NonStop as part of a modern state of the art IT Infrastructure

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Buzzwords from the IT world

- Remote Function Call
- Service-oriented Architecture
- Distributed Computing
- Simple Object Access Protocol
- Virtualization
- Cloud
- Web Services
Buzzwords from the NonStop world

Remote Function Call

Service-oriented Architecture

Distributed Computing

Simple Object Access Protocol

Virtualization

Cloud

Web Services
Open System
NonStop Open System Services (OSS)

A UNIX like environment with transparent access to NonStop Kernel fundamentals for applications based on

- SQL database engines
- Java services
- Web-based client/server technologies
- ...

Enable customers to leverage from the benefits offered by open standards-based environments
What is provided by OSS?

OSS is making NonStop an open system

- > 90% of UNIX/Linux commands and APIs
- UNIX file system API
- UNIX command shell (ksh, bash,...)
- Standard UNIX facilities: semaphores, pipes, message queues, dynamic link libraries (DLLs)
- C, C++, COBOL, Java, Pearl, PHP,...
- APIs with NonStop operating extensions for POSIX programs
What is a Web Service?

Definition:
A Web service is a software system designed to support interoperable machine-to-machine interaction over a network. It has an interface described in a machine-processable format (specifically WSDL). Other systems interact with the Web service in a manner prescribed by its description using SOAP messages, typically conveyed using HTTP with an XML serialization in conjunction with other Web-related standards.

(source: http://www.w3.org/TR/ws-arch/#whatis)

- Agents and services
- Requesters and providers
- Service Description
- Semantics
## Core Web Service technologies

<table>
<thead>
<tr>
<th>XML</th>
<th>HTTP</th>
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</thead>
<tbody>
<tr>
<td>Extensible Markup Language</td>
<td>Hypertext Transfer Protocol</td>
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<tr>
<td>WSDL</td>
<td>SOAP</td>
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<tr>
<td>Web Services Description Language</td>
<td>Simple Object Access Protocol</td>
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Service-oriented Architecture
SOA from a business perspective

Means to achieve business-IT alignment

• Goal is IT agility, leading to business agility
• Architectural approach to build distributed applications
• Approach consists of composing application functionality using many interoperable building blocks
• Each building block offers well defined business functionality
• SOA envisions that there is one enterprise-wide service for each business functionality that is reused in different applications
S in SOA: Service

Oriented Architecture

Service
0 in SOA: Oriented

Service

Architecture

Oriented
A in SOA: Architecture

Oriented

Service

Architecture
SOA from a technical perspective

Architected with service oriented principles + Implemented using web service technology standards = Technical SOA
Why SOA is natural to NonStop?

Use SOA to extend the reach of your TS/MP services beyond the NonStop server
- TS/MP services are valuable business assets
- Use standard technologies to expose the value TS/MP applications and make them available as services

Application design on NonStop is service-centric
- A process implements a service
- Service has an interface that describes request and response messages
- Consumer of a service sends a message and receives a response

Well designed TS/MP services already conform to SOA design principles
Java
More than a programming language

Java refers to several computer software products and specifications that together provide a system for developing application software and deploying it in a cross-platform environment.

“Write Once, Run Everywhere” – the Java HotSpot Virtual Machine (JVM)

• Packaged as multithreaded DLL, the JVM is loaded and executed in a process by a standard launcher such as `java`
• Provides an execution environment for one or more applications which have been compiled into Java bytecode
• The JVM provides operating system type services that abstract applications from the platform on which they run

NonStop Server for Java (NSJ) provides the JVM for NonStop
Using Java on NonStop

Java application deployment on NonStop is different from typical UNIX/Linux

- multiple JVMs on NonStop versus one JVM for an SMP system
- JVM threads confined to a single core on NonStop versus spread across multiple cores

Enterprise-scale Java applications can be implemented on the NonStop server

✓ AND scale
✓ AND perform
✓ AND be fault-tolerant
✓ AND can be easily managed and monitored
NonStop Servlets for JavaServer Pages (NSJSP)

Value-add port of Apache Tomcat for NonStop

Implemented to leverage **scalability** and **fault-tolerance** provided by TS/MP.

Can leverage Pathway Domains feature of TS/MP 2.4 and later releases to implement an “**On-line Upgrade**” configuration of NSJSP.

Management of the complete NSJSP environment from the NSJSP Manager – available since Version 6.1.
What’s needed to turn a Pathway service into a web service?

1. **Target Pathway service** (Service provider)

2. **Service interface described by DDL**

3. **Invoked via Pathsend. Message payload defined by DDL**

4. **Service Adapter**

5. **Message payload defined by DDL**

6. **Tools**

7. **Invokes via SOAP. Message payload defined by WSDL**

8. **Web Service consumer**

9. **Needs WSDL**

10. **WSDL**

11. **DDL**

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Using an industry-standard messaging toolset

- Modernize and extend an existing application
- Exposing an existing service makes it necessary to create WSDL file
- SOAP provides the transport for the client to access the service and invoke it
- NonStop SOAP based on Apache Axis2/C open source Web service engine
- Apache Axis2/C can be used the same way as on other platforms
- Enables interoperability with other platforms
Alternatives for the Service Adapter

- iTP WebServer
- NonStop SOAP 4 (Axis2/C)
- Axis2/J
- NSJSP
- Pathway Server Class
Open Source
Open source Java frameworks on NonStop

- **Apache MyFaces**: Component based web UI framework (JSF)
- **Apache Axis2**: Web services framework (for SOA)
- **Spring**: Framework for developing application components
- **Hibernate**: Object Relational Mapping (ORM) framework (JPA)

**SASH**: MyFaces, Axis2, Spring, Hibernate
Google Web Toolkit – GWT
An alternative to using JSF

Open source development project at Google
Java-based Rich Internet Application software development framework

• Write Web GUI screens using Java
• GWT Compiler generates:
  – JavaScript and HTML to run in the client browser
  – Java Servlet code to run on the server to provide the “service”
• Eclipse plug-in available for GWT:
  – Feature-rich design tool
  – Lots of wizards and integrated testing
• Resulting code is very efficient
GUI modernization using GWT-RPC

Use with NSJSP

- No Sessions involved
- No Session objects required to be stored by NSJSP
- All communication between iTP-WS and NSJSP is through TS/MP
- Better load balancing
- Screen processing offloaded to client
- Fault-tolerance without needing to use persistence
Best Java IDEs for Developers

1. Eclipse
2. NetBeans
3. IntelliJ Idea
4. JCreator
5. JDeveloper

source: http://zoomzum.com/best-java-ide/
NonStop Development Environment for Eclipse (NSDEE)

A modern, industry standard, Integrated Development Environment for NonStop

Leverage Eclipse

For all NonStop developers

Additional NonStop IDE capabilities (supports Java, C, C++, COBOL 85)
Cloud
“Cloud Computing
Gartner defines cloud computing as a style of computing in which massively scalable IT-enabled capabilities are delivered “as a service” to external customers using Internet technologies. When we break down this definition, what we find is a set of mutually supportive concepts. First and foremost is the concept of delivering services (that is, results as opposed to components). Implementation does not matter as long as the results of the implementation can be defined and measured in terms of a service with associated service-level requirements. Included in this concept is payment based on usage, not on physical assets. The payment can be subsidized (for example, by advertising) or paid directly by the customer. The second concept is that of massive scalability. Economies of scale reduce the cost of the service. Implicit in the idea of scalability is flexibility and low barriers to entry for customers. Third, delivery using Internet technologies implies that specific standards that are pervasive, accessible and visible in a global sense are used. Finally, these services are provided to multiple external customers, leveraging shared resources to increase the economies of scale.”

Gartner, IT Glossary
www.gartner.com/it-glossary/cloud-computing
Terminologies in combination with the Cloud

- Bridging
- Bursting
- Hosting
- Security
- Service catalog
- Orchestration
- Monitoring
- Cloud map
- Application lifecycle management
- aaS
- Provisioning
- De-provisioning
- Workflow
- Service template
Cloud and Mission Critical

Any factore of a system whose failure will result in the failure of the business operations and other influences...

- Downtime
- Ability to fulfill service-level agreements
- Security
- Privacy
- Jurisdictions
Cloud offerings on the market
Amazon Web Services

• Is a comprehensive cloud service platform

• Management of resources can be done by the customer through a web-based GUI

• Flexible, cost-effective, scalable and elastic, secure, experienced

• What happens in case of a problem?
Cloud offerings on the market

Google App Engine

- Platform as a service (PaaS)
- Cloud computing for web applications
- Special application design needed to be able to use the infrastructure
- Handles deployment, monitoring, failover, launch of application instances
- Vague SLA definition
Topics to think about in Cloud environments

- Clustering
- Massive linear scalability
- Business process continuity
- Highest availability level
Possible cloud solutions

**Web applications**
- Internal services where your business rely on
- HR solutions
- ERP

**Content delivery**
- Employees success relies on stored content

**Storage as a service**
- Use existing storage arrays

**Database as a service**
Persistent Cloud
What is behind the Persistent Cloud Demo?

- Architecture design to enable a NonStop system to be a controller of, and a participant with, a group of commodity servers or Cloud deployments
- Extend the Pathway functionality to commodity servers or virtual servers running in public or private clouds
- API that provides the intersystem communication and message protocol for the different systems
Conclusion
Go into discussions...

Continuous Availability

NonStop is a key technology element of the HP Mission-Critical Converged Infrastructure

Cloud Computing

Standard and Modern

Integrated Stack

Fully Virtualized
Thank you