

Design of the IPACS Distributed Software Architecture

Dr. Heinz Kredel, Matthias Merz
University of Mannheim,
IT-Center, L 15,16
68131 Mannheim, Germany
{kredel/merz}@rz.uni-mannheim.de

- 1. IPACS-Project**
- 2. Benchmark Process**
- 3. Software Architecture**
- 4. Conclusion**

IPACS-Project

Integrated Performance Analysis of Computer Systems



IPACS-project:

- Start in 2002
- Funded by the German Federal Ministry of Education and Research
- Funding: 1.5 Mio \$, 4 years, 20 men years

UNIVERSITY OF
MANNHEIM



Fraunhofer
Institut
Techno- und
Wirtschaftsmathematik

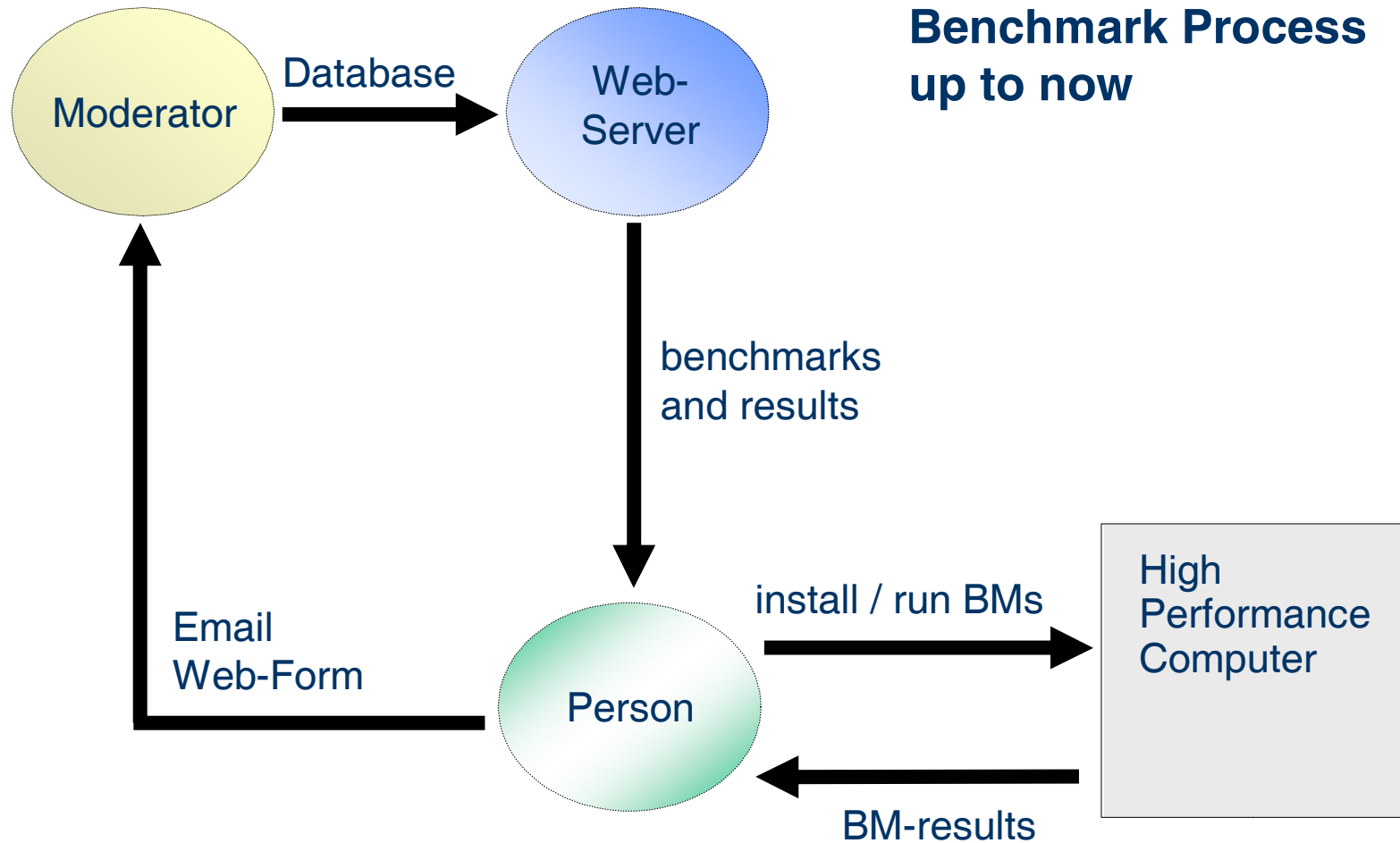


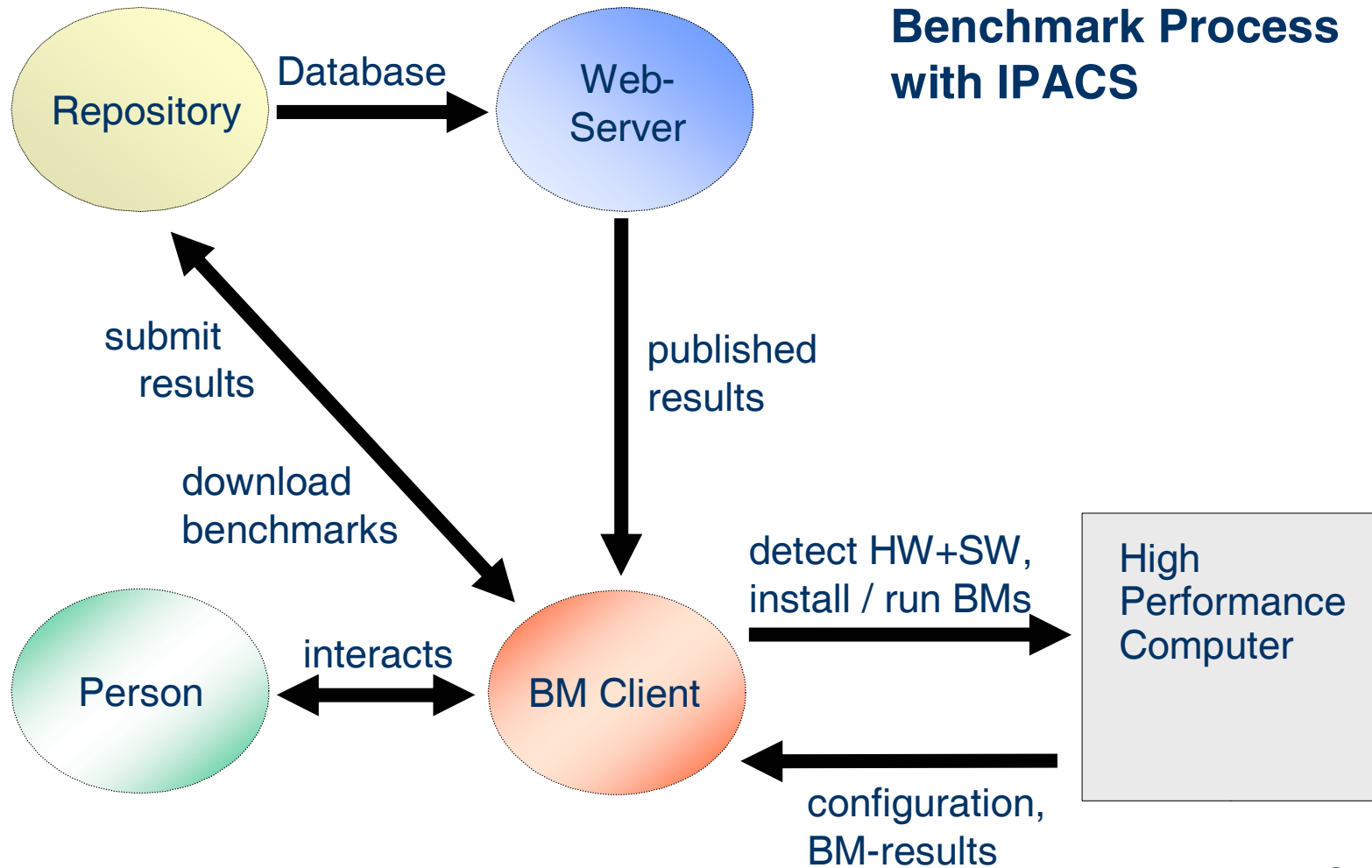
••T••Systems•

Aims:

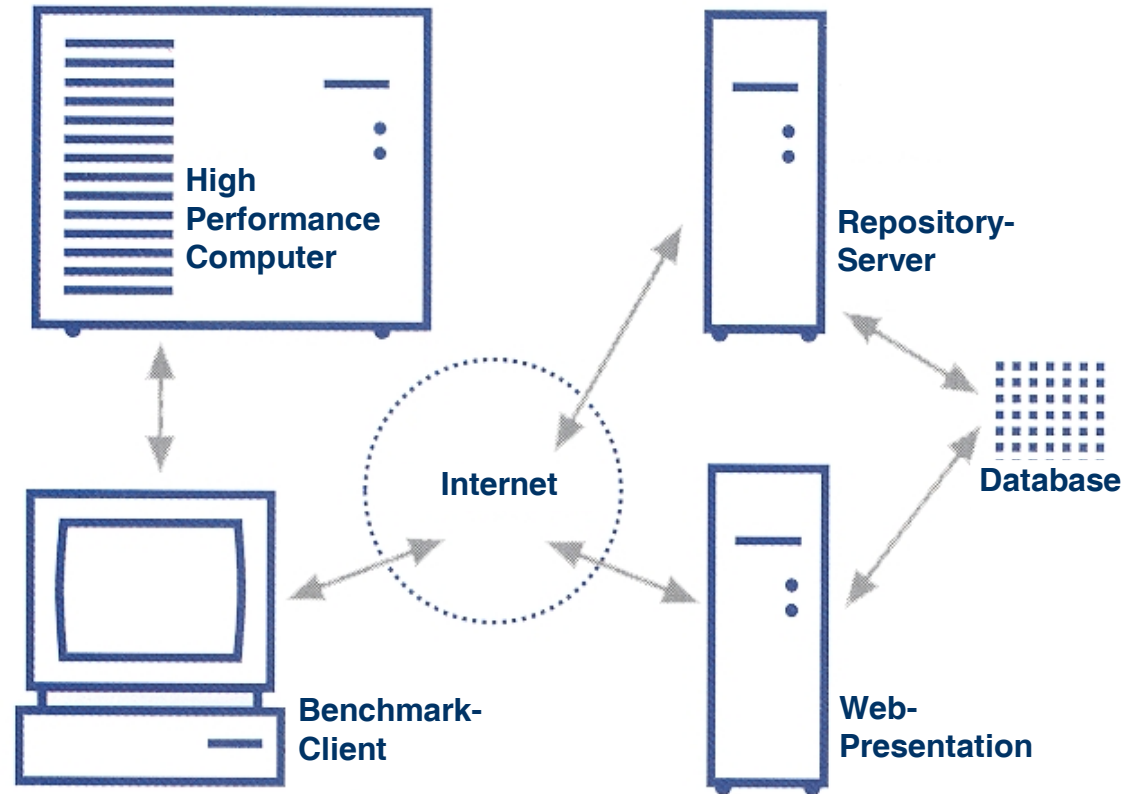
- Scalable, portable and realistic benchmarks for high performance computer (HPC)
- Low level benchmarks
- Application benchmarks
- Performance modeling and prediction
- Benchmark environment

Benchmark Process



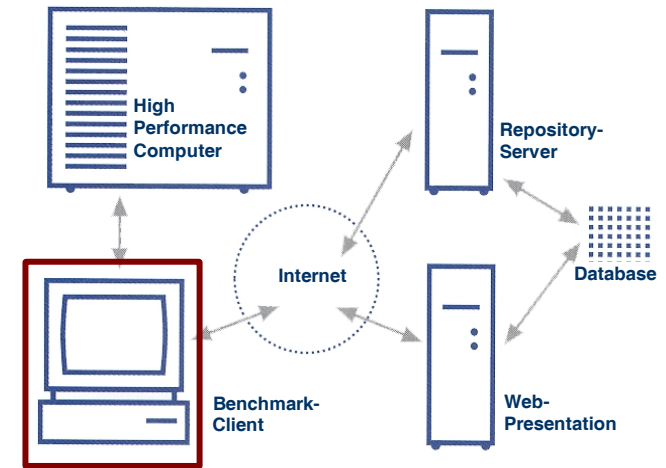
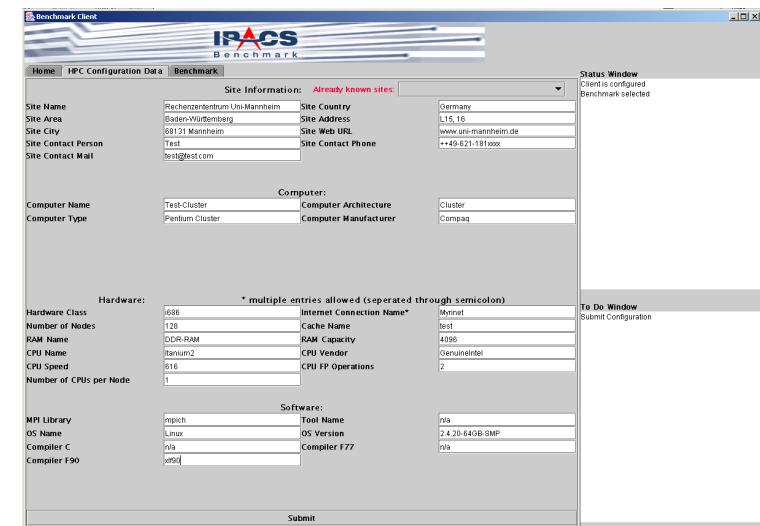


Software Architecture



Benchmark-Client:

- Tasks:
 - Provides essential configuration tasks
 - Auto detection of the current hard- and software environment of HPC
 - Download and execution of pre-configured benchmarks
 - Conversion and transmission of benchmark results

The screenshot shows the 'Benchmark Client' web interface. The main content area is titled 'Site Information' and contains the following fields:

Site Name	Rechenzentrum Uni Mannheim	Site Country	Germany
Site Area	Baden-Württemberg	Site Address	L15 16
Site City	68131 Mannheim	Site Web URL	www.uni-mannheim.de
Site Contact Person	Test	Site Contact Phone	+49 621 181 500
Site Contact Mail	test@test.com		

Below the site information, there are sections for 'Computer', 'Hardware', and 'Software' configuration:

Computer Name	Test-Cluster	Computer Architecture	Cluster
Computer Type	Pentium Cluster	Computer Manufacturer	Compaq

Hardware: * multiple entries allowed (separated through semicolon)

Hardware Class	i686	Internet Connection Name*	Myinet
Number of Nodes	128	Cache Name	test
RAM Name	DDR-RAM	RAM Capacity	4096
CPU Name	Pentium2	CPU Vendor	GenuineIntel
CPU Speed	616	CPU FP Operations	?
Number of CPUs per Node	1		

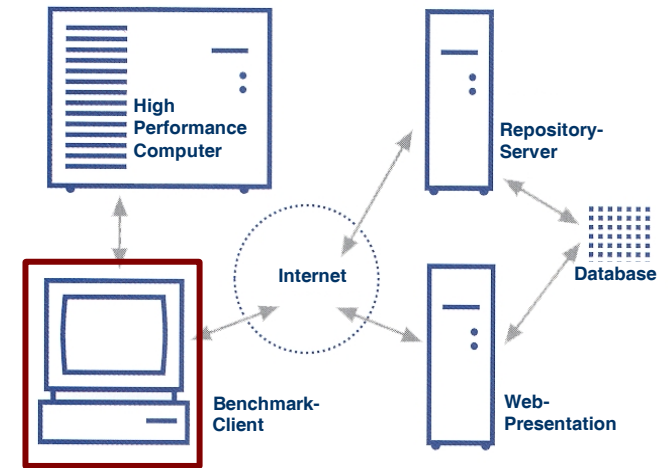
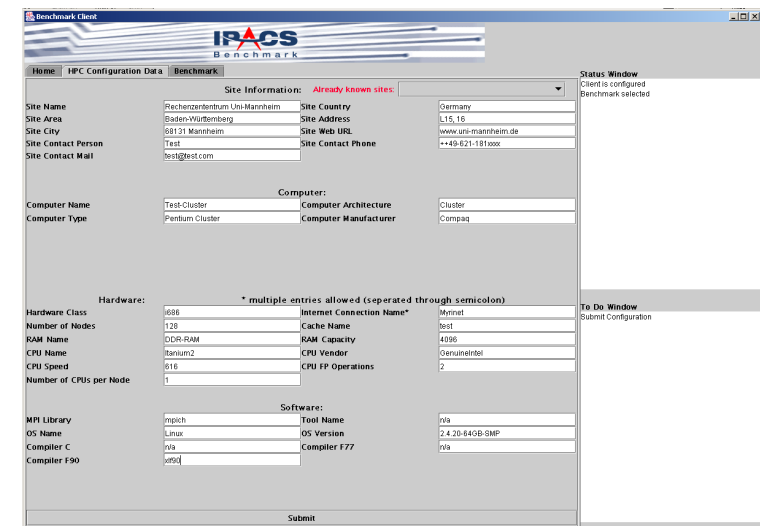
Software:

MPI Library	mpich	Tool Name	iva
OS Name	Linux	OS Version	2.4.20-640B-SMP
Compiler C	iva	Compiler F77	iva
Compiler F90	ivfc		

At the bottom of the form, there is a 'Submit' button. On the right side, there is a 'Status Window' showing 'Client is configured' and 'Benchmark selected', and a 'To Do Window' showing 'Submit Configuration'.

Benchmark-Client:

- Implementation:
 - Java (Portability)
 - Java Web Start
 - Data description XML
 - Communication via HTTP-Protocol

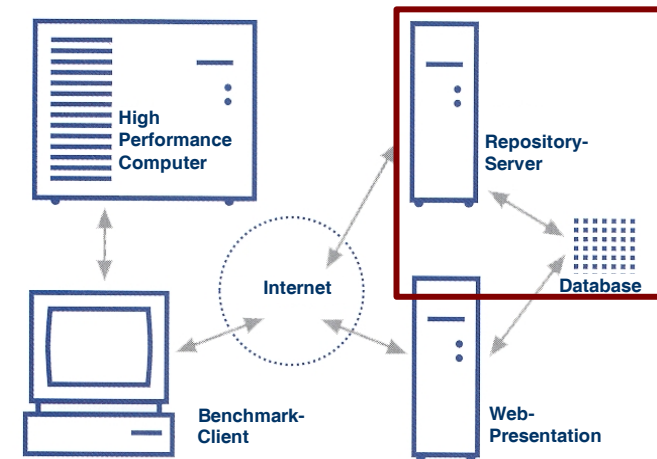
The screenshot shows the 'Benchmark Client' web interface with the following configuration data:

Site Information: Already known sites:		
Site Name	Rechenzentrum Uni Mannheim	Site Country: Germany
Site Area	Baden-Württemberg	Site Address: L15, 16
Site City	68131 Mannheim	Site Web URL: www.uni-mannheim.de
Site Contact Person	Test	Site Contact Phone: ++49-621-181100
Site Contact Mail	test@test.com	
Computer:		
Computer Name	Test-Cluster	Computer Architecture: Cluster
Computer Type	Pentium Cluster	Computer Manufacturer: Compaq
Hardware: * multiple entries allowed (seperated through semicolon)		
Hardware Class	i686	Internet Connection Name*: Myinet
Number of Nodes	128	Cache Name: test
RAM Name	DDR-RAM	RAM Capacity: 4096
CPU Name	Pentium2	CPU Vendor: GenuineIntel
CPU Speed	616	CPU FP Operations: ?
Number of CPUs per Node	1	
Software:		
MPI Library	mpich	Tool Name: iva
OS Name	Linux	OS Version: 2.4.20-64GB-SMP
Compiler C	iva	Compiler F77: iva
Compiler F90	gfort	

Buttons: Home, IPC Configuration Data, Benchmark, Status Window (Client is configured, Benchmark selected), To Do Window (Submit Configuration), Submit

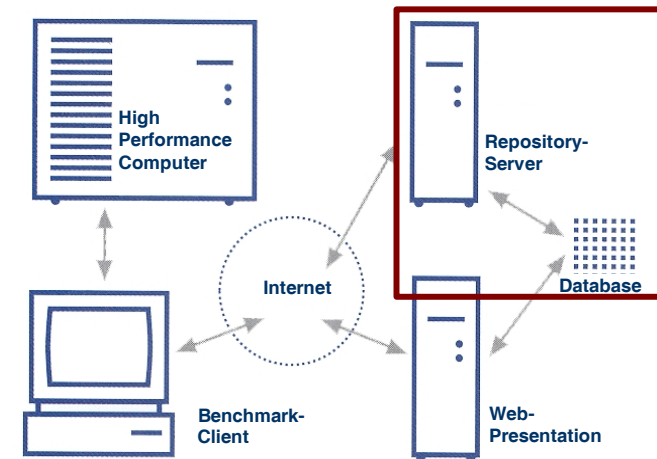
Repository Server:

- Tasks:
 - Contains benchmark files as source and binaries for a variety of architectures
 - Management of HPC-information (e.g. hard- and software configuration)
 - Offers appropriate, pre-configured benchmarks
 - Administration of benchmark-results



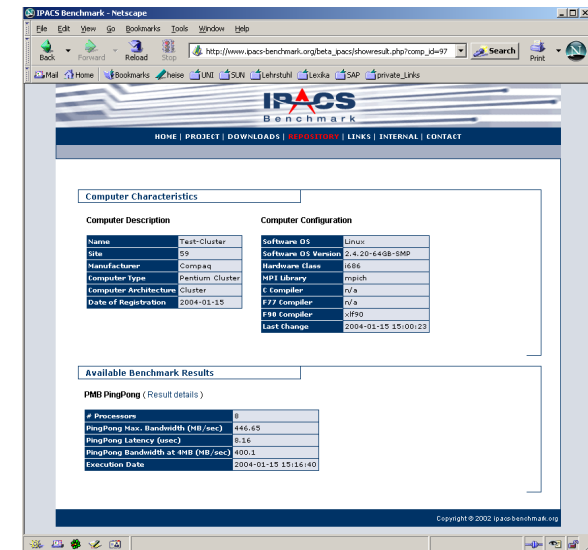
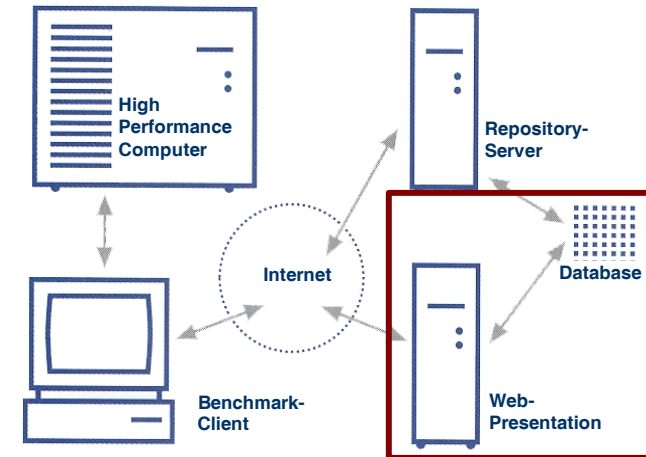
Repository Server:

- Implementation:
 - Servlet-Container accepts HTTP-Request
 - Java-Servlet
 - Parses XML-Data
 - Database access
 - Response
 - Flexible persistence layer



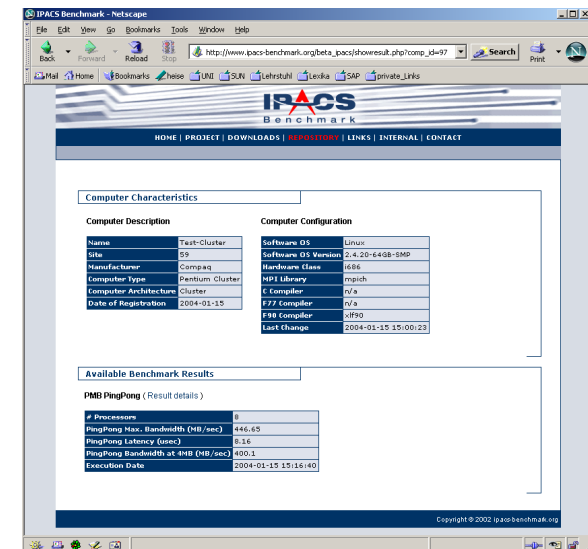
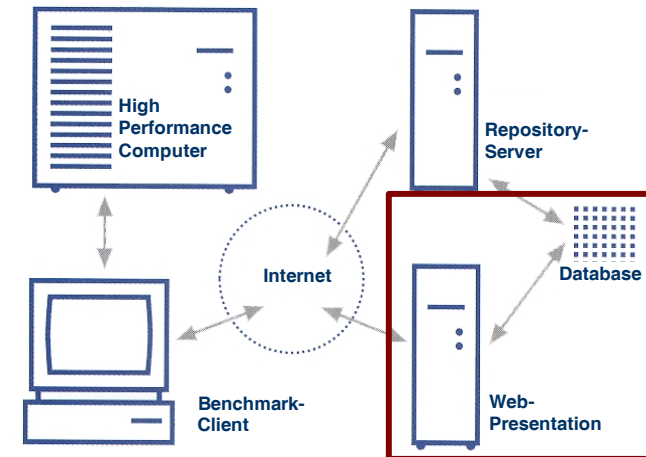
Web-Presentation:

- Tasks:
 - Project representation
 - Download (IPACS-Client, Benchmarks, etc.)
 - Just-in-time presentation of Benchmark results
 - Easy comparison of Benchmark results



Web-Presentation:

- Implementation:
 - Apache HTTP, PHP
 - No private comparison of benchmark-results
 - 3 levels of details



Conclusion

IPACS Software Architecture

- is a new step in the support of easy and efficient benchmarking
- is robust and simple to be deployed in a wide variety of heterogeneous environments
- provides an easily adaptable database design
- facilitates the benchmark community to compare and analysis their results just in time with other benchmark results

For more information please visit our web site

www.ipacs-benchmark.org