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

GTUG & Connect 2012, Dresden

Tobias Kallfass, EMEA NED Presales

Buzzwords from the IT world

Remote Function Call

Service-oriented Architecture

Distributed Computing

Simple Object Access Protocol

Web Services

Virtualization

Cloud

Buzzwords from the NonStop world

Remote Funtion Call

Service-oriented Architecture

Distributed Computing

Simple Object Access Protocol

Web Services

Virtualization

Cloud

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

Web Services

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

XML Extensible Markup Language	**HTTP** Hypertext Transfer Protocol
WSDL Web Services Description Language	**SOAP** Simple Object Access Protocol

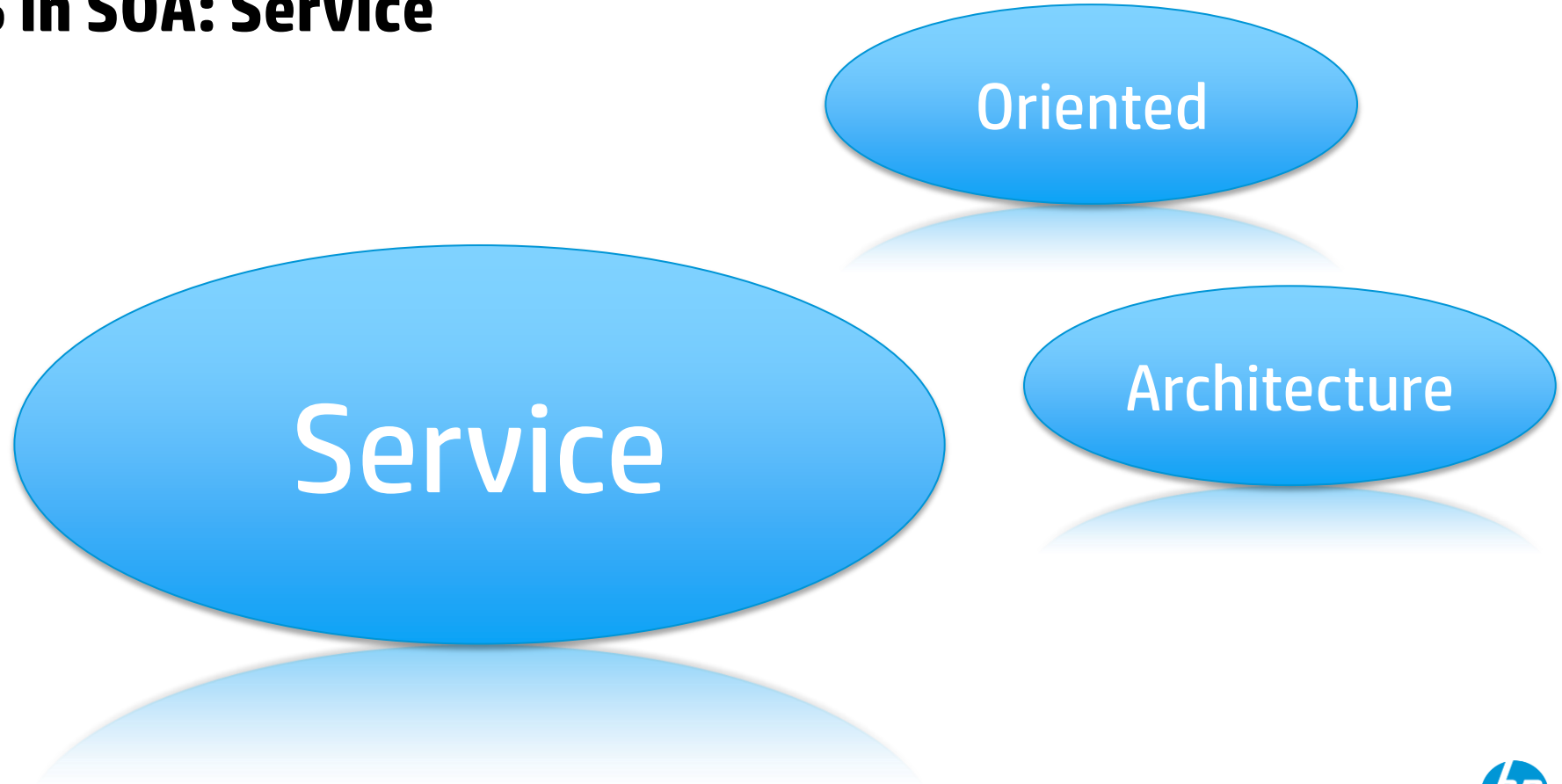# Service-oriented Architecture

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

Service

Architecture

O 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 <u>can</u> be implemented on the NonStop server

- ✓ AND scale
- ✓ AND perform
- ✓ AND be fault-tolerant
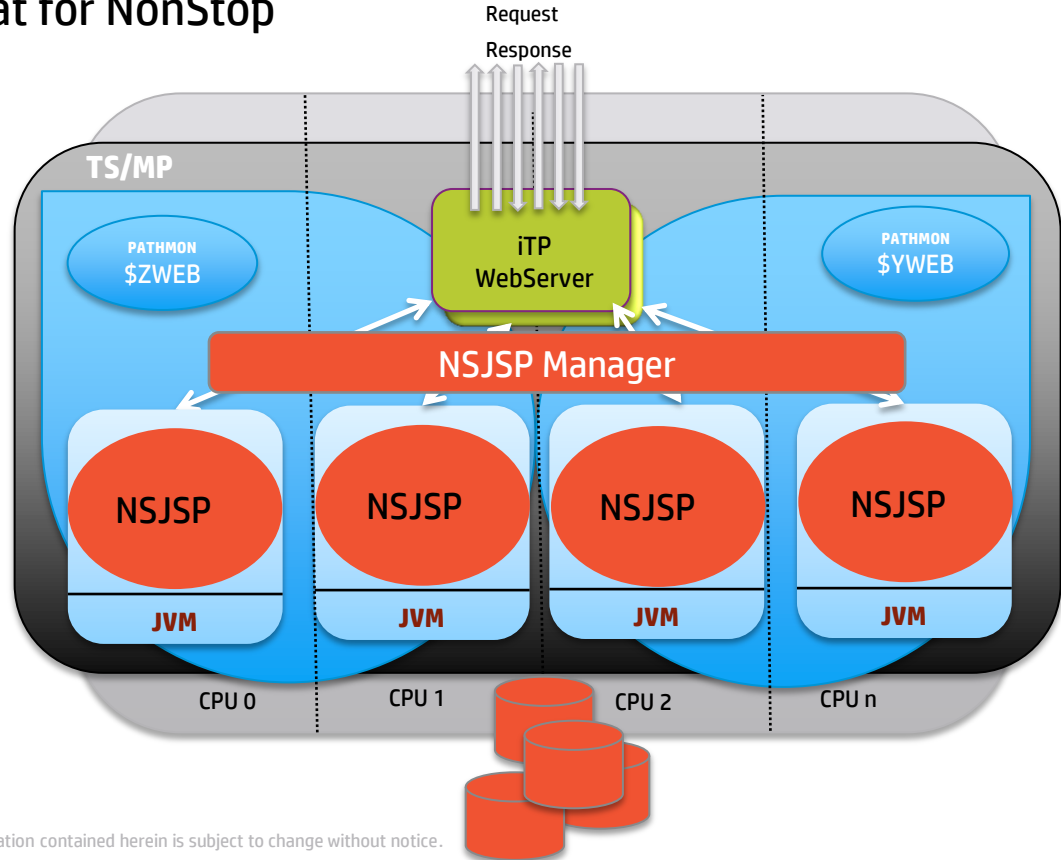- ✓ AND can be easily managed and monitored

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
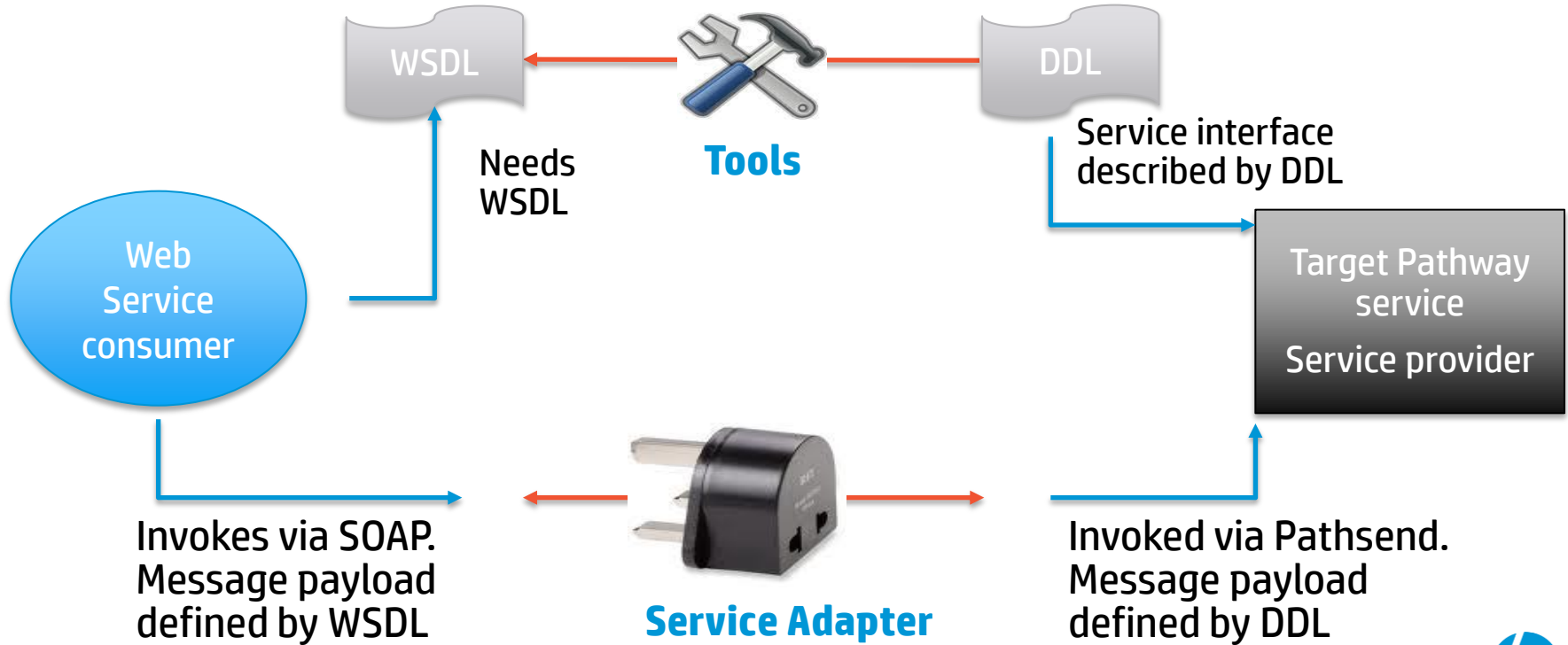releases to implement an "**On-line
Upgrade**" configuration of NSJSP.

Management of the complete
NSJSP environment from the
NSJSP Manager – available since
Version 6.1

Request

Response

TS/MP

PATHMON
$ZWEB

iTP
WebServer

PATHMON
$YWEB

NSJSP Manager

NSJSP

NSJSP

NSJSP

NSJSP

JVM

JVM

JVM

JVM

CPU 0

CPU 1

CPU 2

CPU n

SOAP

What's needed to turn a Pathway service into a web service?

WSDL

DDL

Tools

Needs WSDL

Service interface described by DDL

Web Service consumer

Target Pathway service

Service provider

Invokes via SOAP. Message payload defined by WSDL

Service Adapter

Invoked via Pathsend. Message payload defined by DDL

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
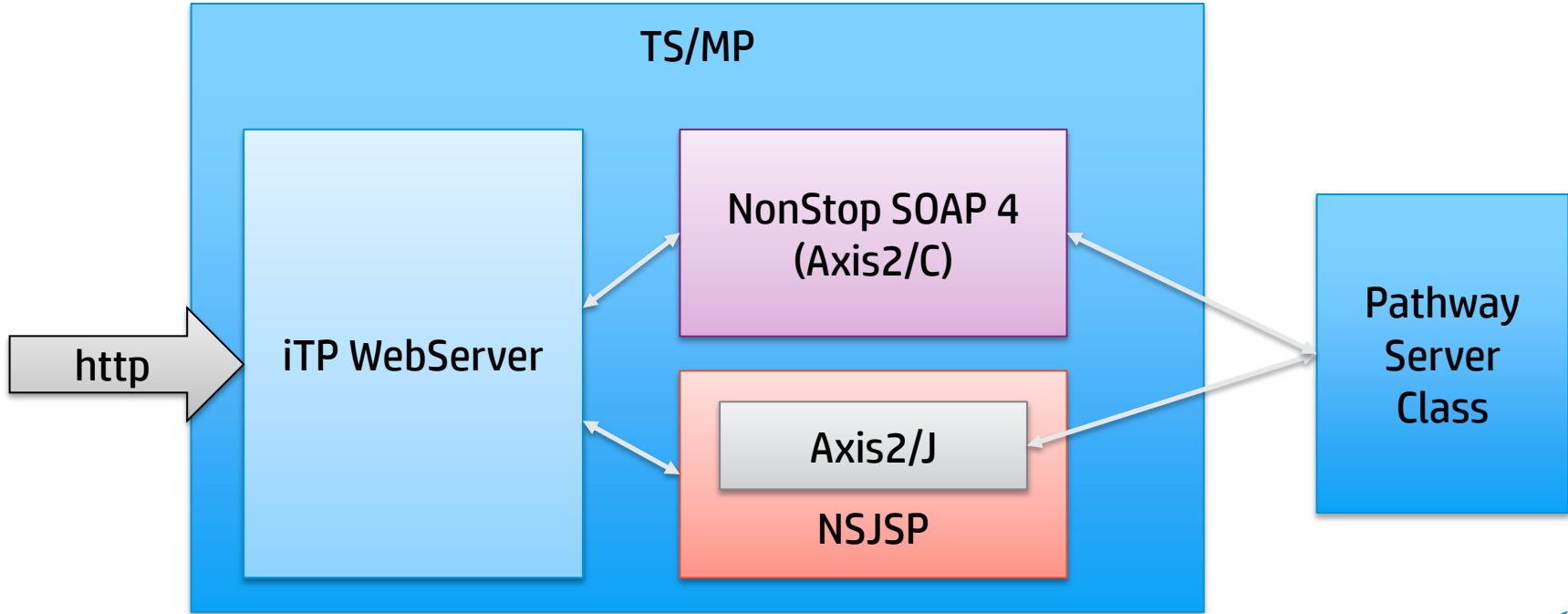
Open Source

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: MyFace**S**, **A**xis2, **S**pring, **H**ibernate

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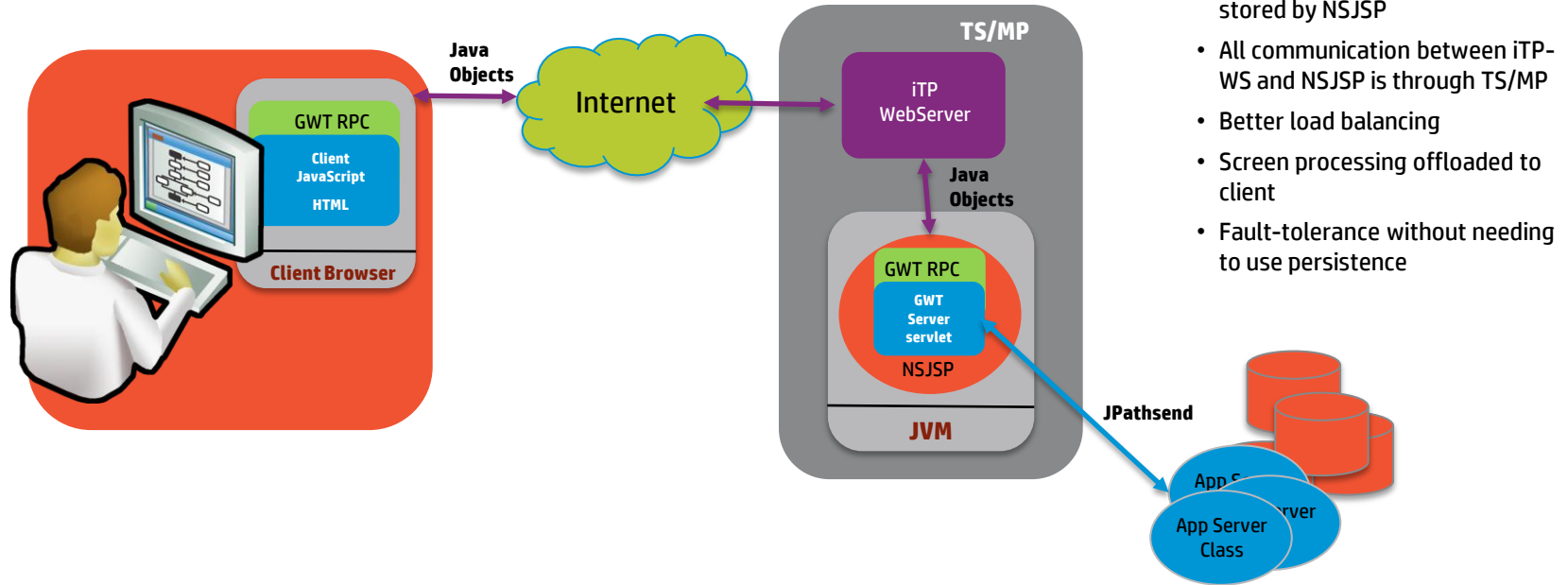
- **No Sessions involved**
- No Session objects required to be stored by NSJSP
- All communication between iTP-WS and NSJSP is through TS/MP
- Better load balancing
- Screen processing offloaded to client
- Fault-tolerance without needing to use persistence

Open Development

Best Java IDEs for Developers

1.Eclipse

2.NetBeans

3. Intelli Idea

4. JCreator

5. JDeveloper

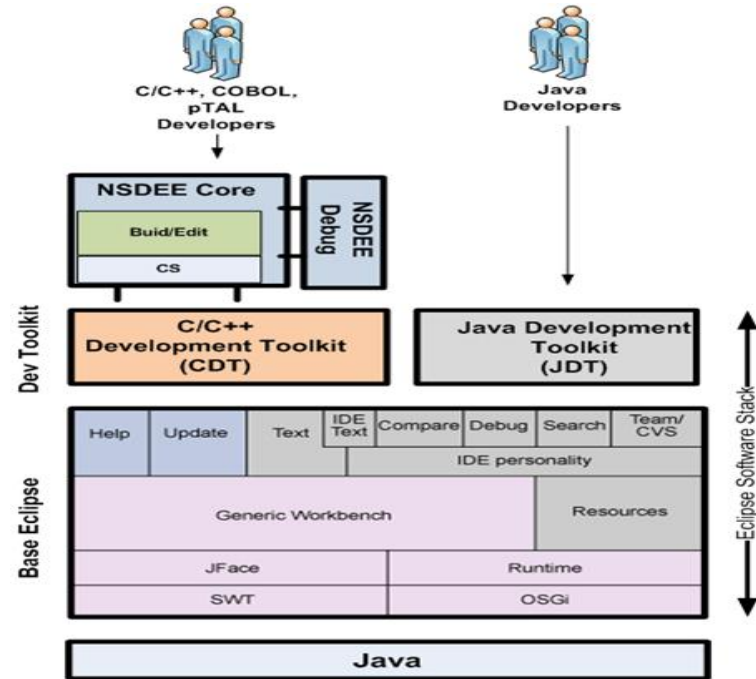**source: http://zoomzum.com/best-java-ide/**

NonStop Development Environment for Eclipse (NSDEE)

A modern, industry standard, Integrated Development Environment for NonStop

Leverage Eclipse

For all NonStop developers

Additional NonStop IDE capabilites (supports Java, C, C++, COBOL 85)

C/C++, COBOL, pTAL Developers

Java Developers

NSDEE Core

Build/Edit

CS

NSDEE Debug

Dev Toolkit

C/C++ Development Toolkit (CDT)

Java Development Toolkit (JDT)

Base Eclipse

Help	Update	Text	IDE Text	Compare	Debug	Search	Team/CVS

IDE personality

Generic Workbench | Resources

JFace | Runtime

SWT | OSGi

Java

Eclipse Software Stack

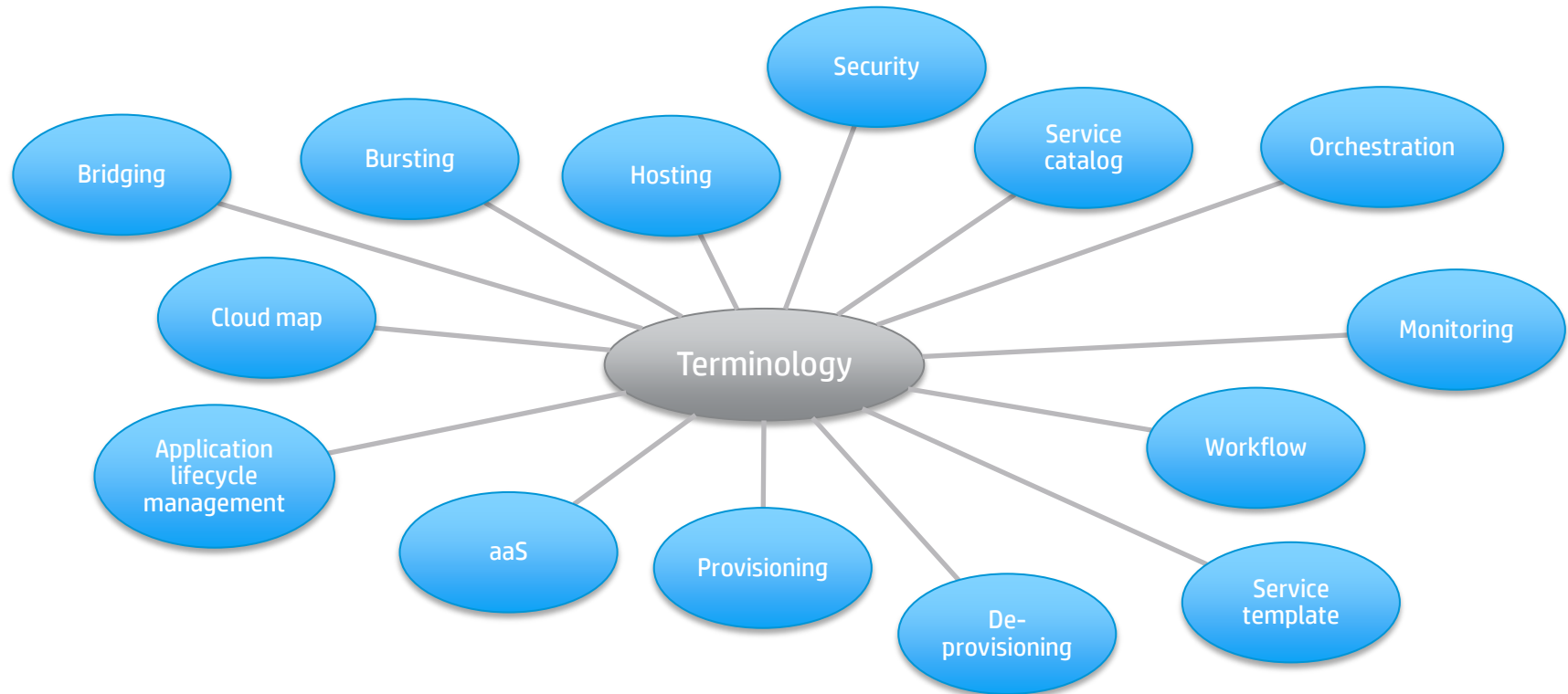# Cloud

"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

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 platfrom

- 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 you business rely on
- HR solutions
- ERP

Content delivery

- Employees success relies on stored content

Database as a service

Storage as a service
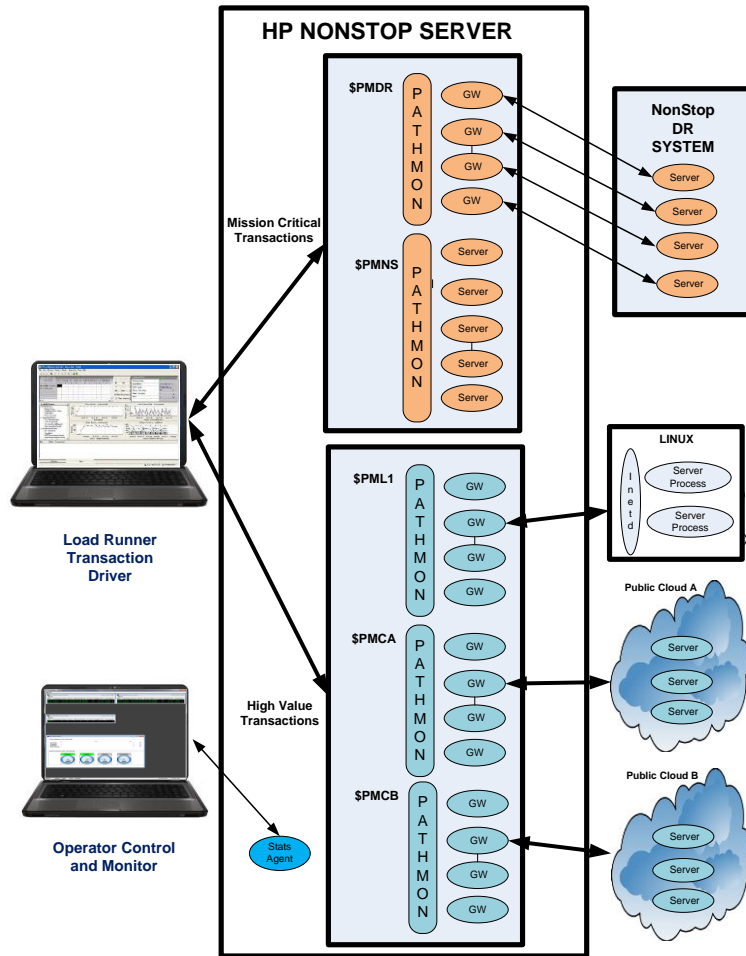
- Use existing storage arrays

...

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

HP NONSTOP SERVER

$PMDR — PATHMON — GW, GW, GW, GW

$PMNS — PATHMON — Server, Server, Server, Server, Server

NonStop DR SYSTEM — Server, Server, Server, Server

Mission Critical Transactions

Load Runner Transaction Driver

$PML1 — PATHMON — GW, GW, GW, GW

LINUX — Inetd — Server Process, Server Process

$PMCA — PATHMON — GW, GW, GW, GW

Public Cloud A — Server, Server, Server

High Value Transactions

$PMCB — PATHMON — GW, GW, GW, GW

Public Cloud B — Server, Server, Server

Operator Control and Monitor

Stats Agent

Conclusion

Go into discussions...

Continuous Availability

Standard and Modern

Integrated Stack

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

Fully Virtualized

Cloud Computing

Thank you