SSL (Secure Socket Layer)
  - Stunnel (Secure Tunnel)
- SSH (Secure Shell)
- IPSEC

Authentication

Validating who you are

- Kerberos (API's & IDC)
- External Authentication
  - LDAP ACME Agent
  - Kerberos ACME agent

Standards

Industry Requirement

- HIPAA
- DIICOE
- Common Criteria

DEFCON 9 Winner
July 2001
Cool and Unhackable

Web Integration Standards with OpenVMS

patsystems
professional automated trading systems

spiritsoft.
go beyond jms

Data <glider>

IBM

SANCHEZ

IONA Total Busi

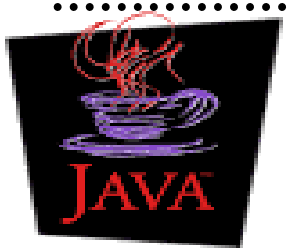
ERICOM SOFTWARE

onExchange℠

bea™

WORKFORCE
HR Trends & Tools for Business Results

ATTUNITY



Java Compatible™
Enterprise Edition

open source™

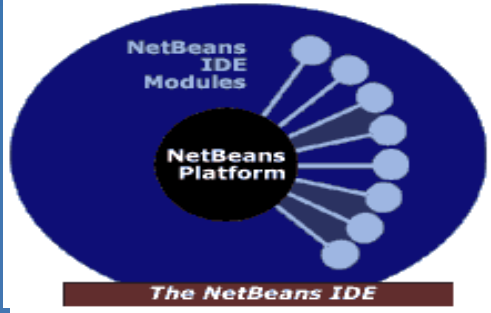
Microsoft .net

XML

COM

WSDL

UDDI



OpenVMS eBusiness infrastructure plans

- Performance improvements in the kernel, CRTL, Java and UNIX portability
- Security enhancements in the areas of SSL ,CDSA, SSH, GnuPG, Stunnel, LDAP authentication and Kerberos
- Additional messaging, TP, and middleware functionality (e.g. Java interface for ACMS and RTR)
- Plug-ins for NetBeans for native 3GL compilers
- Enhanced Web services offerings (SOAP, XML, UDDI, WSDL)
- Utilize eBusiness lab for internal and external integration and performance testing
- Identify open source technology that needs to be included with our infrastructure
- Monitor and provide needed infrastructure for J2EE (e.g Java)
- Continue to port new versions of Apache, Tomcat, etc
- Ship next releases of eBusiness CD (V1.5)
- Provide OpenView agent to manage systems and applications

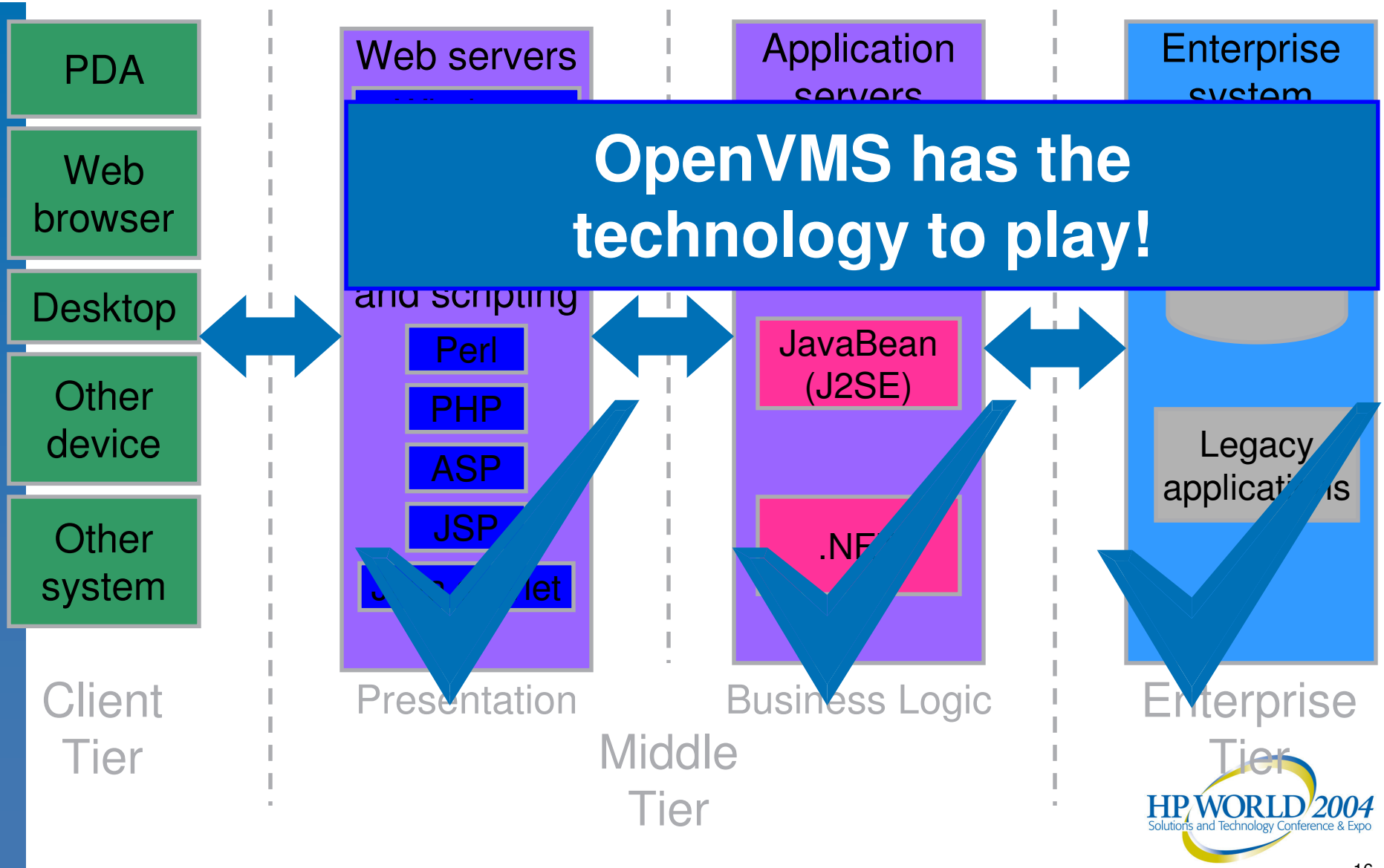
OpenVMS eBusiness Web server, Web browser and data access plans

- Continue with Apache as is the strategic webserver for OpenVMS
  - track major Apache Software Foundation (ASF) version updates
- Ship Mozilla as the premier web browser for OpenVMS Alpha
- Continue with Attunity Connect to provide:
  - JDBC driver, XML and ODBC client APIs and XML, ODBC, and Oracle 8 data adapters
- Investigate additional connector technology for bringing existing applications into the ebusiness context

OpenVMS eBusiness application servers and middleware plans

- Test and release additional versions of BEA WebLogic Server as the premier app server on OpenVMS
- Messaging/middleware offerings:
  - test and release additional versions of ORB2 on OpenVMS V7.3-1
  - continue to work with BEA (MessageQ) and port to Itanium
  - port IBM (WebSphere MQ V5.3) on OpenVMS Alpha and Itanium
- Verify that key third party Java-based applications run on OpenVMS (either as pure Java based apps or in the context of an app server)

Today's Environment



Web Services and Integration

- We believe Web Services will revolutionize (application) integration
  - Fundamental, enabling technology for integration solutions
  - Over time, integration solutions will increasingly be developed using this technology
- Think of Web Services as "middleware for the Internet"
- Facilitates creation of open, loosely coupled distributed systems
  - Dynamic computing environment for applications
  - Service oriented application architectures

Web Services…The Possibilities

- Save money by increasing the ROI for existing applications
- Reduce costs by focusing on a single application infrastructure
  - phasing out costly and proprietary alternatives over time
- Increase revenue and/or reduce costs
  - By working with your partners and suppliers to streamline business processes using the same infrastructure
  - By implementing new solutions from existing solutions and applications that have been exposed as services

OpenVMS and Integration = Web Services

- Focus on Web Services as the primary integration technology

- Provide a Web Services Toolkit
  - A unified and integrated development and deployment environment for Web Services
  - Goals:
    - Enhance key products and technology to focus on development and deployment of Web Services
    - Enable easy creation of Web Services from existing legacy applications
    - Enable non-Java applications which currently use unique OpenVMS technology to be exposed as Web Services

The Basics: A Brief History Lesson

Yeap, No marketing here, but, HP did it first!

In 1999, Hewlett-Packard become the first software vendor to introduce the concept of Web Services. HP called it *e-Speak.*

Microsoft coined the actual term “Web Services” in June 2000, when MS introduced them as a key component of it’s .NET initiative.

Web Services Defined

- Web services are software programs that use XML to exchange information with other software via common internet protocols.

- In other words, a Web Service communicates over a network to supply a specific set of operations (specific tasks performed by computers, often called methods or functions) that other applications can invoke (IE access or use)

Web Services Defined.. Continued.

- Web Service technology is the next stage in distributed computing.
- Web Services encompass a set of related standards that can enable any two computer applications to communicate and exchange data via the internet
- Implementing Web Services facilitate application integration and business-to-business transactions

How do you “write” a Web Service?

- In the late 60’s, early 70’s in order to get over some major programming difficulties, *Structured procedural programming* was adopted.
  - Disciplined approach to creating programs that are clear, demonstrably correct and easy to modify.
  - Languages include Fortran, Pascal, Basic and C
  - Focuses on actions (verbs)
- But Object Oriented programming is where it is at.
  - Languages include C++, Java, C# and Visual Basic .NET
  - Focuses on objects (nouns)

What are Objects?
What makes them special?

- Object technology is a packaging scheme that enables programmers to create meaningful software units.
  - These units can be large and are focused on particular applications areas.
    - *There are date objects, time objects, paycheck objects, invoice objects, audio objects, video objects, file objects, record objects, etc etc etc…*
    - *Any "noun" can be a software object*.
- Objects have properties (IE attributes, such as color, size and weight) and perform actions (IE behaviours, such as moving, sleeping and drawing)
- *Classes* represent groups of related objects.
  - *A Class is to an object as a blueprint is to a house*

Classes? Please tell me more!

- A class specifies the general format of it's Objects
  - The properties and actions available to an Object depend on its Class

- We live in a world of Objects
  - Cars, planes, people, animals, buildings, traffic lights etc.
  - Programmers can now write code in an object-oriented manner that reflects the way in which they perceive the world

Objects & Classes Oh My! Who Cares?

- Key problems with procedural programming
  - Does not mirror real world entities
  - This makes them highly un-reusable
  - Have to write and rewrite similar software for different projects
  - This wastes time, money and the wheel has to be continually reinvented.

- Object-Oriented (OO) programming allows code to be organized and encapsulated as classes
  - Facilitates the reuse of software components
  - You can then group Classes into Class libraries
    - Then make the Class Libraries available to other developers so that they do NOT have to reinvent the wheel.

So how does this benefit me?

- Web services take advantage of OO programming techniques in that the Web Services enable developers to build applications from existing software compenents
  - This encourages a modular approach to programming
    - Transforms the internet into an enormous library of components available to developers
    - This reduces the effort required to implement certain kinds of systems.

One Last Lesson Before We Go… What is Distributed Computing?

- When developers create substantial applications, often it is more efficient, or even necessary, for different tasks to be performed on different computers
  - Powerful computers and networks led to the distributed computing phenomenon.

N-Tier applications often split up applications over numerous computers.

- 3-tier applications might have a user interface on one computer, business logic processing on a second and a database on a third
- All interacting as the application runs
- First done using technologies such as CORBA, DCOM and RMI.

Distributed Computing Continued

- CORBA (**C**ommon **O**bject **R**equest **B**roker **A**rchitecture), DCOM (MS's **D**istributed **C**omponent **O**bject **M**odel) and the others, allow programs running in different locations to communicate as if they were on the same computer.

- Sounds Great, but…
  - Interoperability between the different vendors is limited
  - CORBA and DCOM, the two most popular, cannot communicate easily.
  - They often have to communicate over a DCOM/CORBA bridge
    - If the protocols changes in either, then the bridge has be to reprogrammed.

- Why you telling me this? You ask?

Cause…

- Web Services improve distributed computing
  - They Address the issue of Limited interoperability
  - Unlike DCOM and CORBA, Web Services operate using Open-Standards (non-proprietary).
  - This means Web Services can enable any two software components to communicate, regardless of the technologies used to create each component OR the platform on which the components reside.
  - They are easier to debug because Web Services use text based communication protocols, rather than the binary communications protocols used by DCOM and CORBA.
- Companies are using Web Services to improve communication between DCOM and CORBA components and to create standards-based distributed computing.
- Thus Web Services enable organizations to finally achieve the goal of distributed computing.

You Said You Would Define The Acronyms…

- **XML** – e**X**tensible **M**arkup **L**anguage
  - Developed from the Standard Generalized Markup Language (SGML)
  - XML is a widely accepted standard for describing data & creating markup languages.
  - XML was defined by the W3C (World Wide Web Consortium) as an open standard technology
  - 1998, XML version 1.0 was accepted as a W3C recommendation.
    - Which means that the technology is stable for deployment in industry
  - Data independence or the separation of content from its presentation, is the essential characteristic of XML
    - Because XML documents describe only data, any application that understands XML, regardless of the application's programming language or platform.

SOAP: Simple Object Access Protocol

- SOAP is one of the most common standard used to deliver Web Services
- The purpose of SOAP is to enable data transfer between systems distributed over a network.
  - When an application talks with a Web Service, SOAP messages are the most common way which two systems exchange data.
    - A SOAP message sent to a Web Service invokes a method provided by the Service, meaning that the message requests the Service to execute a particular task.
    - The Service then uses information contained in the SOAP message to perform its function.
      - If necessary, the Web Service returns the result via another SOAP message.
  - SOAP messages consist of 3 main parts. Envelope, Header and Body.
    - Envelope: Wraps the entire message and contains the header and body
    - Header: An optional element that provides information regarding such topics as security and routing.
    - Body: Contains the application specific data that is being communicated.

WSDL: Web Services Description Language

- WSDL provides developers with an XML-based language for describing Web Services and exposing those Web Services for Public Access
- Nearly every Web Service published on the internet is accompanied by an associated WSLD document.
  - WSLD documents List:
    - the Service's capabilities
    - states its location on the web
    - provides instructions regarding its use.
  - WSDL documents also provide specific technical information that informs applications how to connect to and communicate with Web Services over HTTP or other communication protocols.

UDDI: Universal Description, Discovery and Integration

- UDDI enables developers and business to publish and locate Web Services on a network.
- UDDI Defines an XML-based format in which companies can describe their electronic capabilities and business processes.
- UDDI provides a standardization method of registering and locating the descriptions on a network, such as the internet.
- Companies can store their information in private UDDI registries or public registries.

.NET Web Services: .NET

- The .NET platform is one of the most complete environments for building, deploying and accessing Web Services
  - Benefits to implementing Web Services in .NET:
    - Support for multiple programming languages
    - It's tools for code reuse
  - In .NET a Web Service is an application stored on one machine that can be accessed by another machine over a network.
  - Simply, a Web Service created in .NET is a *class,* or a logical grouping of methods that simplifies program organization.
    - Methods are defined within a class to perform tasks and return information when their tasks are complete
    - .NET Web Services classes contain methods (called Web Services methods) that are specified as part of the Web Service.
    - These methods can be invoked remotely using either document-style or RPC-based messaging (**R**emote **P**rocedure **C**all)

J2EE: Java 2 Enterprise Edition

- The Java 2 platform provides rich support for Web Service technologies.
- Since its initial release in ’95, Java has become one of the most popular programming platforms for building many types of applications.
- Originally promoted as a language for building interactive Web pages and animations.
  - Java has evolved into a platform that provides a rich set of Application Program Interfaces (API) for building embedded applications, desktop applications, dynamic Web components, distributed systems and enterprise-class applications.
- Primary feature of Java is its portability.
  - Java-based applications can execute on any operating system and hardware platform that supports Java.
  - Portability along with Java’s support for XML and standard networking technologies, makes Java ideal for building Internet Applications of all kinds.

Web Services Advantages

- Web Services operate using open, text-based standards, which enable components written in different languages and for different platforms to communicate.
- Web Services promote a modular approach to programming, so multiple organizations can communicate with the same Web Service.
- Web Services are comparatively easy and inexpensive to impliment, because the employ an existing infrastructure (such as the internet) to exchange information. Moreover, most applications can be repackaged as Web Services, so companies do not have to adopt entirely new software.

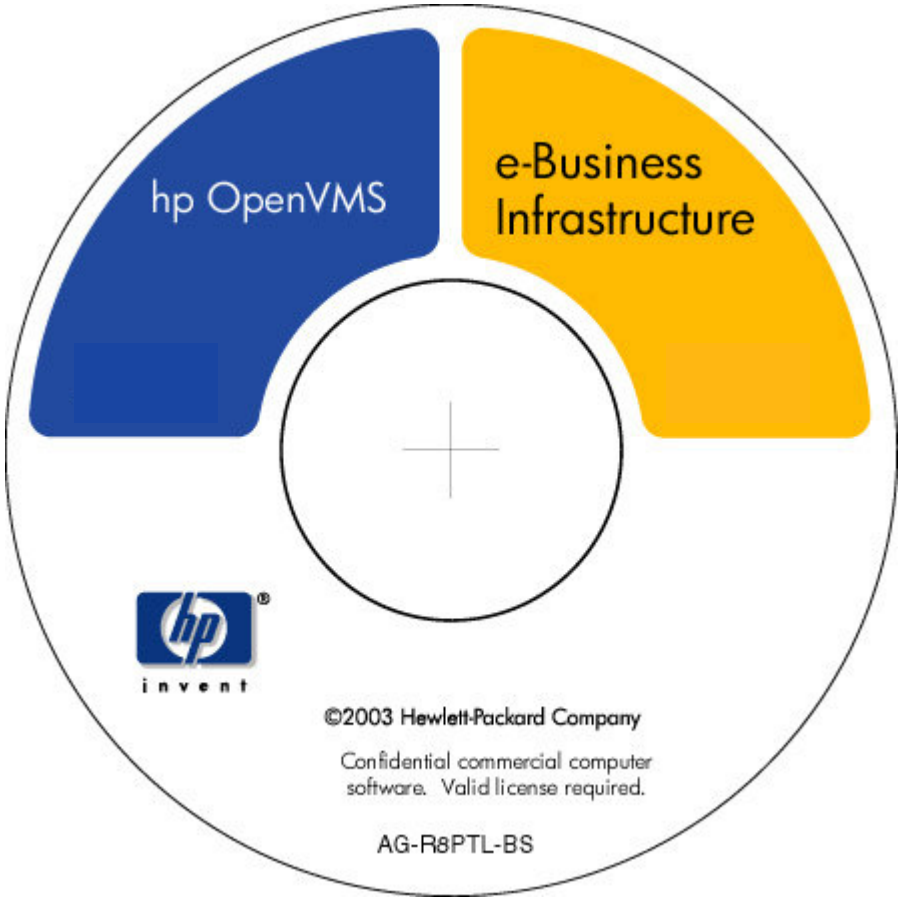
Web Services Advantages, continued

- Web Services can significantly reduce the costs of Enterprise Application Integration (EAI) and Business to Business (B2B) communications, thus offering companies tangible returns on their investments.
- Web Services can be implimented incrementally, rather than all at once. This lessons the cost of adopting Web Services and can reduce organizational disruption resulting from an abrupt switch in technologies.

Web Services Standards

Foundational Standards	Purpose
HTTP	Transport
XML	Data
SOAP	RPC
WSDL	Service description
UDDI	Service directory (yellow pages)
Evolving Standards	**Purpose**
HTTPR, WS-Reliability, ebXML Messaging Service	Asynchronous messaging and guaranteed delivery
XML Encryption, WS-Security	Encryption
XML Digital Signature, WS-Security	Signature
SAML	Single Sign On
XKMS (XKISS, XKRSS)	Management of public/private keys
XACML	Access control list
BTP, XAML, WS-Transaction, WS-Coordination	Transaction
BPEL, BPML, XLANG, WSFL, WSCI, WS-Choreography	Process representation
OMI	Administration
fpML, CML, etc	XML dialects of business messages
RosettaNet, etc	XML dialects of business processes

OpenVMS e-Business Infrastructure Package



- Enhances OpenVMS with key Internet and e-Business technologies
  - Secure Web Server (based on Apache) including PHP, Perl, and JSP (Tomcat) support
  - Secure Web Browser (based on Mozilla)
  - Java™ SDK
  - Attunity Connect™ On Platform Package
  - Reliable Transaction Router
  - Enterprise Directory
  - COM
  - BridgeWorks
  - NetBeans
  - Simple Object Access Protocol (SOAP) Toolkit
  - XML Technology (parser and stylesheet processor)

OpenVMS eBusiness lab

provides a secure hardware and software environment for internal groups and external partners to stage and evaluate eBusiness products on OpenVMS

- located in Compaq's Nashua, New Hampshire facility
- systems can be accessed locally or remotely
- systems are configured with the latest eBusiness technology on OpenVMS including web server (Apache), middleware, application servers, and Java

customer implementations of the *OpenVMS* eBusiness integration strategy

Customer implementations

- ISVs porting to OpenVMS
- new OpenVMS customer using ebusiness suite
- hosting web applications on OpenVMS
- re-use of existing applications and new technology integration (“black box” approach)
- multiple device access to cross platform applications: applying an integration engine for B2B
- building new, portable, OpenVMS applications and integrating with existing applications using encapsulation
- multiple data source integration
- cross platform access and integration

onExchange - ISV porting to OpenVMS

onExchange is a provider of risk management and derivatives trading technology

onExchange's clearing and trading system is internet-based, provides standardized derivatives instruments and complex over the counter (OTC) products

- written in J2EE, runs on Solaris with APIs for XML, Java, and EJB…
- lab goal: verify operation of their Java on BEA WLS
- application runs on on OpenVMS (Oracle, BEA WLS, Java)
- straightforward porting of Windows WebLogic scripts
- onExchange test scripts were run on OpenVMS
- all work was done remotely; no on-site visit necessary
- ~3 days to setup test environment and 1 week of remote access with occasional consultation

Sanchez Computer Associates - ISV porting to OpenVMS

Sanchez PROFILE/Xpress™ - a customer integration solution, which provides active customer aggregation, financial product distribution, and supports the real-time integration of all customer delivery channels to an institution's internal and external product processing systems

- lab goal: to test PROFILE/Xpress running WebConsumer on WebLogic using Compaq hardware and OpenVMS and Tru64 operating systems. (Oracle, WebLogic, Tru64 required)
  - most work involved logistics: concall for initial information sharing, waiting for BEA certification, trying to get access via our firewall.
  - actual setup only took a few days. modifying startup, profile, property files with appropriate directories and classpaths which is typical.
  - onsite “porting” and testing work by their engineer and our eBus lab only took 2-3 days total for both OpenVMS and Tru64

New OpenVMS finance customer using the eBusiness suite

requirements

- all access via Internet devices (browsers, phones, WAP)
- orders via internet
- consolidated account information
- increase timeliness and accuracy of information
- use Java code already developed on Windows
- provide 24*7 availability and dt
- one development and deployment platform
- use standard components where possible

solution

- Web clients (browser, WAP, phone,…)
- Apache as Web server
- WebLogic Server for J2EE and integration engine (EJB, JSP, Servlets)
- Oracle database (OPS)
- 24*7 with OpenVMS disaster tolerant cluster
- Compaq Advanced Server provides file stores for common development and deployment environment

Web hosting on OpenVMS

PDV is a system house that was founded some 20 years ago, focusing on solutions mainly for the cement, steel and mining industries

requirements

- host 160 web site domains with 24 x 365 availability
- enable easy growth and load balancing
- data integrity and security
- data accessible to a larger customer base
- Web sites must be transferable between operating systems and Web servers

solution

- Compaq Secure Web Server (Apache) as Web server
- cluster of 2 AlphaServer 1000A Systems, OpenVMS v7.2-1H1
- DIGITAL Server 3000R, Windows NT 4.0, Microsoft IIS 4.0
- DIGITAL Server 3000R, Linux, Apache
- AlphaServer 4100, OpenVMS v7.1, Process Software Purveyor v2.1

Manufacturing - Car plant production Flow Control application

requirements

- consolidate 800 different systems on to two platforms and os's (Windows and Alpha openVMS)
- develop architecture to support b2b integration
- standardize development tools
- web enable production control system
- retain existing core functionality (investment) on openVMS
- enhance overall system availability, including sw upgrades, to support 24x365 operation

solution

- Programmer's workbench using MS Visual Studio, Enterprise Toolkit for VS, BridgeWorks, WebGain, and NetBeans
- transform the existing ACMS tasks into Java components by wrapping them with BridgeWorks
- BEA WebLogic Application Server and Attunity Connect on OpenVMS for data access from Windows and OpenVMS
- Apache Web Server on OpenVMS for data access from PC based clients

Building new, portable, OpenVMS applications and encapsulating existing applications

customer implementation

requirements

- happy with stability and efficiency of existing systems (no downtime) ***but…***
- need to plan for new production systems and business needs over next 5-10 years
- need to plan for rapid e-integration if and when needs arise
- need for wireless/PDA access devices
- difficulty in recruiting resources to maintain and grow existing infrastructure
- need to make decisions ***now***!

solution

- implement J2EE architecture
- wrap existing 3GL logic as encapsulated Java objects using BridgeWorks
- CWS, Tomcat, MQseries
- migrate over time TP functionality to industry standard application server (BEA WebLogic Server)
- presentation logic both Web and PDA accessible

Application integration across multiple operating systems and applications

customer implementation

situation

manufacturer has acquired three companies and the IT infrastructure is totally different. each system also has data differences (for example, each system has different numbers for the same part)

solution

use Ericom's Host Publisher to interact with the legacy systems and external applications.

Major findings from our experience

- re-use of existing logic is efficient, but plan it carefully
- architect and design around Java/J2EE technologies
- emphasis on integration, B2Bi and EAI to any application or platform
- we are partnering with industry leaders (BEA, Iona, Attunity, Oracle, etc.)
- develop on any platform and deploy on OpenVMS
- our aim is to help enhance your business applications in parallel with the Itanium™ plans for product and OS

additional information
and
resources

Complementary resources and services

- HP will deliver transition tools, services and support portfolios at no charge to help with customer and partner transitions
- Two day architectural workshops to evaluate the current environment and plan for transition and integration
- Consulting expertise centers jointly staffed with hp and Intel experts
- Worldwide porting centers for validating ISV and custom applications on Itanium™ processor family systems
- On-Line support including “test drive” systems for application testing over the net
- Comprehensive portfolio of white papers with “how to” transitioning information

Comprehensive Professional Services Portfolio

- HP also has an extensive portfolio of chargeable services available for complete transition assurance
- Training courses for partners and customers
- System architecture consulting for highly complex solutions
- Transition assessment services
- Consolidation assessment services
- Transition/consolidation implementation services
- Integration services
- Detailed enterprise architectural planning services
- Experienced professional services professionals who can deliver the transition project for you

OpenVMS ebusiness seminars

- Available for delivery anywhere, anytime
- Customizable for specific technologies
- Can be tailored for specific customers
- Can be delivered with partners

Questions --- Comments

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