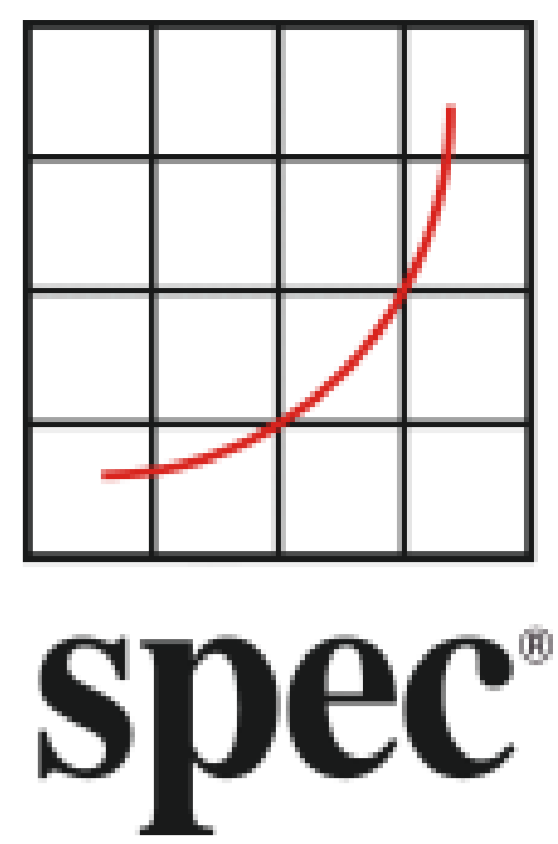


SPECjEnterprise2010

SPECjAppServer2001-2004



Industry Standard Benchmark
For Java Enterprise Applications

SPECjEnterprise2010 Performance Benchmark Overview

The SPECjEnterprise2010™ benchmark is an end-to-end benchmark which allows performance measurement and characterization of JEE 5.0 servers and supporting infrastructure such as JMS, Database, CPU, disk and network.

The workload consists of an end-to-end web based order processing domain, an ERP and Web Services driven manufacturing domain and a supply chain model utilizing document based Web Services. The application is a collection of Java classes, Java Servlets, Java Server Pages, Enterprise Java Beans, Java Persistence Entities (e.g. JPA) and Message Driven Beans.

SPECjEnterprise2010 is the third generation of the SPEC organization's J2EE end-to-end industry standard benchmark application. The new SPECjEnterprise2010 benchmark has been re-designed and developed to cover the JEE 5.0 specification's significantly expanded and simplified programming model, highlighting the main features used by developers in the industry today. This provides a realistic workload during the Application Server's implementation of the JEE to its maximum potential and allowing maximum stressing of the underlying hardware and software systems.

SPECjEnterprise2010's new design spans JEE5 including the new EJB 3.0 and WBEI component architecture, Message Driven Beans, and features level transactions.

Additional overview information is included in the [FAQ](#).

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Workload Scenario

Modeled after end-to-end real world business case

- Automobile manufacturer whose main customers are automobile dealers
- Incorporating CRM, manufacturing and supply chain management

EASstress Workload

- exclusively for exploratory *research* and *development purposes*
- results may be publicly discussed w/o being first reviewed by SPEC
- no comparisons with SPECjEnterprise/AppServer results allowed
- no changes in workload

Metric

SPECjEnterprise2010 EJoPs : jEnterprise Operations Per Second

= ∑ successfully completed workflows

- Dealer Domain Business Transactions: Browse, Purchase, Manage
- Work Orders completed in Manufacturing Domain
- during measurement interval
- average normalized per second

SPECjEnterprise2010

Manufacturer: Schedule Work Order

To schedule a work order, please select Assembly ID and enter quantity.

Assembly ID: [00001MTEM00000000] Location: [] Quantity: [] [Schedule]

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SPECjEnterprise2010

Dealership Home - Dauria Subaru

User Statistics

Account ID: 1
Account Creation: October 27, 2009
Session Creation: Tue Dec 29 15:58:11 CET 2009

Account Summary

Cash Balance: \$6,730.00
Vehicles in Inventory: 24
Inventory Value: \$402,425.84
Account Value (Vehicles + Cash): \$409,155.84
Credit Limit: \$31,155,347.26
Credit Rating: GC

User Navigation Summary

Login Date	June 12, 1020
Purchase Value	\$130913
Sale Value	\$20904
Orders Placed	12
Orders Cancelled	32
Inventory Sold	94
Pages Viewed	35

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SPECjEnterprise2010 1.0

RunID: specjdriverharness.6G

CONTENTS

- Benchmark Information
- MfgDriver Throughput
- MfgDriver Frequency Distribution of Response Times (seconds)
- MfgDriver Frequency Distribution of CycleThink Times (seconds)
- MfgDriver Frequency Distribution of Targeted CycleThink Times (seconds)
- DealerDriver Throughput
- DealerDriver Response Times (seconds)
- DealerDriver Frequency Distribution of Response Times (seconds)
- DealerDriver Frequency Distribution of CycleThink Times (seconds)
- DealerDriver Frequency Distribution of Targeted CycleThink Times (seconds)

BENCHMARK INFORMATION

Name	Value
RunID	specjdriverharness.6G
Previous	Next Top Query

MFGDRIVER THROUGHPUT

MfgDriver Throughput

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SPECjEnterprise2010 Result

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Application Server	7,903.16 SPECjEnterprise2010 EJoPs		
Substrate	64-core, 16 chips	SPEC license # 1	Test date: Dec-2009
Software Products	Application Server: VM (Build 2.4, J2EE 1.6) 2.4 JUnit: 64-64 JSP: 2.4 JPA: 2.0 JMS: 2.0 JTA: 1.1 JWS: 2.0 JXC: 2.0 JX: 2.0	Software Configurations: JEE Application Server: JBoss Application Server 4.2.1.GA Database Software: Oracle 10gR2 Database Software: Oracle 10gR2 EJB: 3.0 JPA: 2.0 JMS: 2.0 JTA: 1.1 JWS: 2.0 JXC: 2.0	Hardware Systems: JEE Application Server: JBoss Application Server 4.2.1.GA Database Software: Oracle 10gR2 Database Software: Oracle 10gR2 EJB: 3.0 JPA: 2.0 JMS: 2.0 JTA: 1.1 JWS: 2.0 JXC: 2.0

JEE Server Nodes:	5	DB Server Nodes:	1
JEE Server CPUs:	64 cores, 16 chips	DB Server CPUs:	24 cores, 4 chips
JEE Instances:	16	DB Instances:	1
Other SUT Components:	48-port switch		

Dealer Injection Rate:	4,968	Ramp Up Time:	1,800 seconds
DB Load Injection Rate:	5,000	Steady State Time:	3,600 seconds
# of Dealer Agents:	43,630	Ramp Down Time:	300 seconds
# of Manufacturing Agents:	14,904		

Detailed Results			
Transaction Mix	Count	Tx Mix	Failure Count
Purchase	4,488,317	22.00%	4
Manage	4,489,177	22.00%	9
Browse	8,975,211	49.99%	0
Total # Dealer Transactions	17,952,705		
Manufacturing Transaction Mix			
Transaction Mix	Count	Tx Mix	Failure Count
CreateVehicleEJB	5,247,470	49.98%	1,785
CreateVehicleWS	5,250,698	50.02%	1,741
Total # Manufacturing Transactions	10,498,168		

Response Times				
Transaction	Average	Standard Deviation	Maximum	90th%
Purchase	0.400	0.000	8.158	1.320
Manage	0.273	0.000	4.799	0.660
Browse	0.524	23.26	1,590	2,000
CreateVehicleEJB	0.244	0.229	5.578	0.540
CreateVehicleWS	0.182	0.000	5.621	0.350

Key Java EE 5 Technologies Used

- Dynamic Web page generation - JSP 2.1
- Web Service based interactions - JAX-WS 2.0, JAXB 2.0 **NEW**
- Transactional components - EJB 3.0 **NEW**
- Distributed Transactions - JTA 1.1
- Messaging and asynchronous task management - JMS 1.1
- Object persistence - JPA 1.0 **NEW**
- Multiple company service providers with multi-site servers

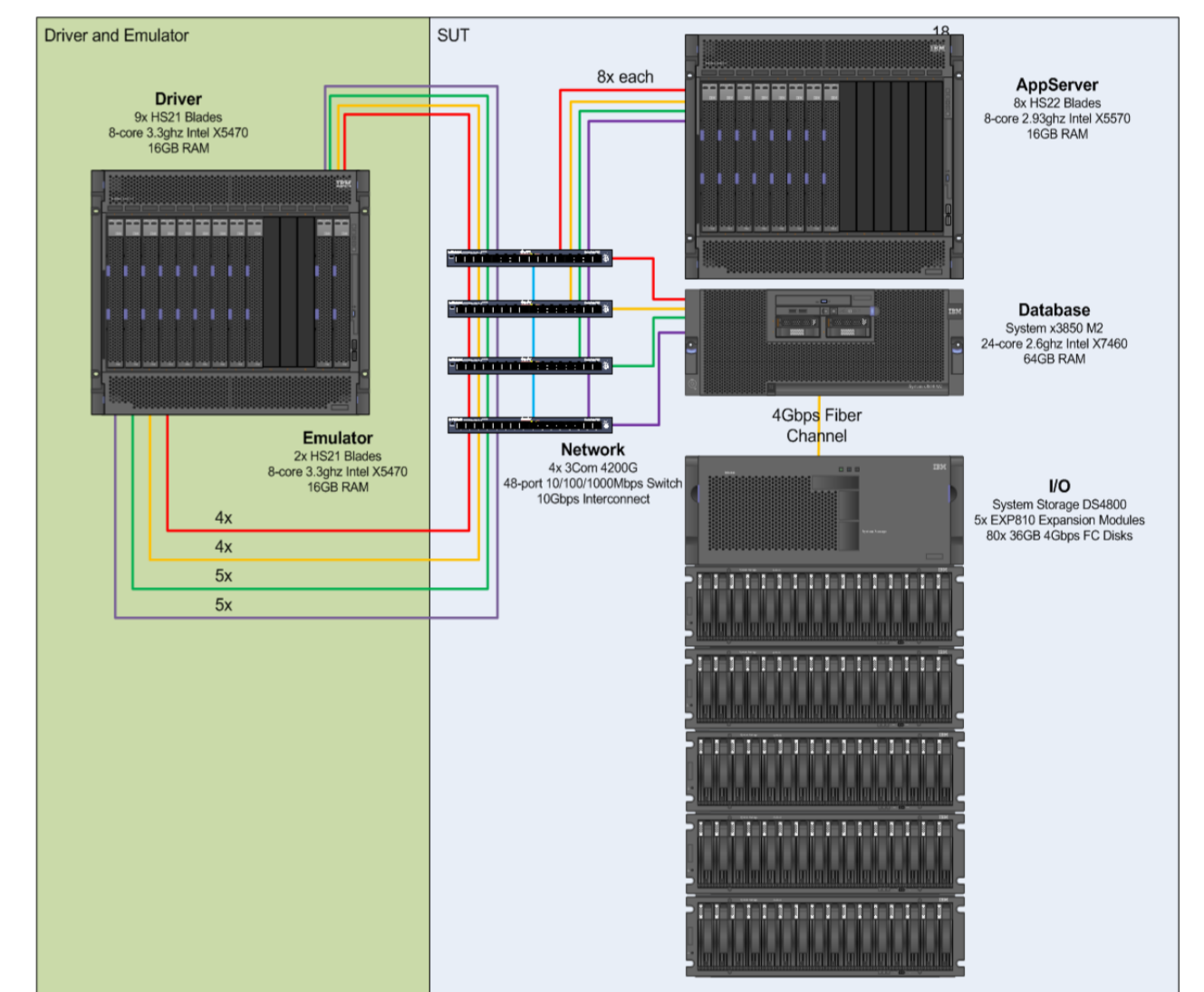
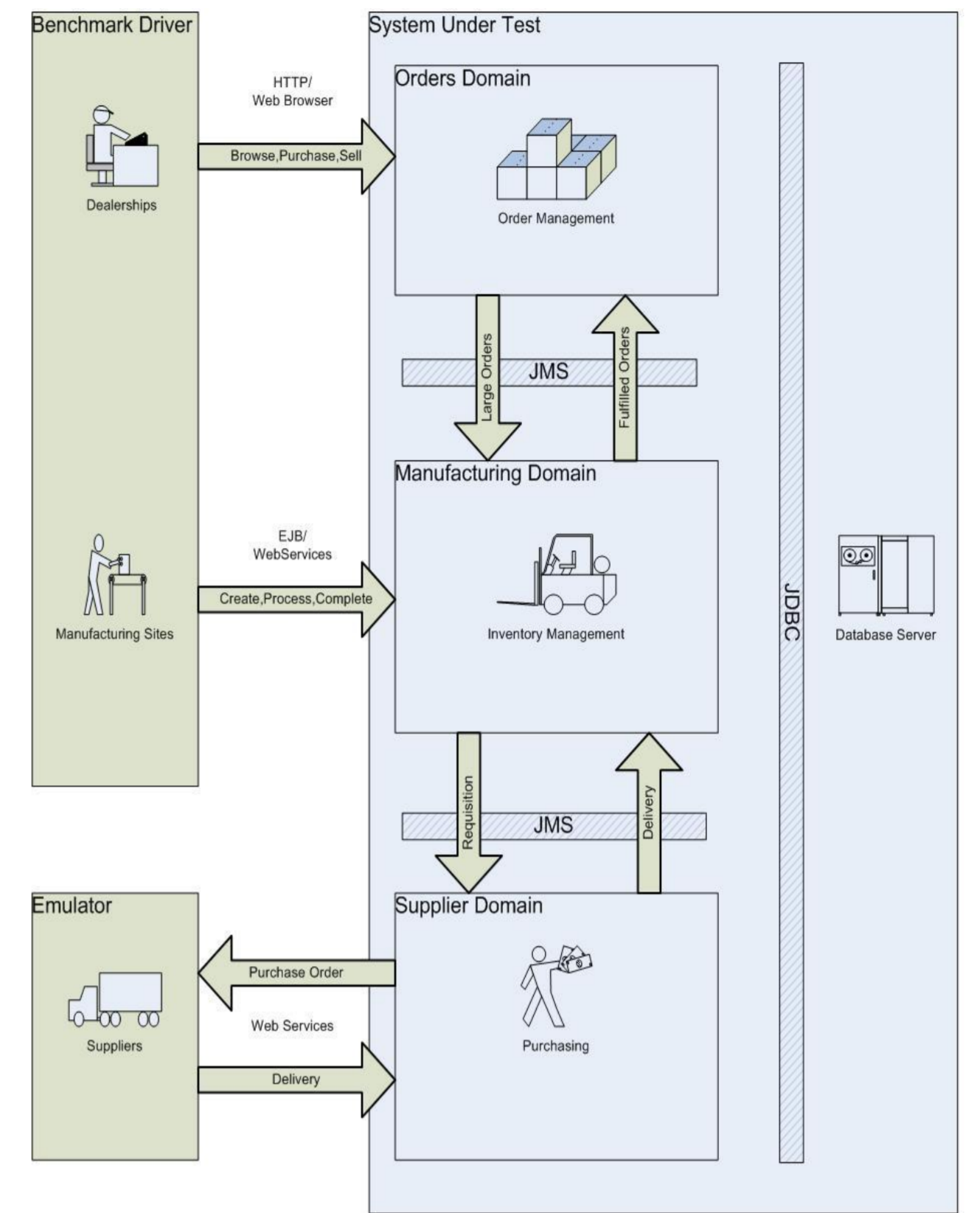
What is measured?

Full-system performance for Java Enterprise Edition (Java EE 5) application servers and supporting infrastructure including

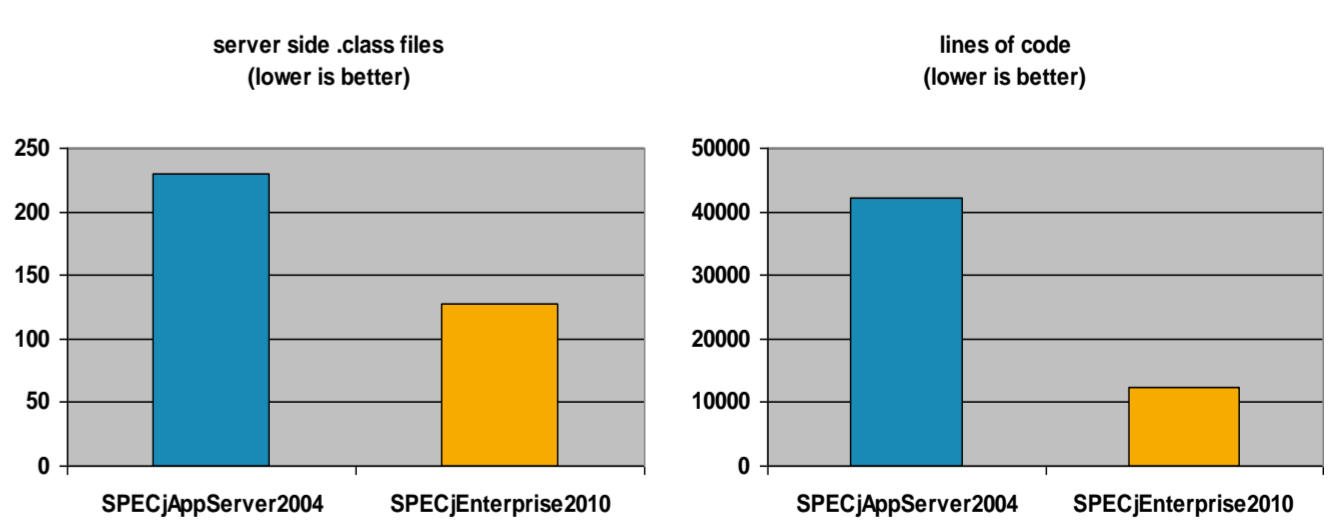
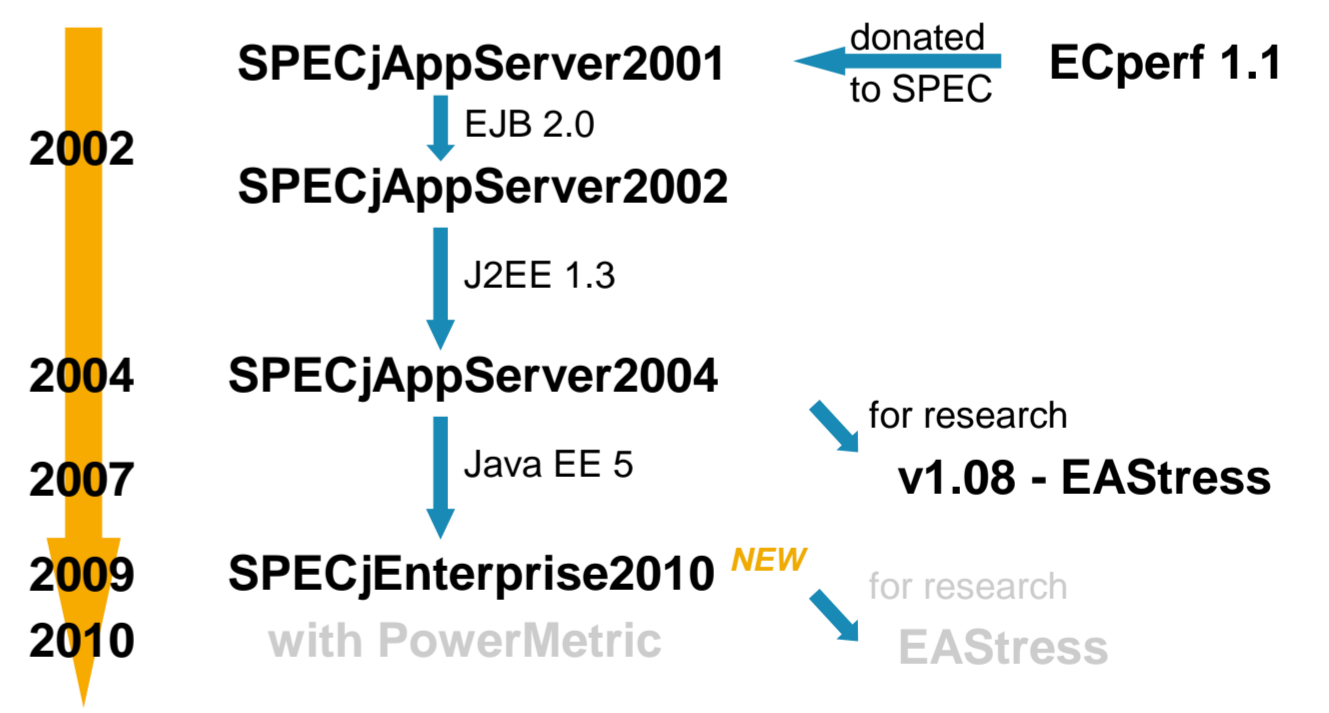
- Software
 - JVM
 - Database
 - Operating System
- Hardware
 - Processors
 - Network
 - Storage

Novelties – Simplifications

- Java EE 5 **NEW** – e.g.
 - Annotations and sensible defaulting **NEW**
 - JPA and Optimistic Locking **NEW**
 - Web Services **NEW**
- Usage of Java EE 5 reduced number of classes and lines of code
- Fabian – facility for developing and running benchmarks **NEW**
- Look and feel **NEW**
- Integrated and simplified database loader
- Vertical/horizontal partitioning assuming Data Access Transparency
 - Data model, e.g. Locations
- Emulator
- Increased CPU consumption by additional workload
- Increased contention on database
- Improved plugin points for vendors



History - Upcoming



SPECjEnterprise2010 Development Group in the OSG Java subcommittee of SPEC with participation of



References

- Results: <http://www.spec.org/jEnterprise2010/results>
- Benchmark Home: <http://www.spec.org/jEnterprise2010>
- FAQ
- Run And Reporting Rules
- User Guide
- Design Document