eTICS2
The Grid Quality Process

European Commission
Information Society and Media

INFSO-RI-223782

Multi-Node Testing and Dynamic Virtual Machine Loading with ETICS

EGEE 09

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CERN

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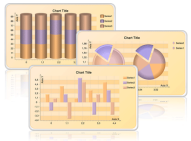
ETICS Overview

The ETICS System

- Continuous software **build, test** and **QA** verification system



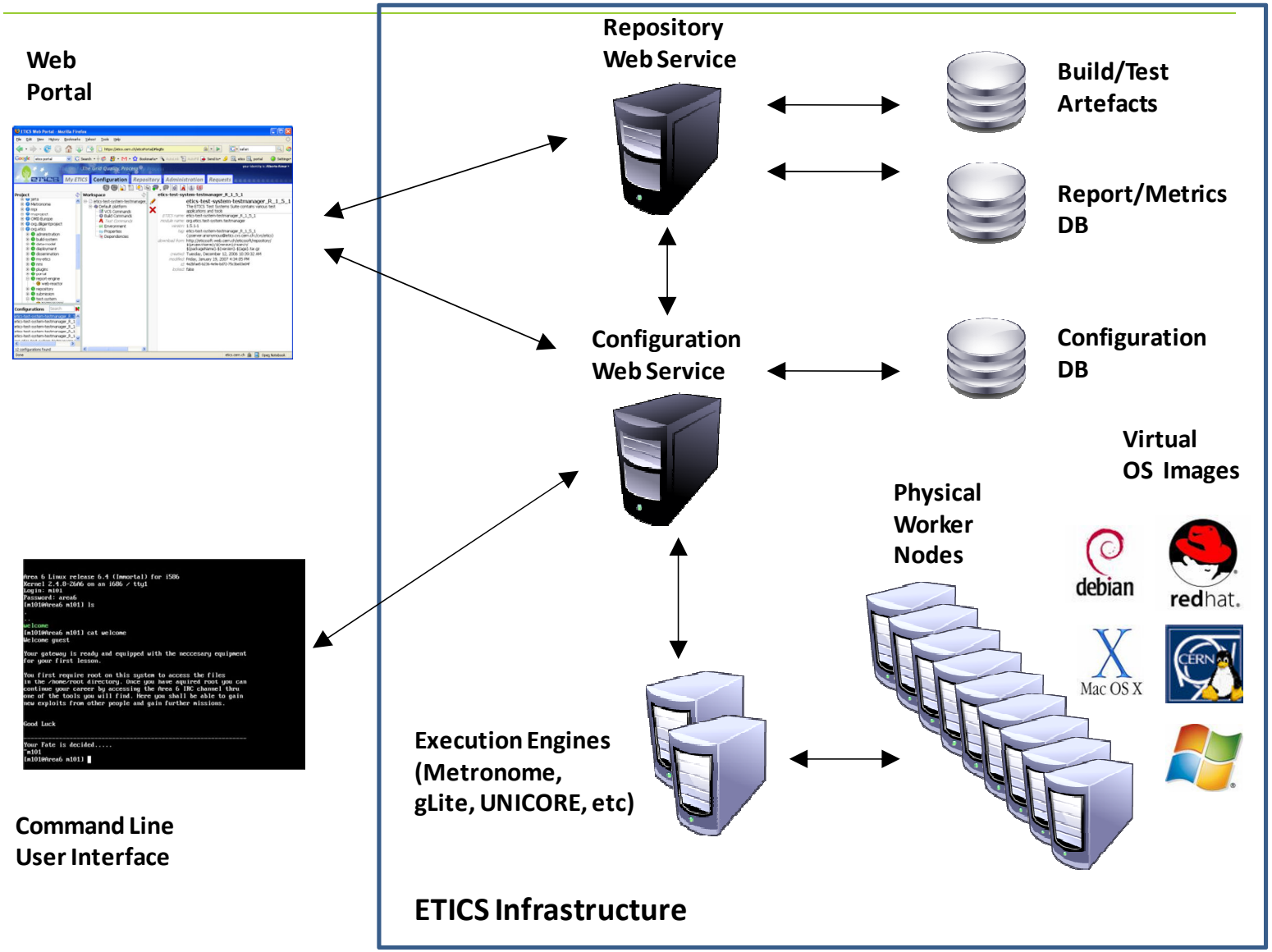
- Easily **extensible** with additional **plugins**
- **Scheduled** or **on-demand** build and test jobs

- **User** computers or **remote** distributed infrastructures
- Built-in **connectors** to distribute build and test jobs on different types of infrastructures from standard job management systems to the grid

- Open **repository** of configuration metadata, packages and build, test and QA reports
- Support for standard **package management** systems like **YUM**

- It's **multi-platform** and **independent** from any specific language, build or test tool

Architecture

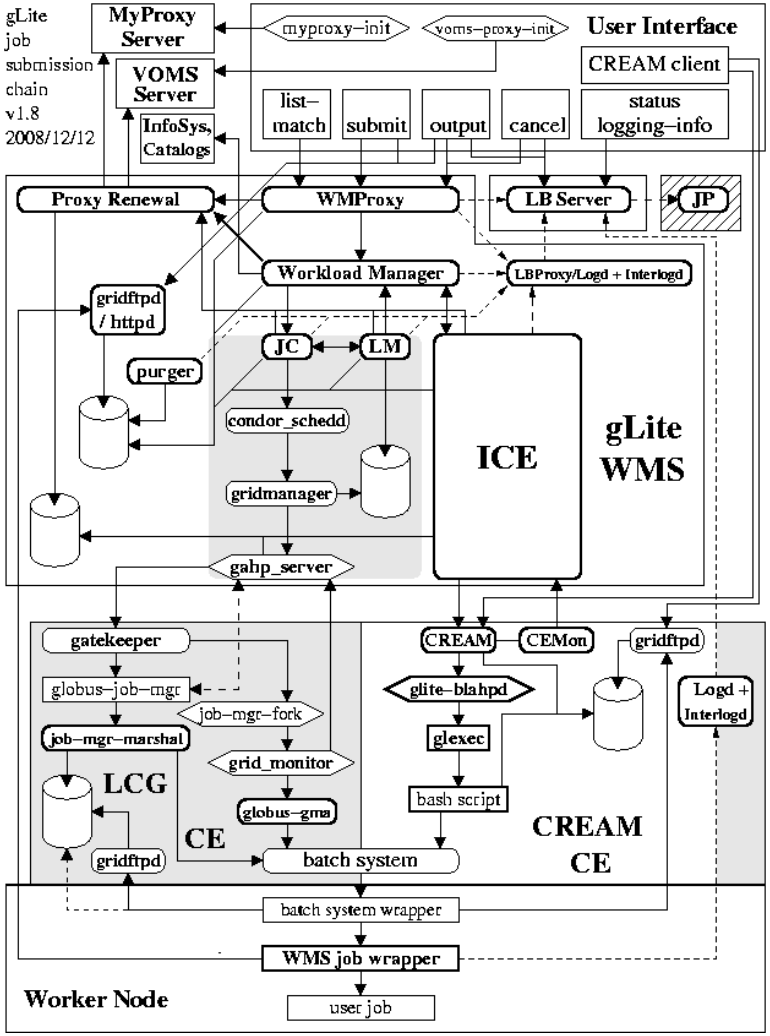


Multi Node

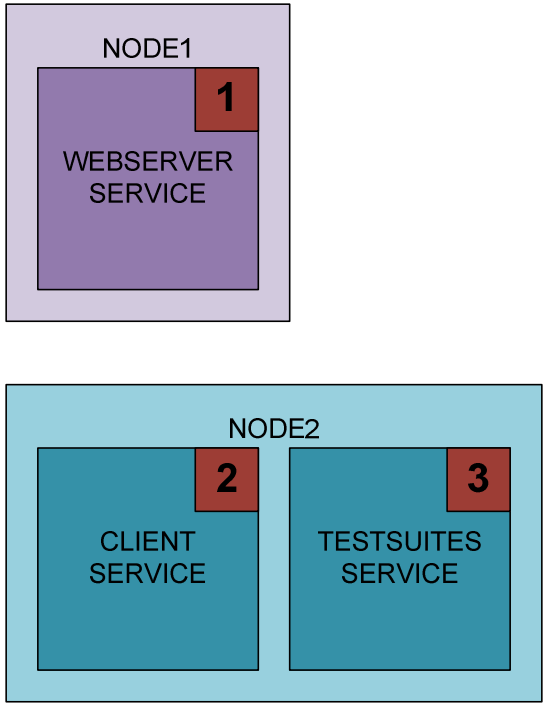
Multi-Node

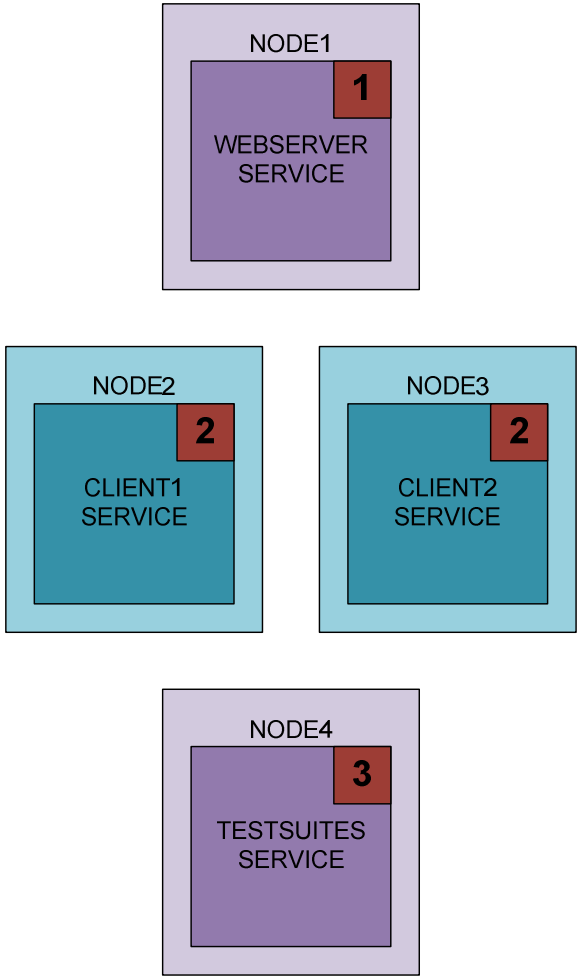
The ability to setup scenarios where multiple services are **automatically deployed** in **multiple nodes**.

These services must be able to **work properly** as if they would be installed manually by a user performing **any required operation** in the **required order**.

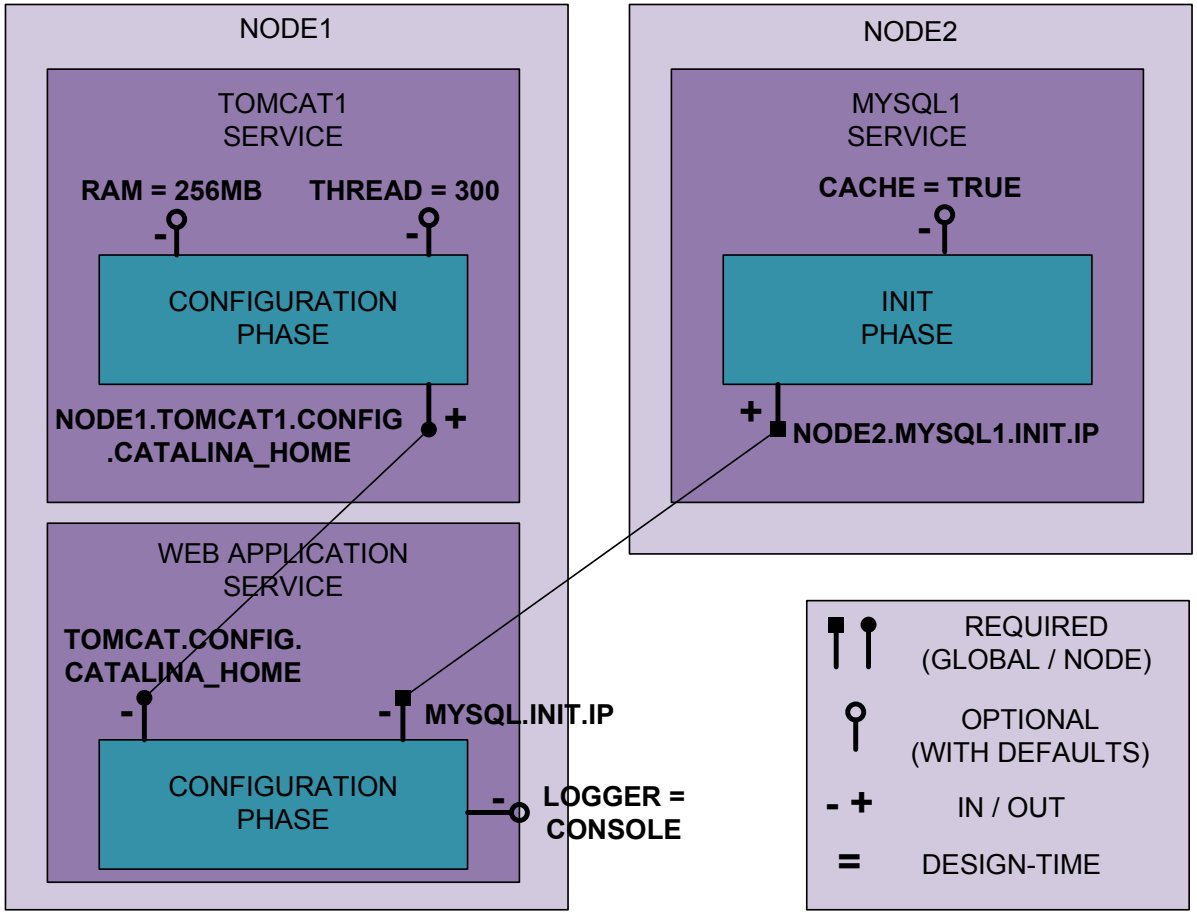


Issues
Service Synchronization

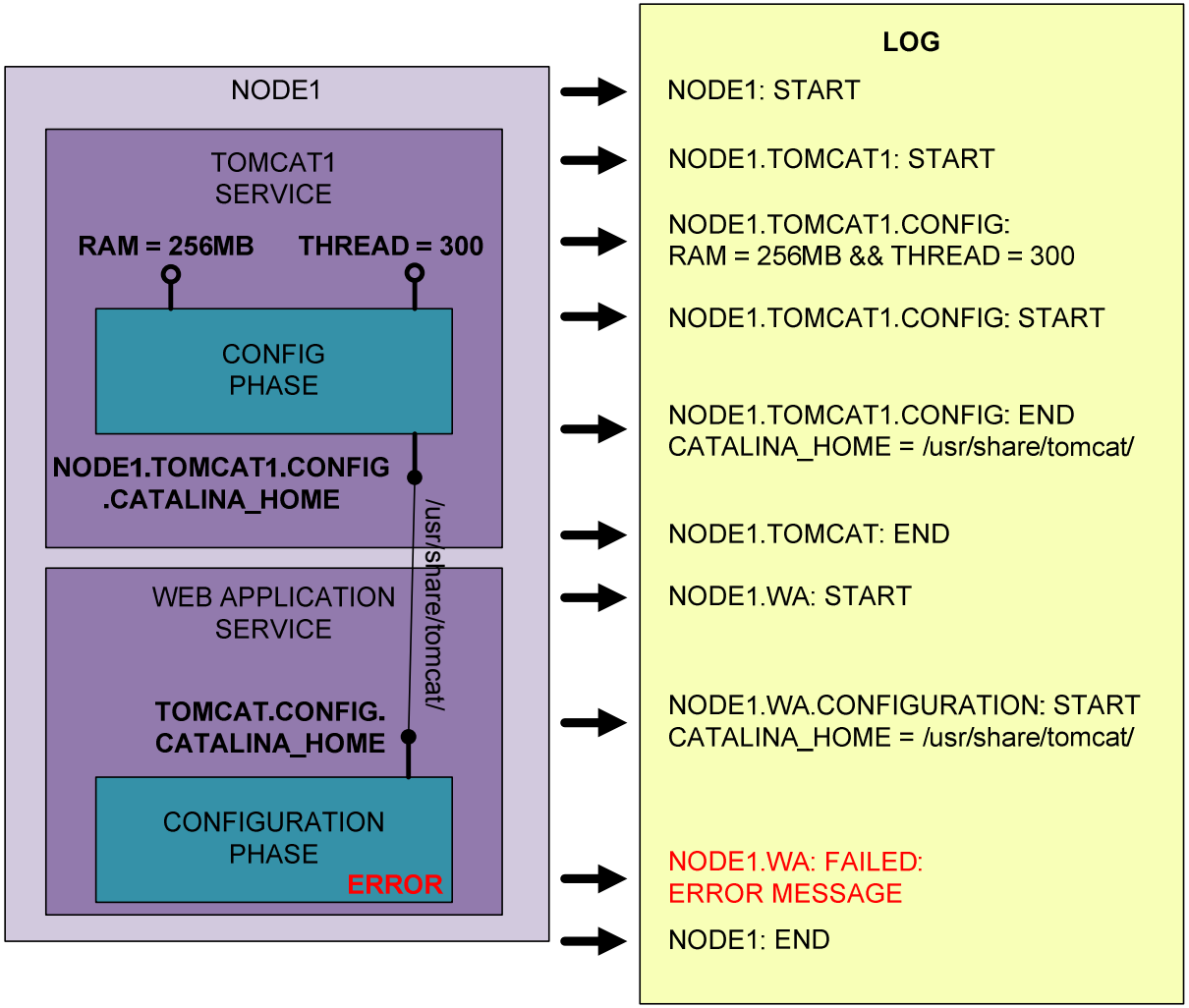




Issues
Information Interchange

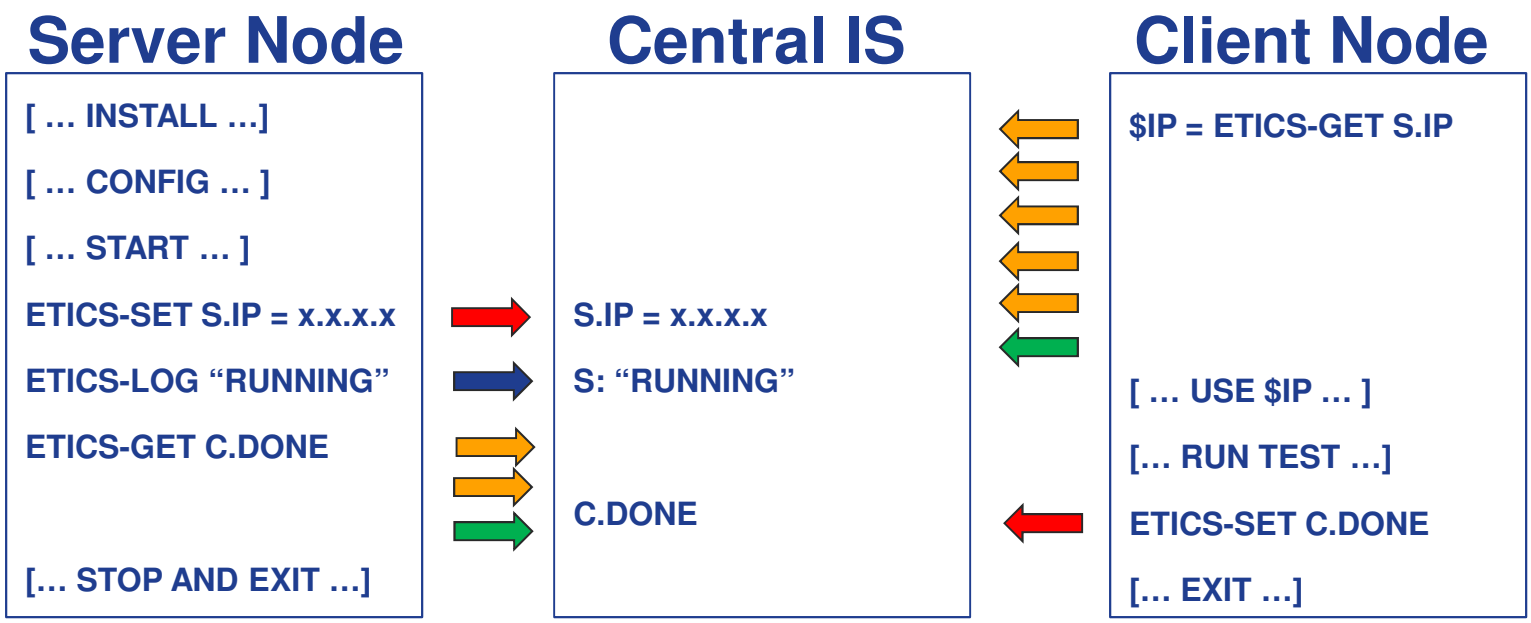


Issues: Flow Monitoring



The ETICS Solution

- **ETICS-SET** is used to publish **key-value pairs** or only **keys** to the central information system in order to make the information available to all the other nodes, services or phases.
- **ETICS-GET** is used to get (**blocking** or **not-blocking**) the information published by some local or remote execution of ETICS-SET.
- **ETICS-LOG** is used to **log** and for real-time **monitoring**.



The PING Example (1/3)

The PING Example (2/3)

Submissions | Configuration | Repository | QA | TestSystem | Requests

Workspace

- My Workspace
  - etics-multi-node-test_R_1_0_0_1
    - etics-multi-node-client_R_1_0_0_1
      - Default platform
        - Test Commands
        - Properties
        - Environment
        - Deployed Software
    - etics-multi-node-server_R_1_0_0_1
      - Default platform
        - Test Commands
        - Properties
        - Environment
        - Deployed Software

Submit Remote Test for 'etics-multi-node-test_R_1_0_0_1'

General — more options »

logging: ☐ verbose

Checkout — more options »

environment: ☐ Propagate environment and properties from myconfig_UNITTEST

checkout: ☐ Use custom checkout behaviour: possibly build from binary

Test Execution — more options »

execution: ☐ Do not stop on errors

Host — more options »

host selection:
- CERN Scientific Linux 3 (ia32) with gcc 3.2.3
- CERN Scientific Linux 4 (ia32) with gcc 3.4.6
- CERN Scientific Linux 4 (x86_64) with gcc 3.4.6
- Debian Linux 4.0 (ia32) with gcc 4.1.2
- Debian Linux 4.0 (x86_64) with gcc 4.1.2

Submission Parameters — more parameters »

platforms: slc4_ia32_gcc346,

checkoutOptions: --config "etics-multi-node-test_R_1_0_0_1" --forcecheckout

submitOptions: --config "etics-multi-node-test_R_1_0_0_1" --target postpublish

requirements:

Run Results

ID	Result	User	Type	Project	Comp	Start	Duration	Description	Platforms	Archive
33022	Running	Guest User	TEST	org.etics.testsuites	org.etics.testsuites.multi-node.server	Sep-21-2009 13:31 UTC+0	In Progress	ETICS Multi-node server test (1.0.0)	nmi:x86_slc_4	
33021	Running	Guest User	TEST	org.etics.testsuites	org.etics.testsuites.multi-node.client	Sep-21-2009 13:31 UTC+0	In Progress	ETICS Multi-node client test (1.0.0)	nmi:x86_slc_4	

The PING Example (3/3)

CLIENT

```
NMI_user_notify=guest.user@nowhere.org
NMI_version=etics-multi-node-client_R_1_0_0_1
NMI_version_id=dabbd3ee-8825-4d09-a4ba-d225b1fa9078
PATH=/home/condor/execute/dir_24403/userdir/etics/bin:/home/condor/execute/dir_24403/userdir/etics/src:/home/condor/execute/dir_24
PWD=/home/condor/execute/dir_24403/userdir/org.etics.testsuites.multi-node.client
PYTHONPATH=.:/home/condor/execute/dir_24403/userdir/etics/bin:/home/condor/execute/dir_24403/userdir/etics/lib/python2.3/site-packa
09/21/09 15:36:12.251 INFO main [write] - on/xml/dom:/home/condor/execute/dir_24403/userdir/etics/repository/externals/log4py/1.3.0
SHLVL=3
USER=nobody
_=/bin/env
09/21/09 15:36:12.355 INFO main [write] - [test]: export SERVERIP=`etics-get -b SERVER-IP`; ping $SERVERIP

09/21/09 15:36:12.356 INFO main [_systemCall] - Calling system command: export SERVERIP=`etics-get -b SERVER-IP`; ping $SERVERIP
09/21/09 15:36:14.601 ERROR main [write] - Waiting for SERVER-IP
09/21/09 15:36:20.386 INFO main [write] - PING lxetvm0098.cern.ch (128.142.130.132) 56(84) bytes of data.
64 bytes from lxetvm0098.cern.ch (128.142.130.132): icmp_seq=0 ttl=64 time=0.418 ms
09/21/09 15:36:21.389 INFO main [write] - 64 bytes from lxetvm0098.cern.ch (128.142.130.132): icmp_seq=1 ttl=64 time=0.076 ms
09/21/09 15:36:22.390 INFO main [write] - 64 bytes from lxetvm0098.cern.ch (128.142.130.132): icmp_seq=2 ttl=64 time=0.037 ms
09/21/09 15:36:23.394 INFO main [write] - 64 bytes from lxetvm0098.cern.ch (128.142.130.132): icmp_seq=3 ttl=64 time=0.034 ms
```

SERVER

```
NMI_version=etics-multi-node-server_R_1_0_0_1
NMI_version_id=d5406c74-5de5-4ce5-96e2-5967b6982567
PATH=/home/condor/execute/dir_24530/userdir/etics/bin:/home/condor/execute/dir_24530/userdir/etics/src:/home/condor/execute/
PWD=/home/condor/execute/dir_24530/userdir/org.etics.testsuites.multi-node.server
PYTHONPATH=.:/home/condor/execute/dir_24530/userdir/etics/bin:/home/condor/execute/dir_24530/userdir/etics/lib/python2.3/sit
09/21/09 15:36:14.047 INFO main [write] - on/xml/dom:/home/condor/execute/dir_24530/userdir/etics/repository/externals/log4p
SHLVL=3
USER=nobody
_NMI_TASKNAME=remote_task
09/21/09 15:36:14.150 INFO main [write] - [test]: etics-set SERVER-IP "`hostname`"

09/21/09 15:36:14.151 INFO main [_systemCall] - Calling system command: etics-set SERVER-IP "`hostname`"
09/21/09 15:36:16.200 INFO main [write] - Done!
09/21/09 15:36:16.309 INFO main [write] - [publish]: Running ETICS Publisher
```

Challenges

- **Deployment automation** in the context of complex software development is a **prerequisite** for **automatic system testing**
- **Complexity** of service configuration
  - Developers should provide deployable configurations, or
  - Parameterised configurations
- **External dependencies**: all dependencies must be **deployable** automatically
  - Knowledge of these “external” components is not necessarily with the end-user
- **Privileged** deployment/configuration operations
  - **Root** / Super User actions
  - Mix of normal user-level and root level actions

Benefits

Automation of **complex processes**

Automatic setup of **complex environment**

Automatic generation of **reports**

Save on resources and time

- More scenarios can be explored
- **Less human errors**

Form the foundation for more **advanced system tests**

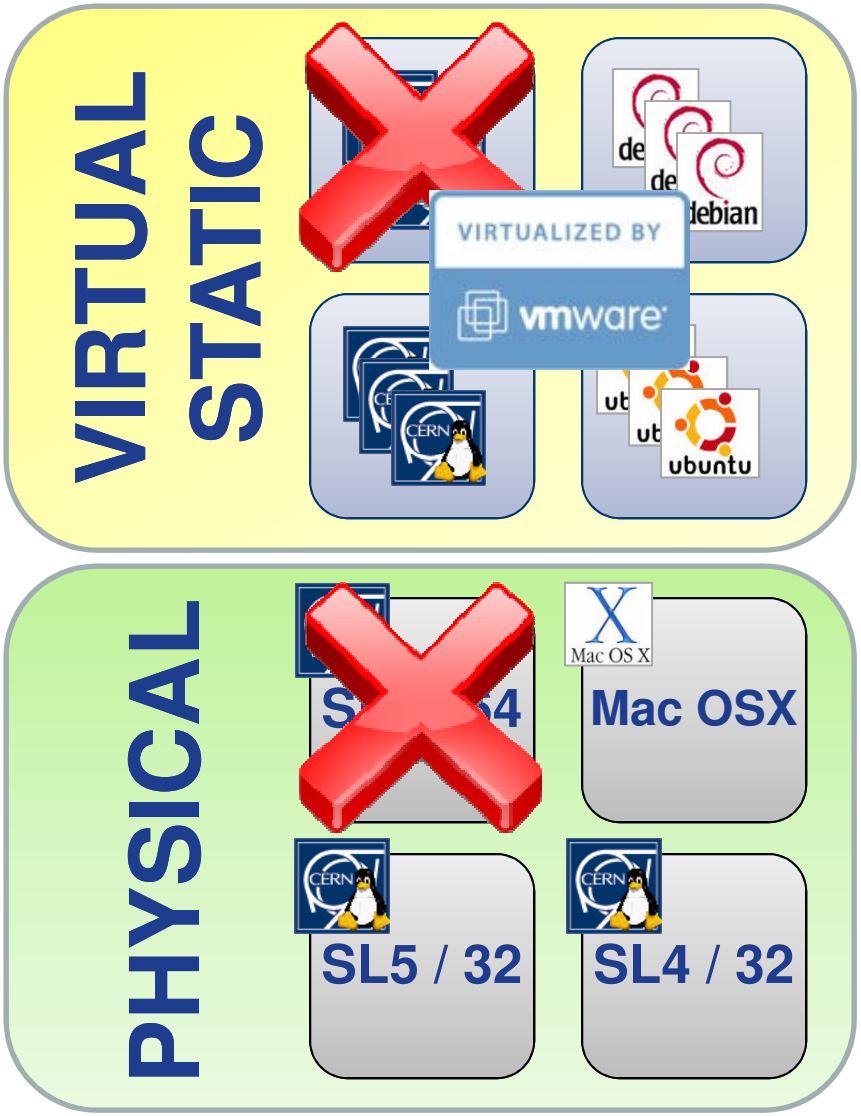
VMLoader

On-Demand Dynamic Virtualization Manager

ETICS Infrastructure - Static Platforms

The composition of the pool is **fixed**

The Job is **queued** even though there are **IDLE WNs**



ETICS Infrastructure - Static Platforms

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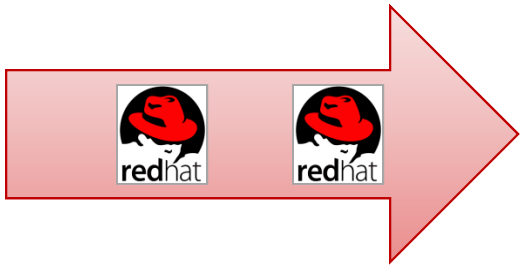
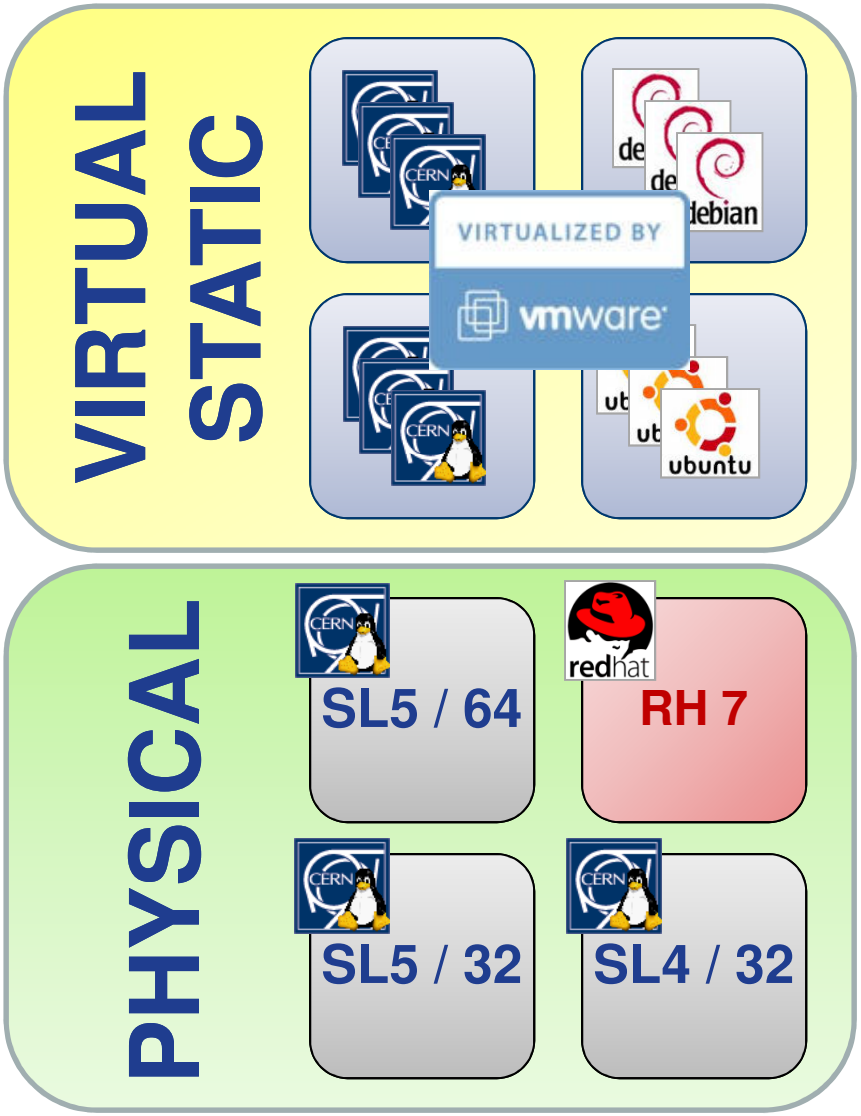
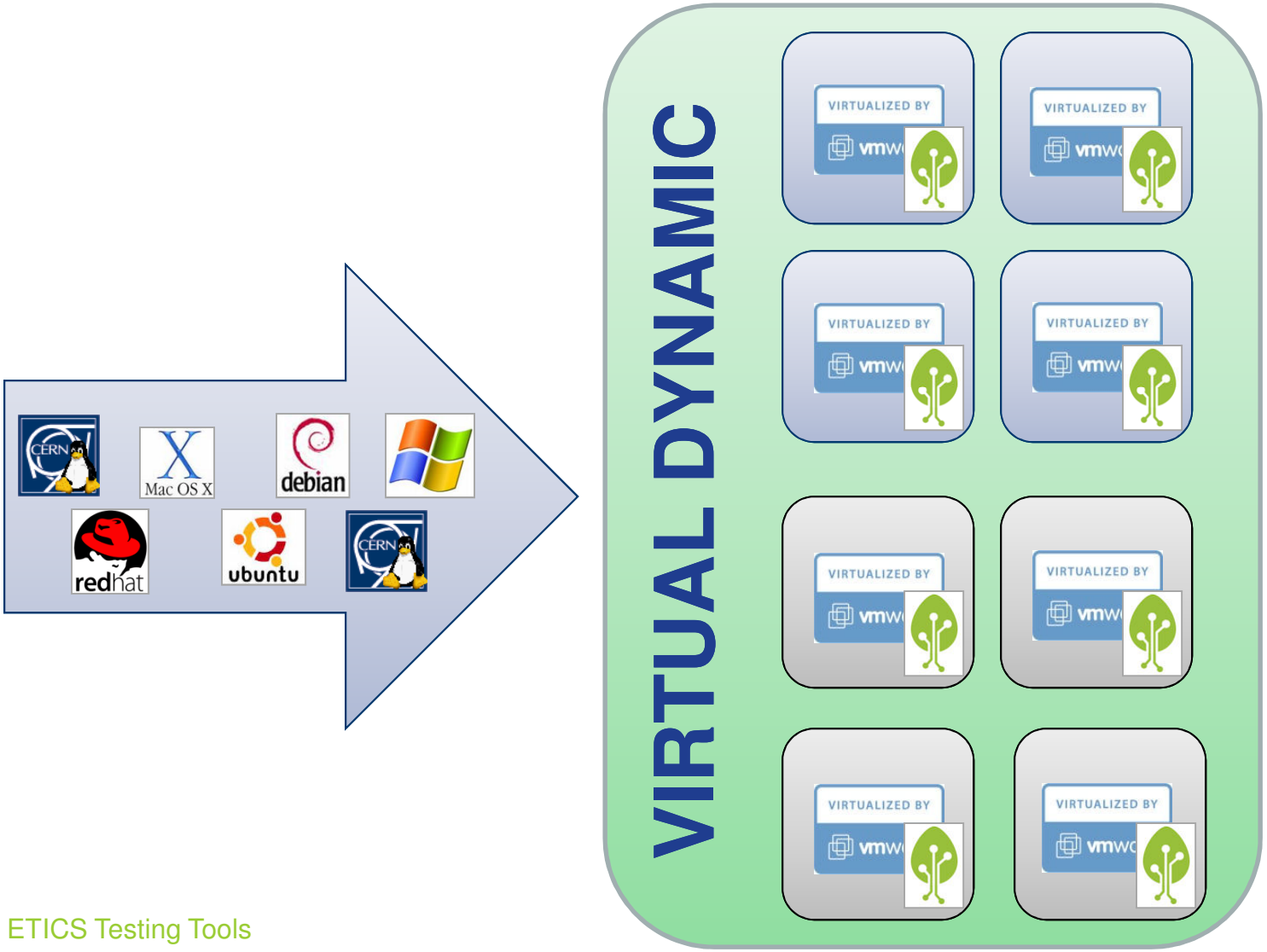


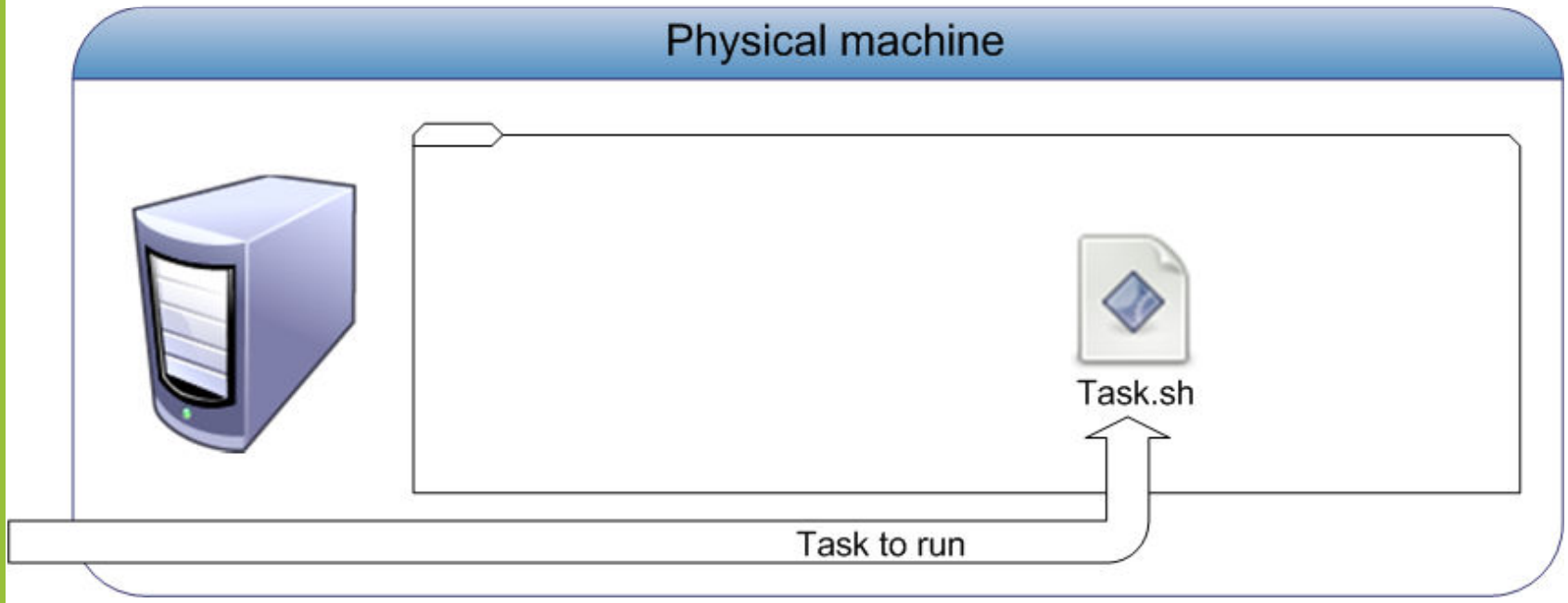
Rarely used platforms are **IDLE** most of the time



Dynamic Loaded Platforms



Deploying the ETICS VMLoader



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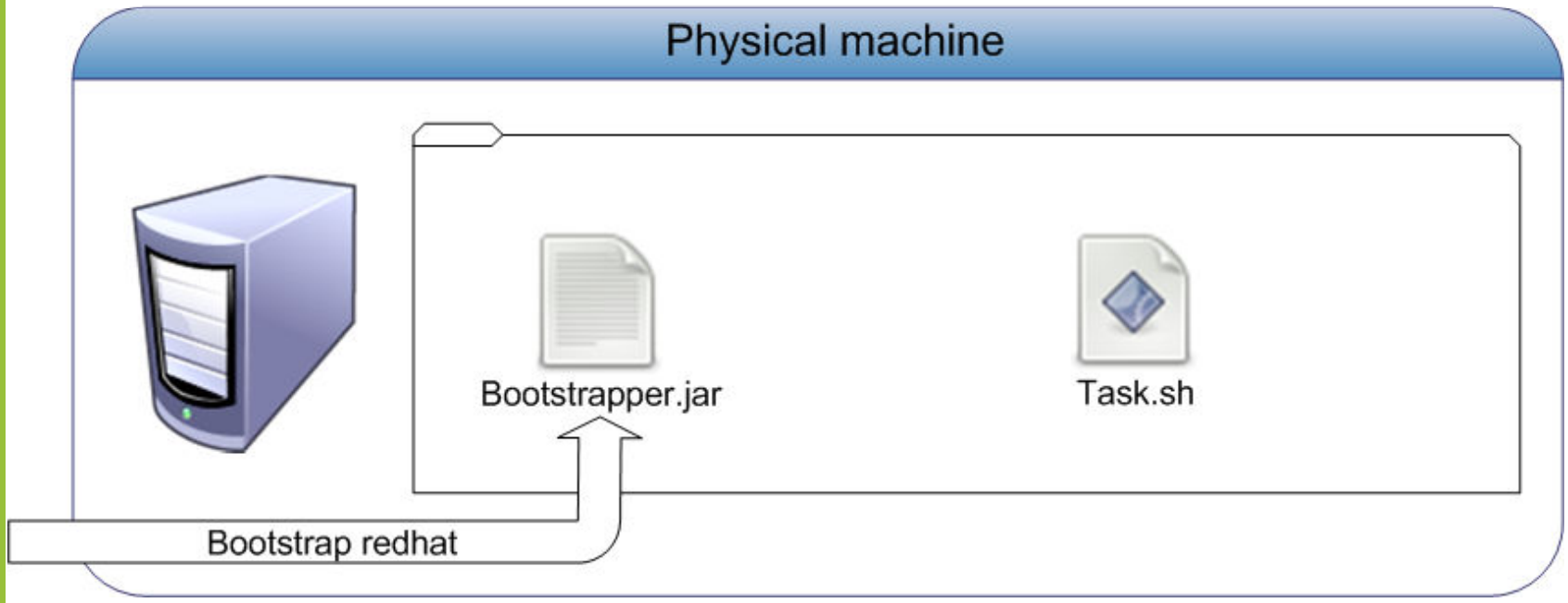

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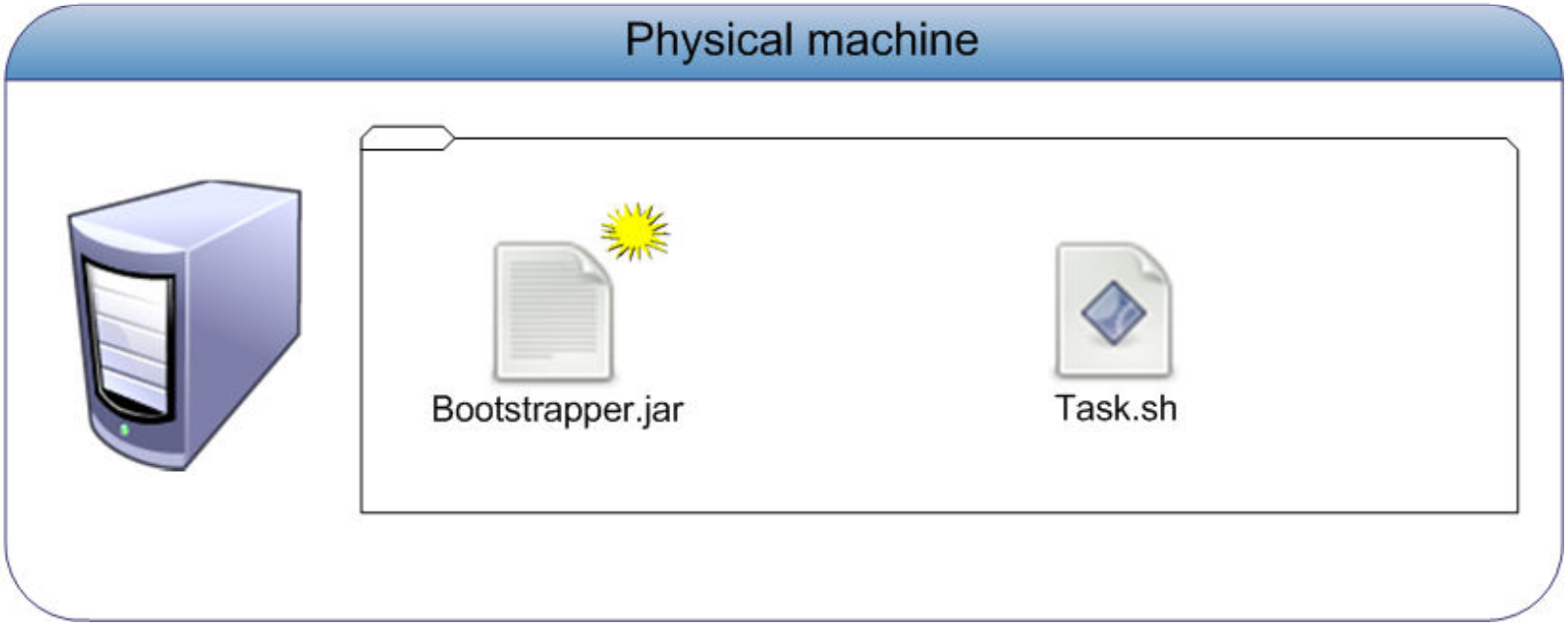

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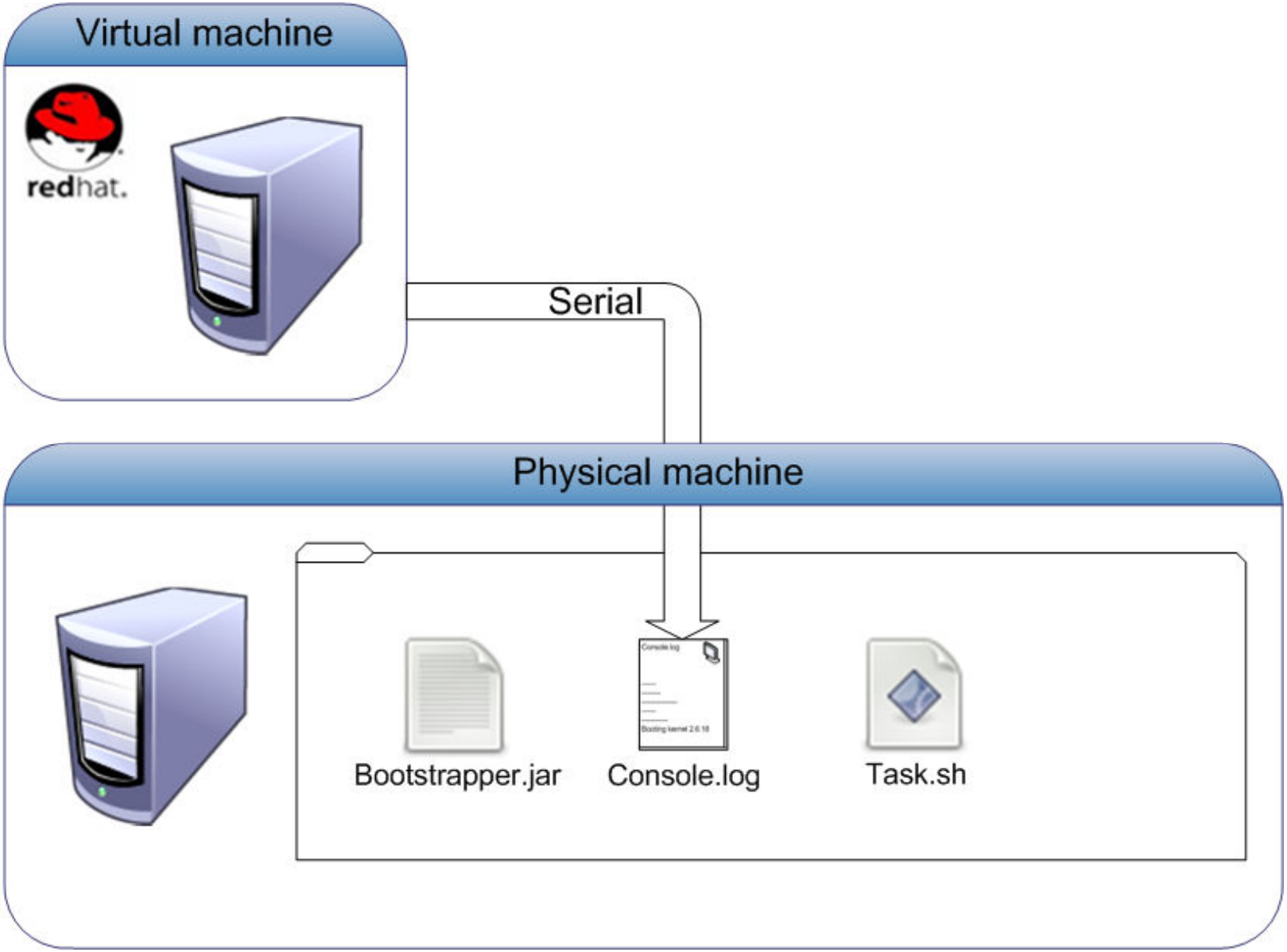
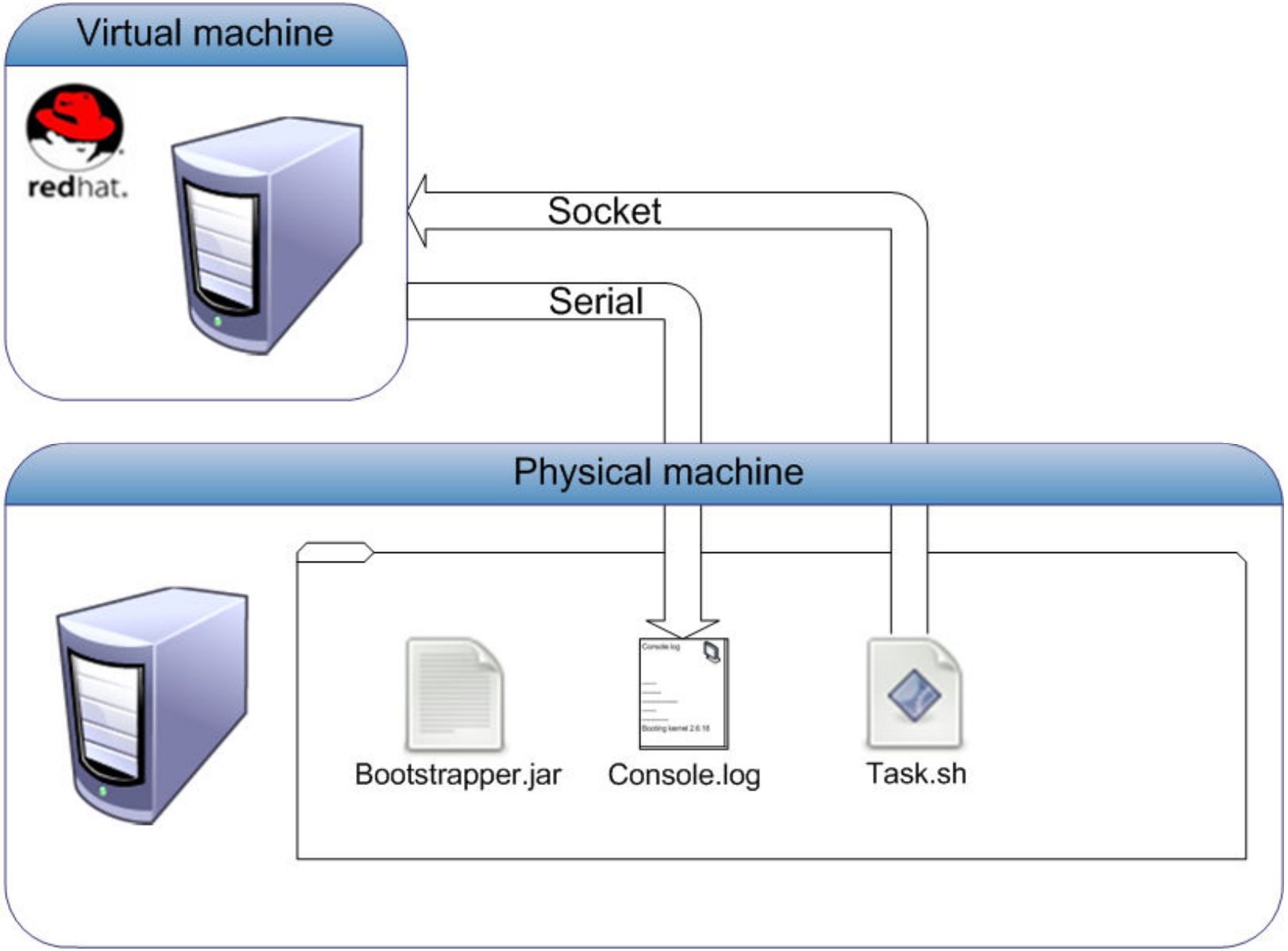


Deploying the ETICS VMLoader



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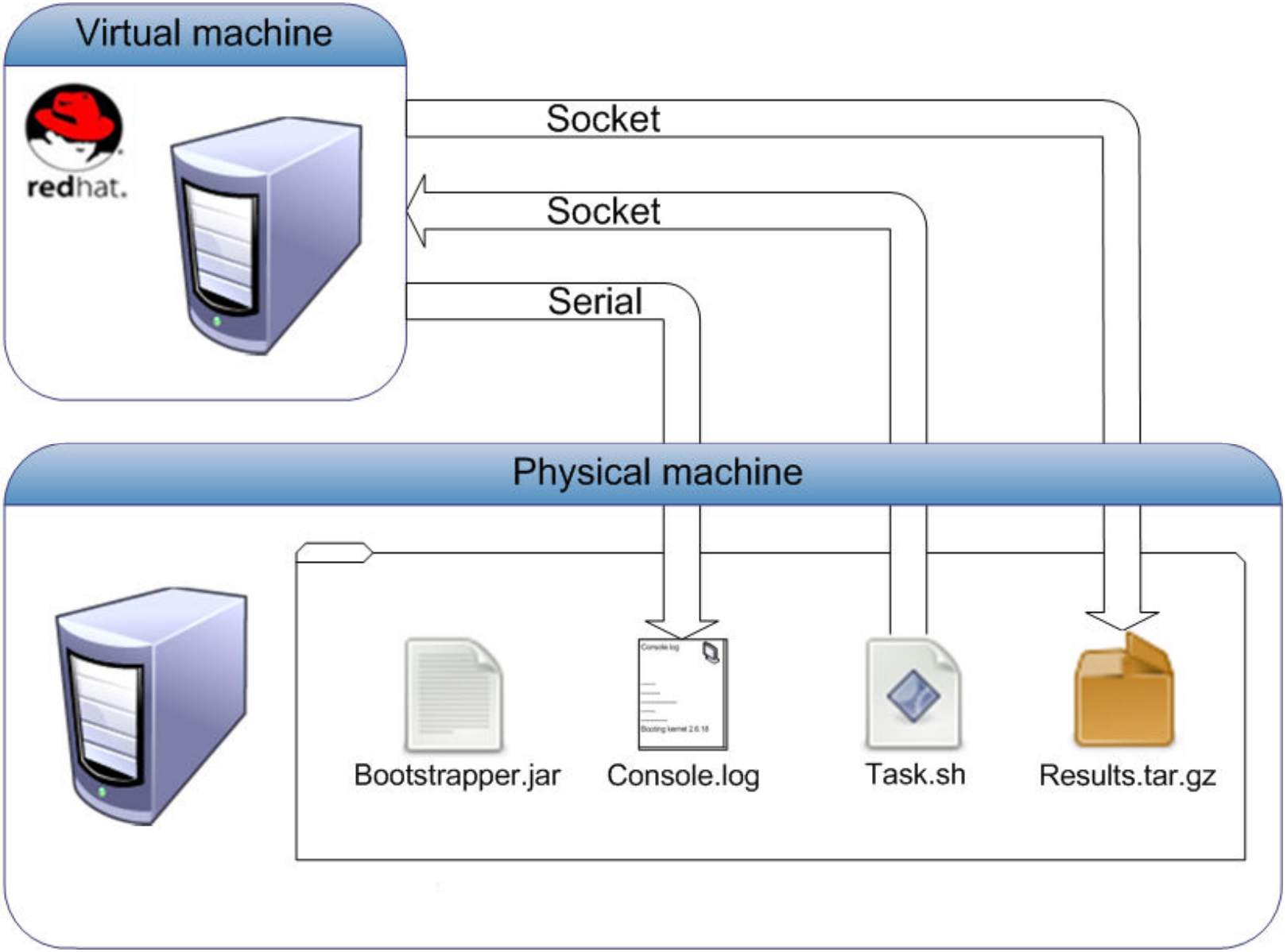
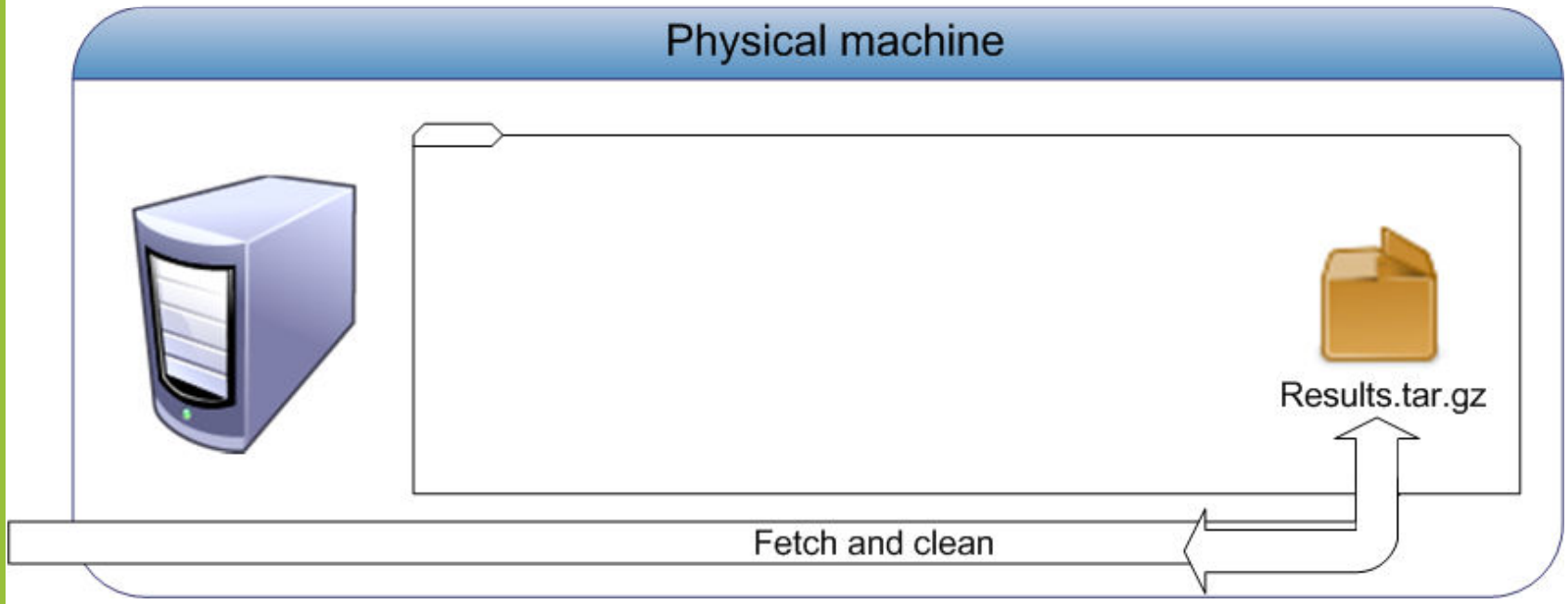
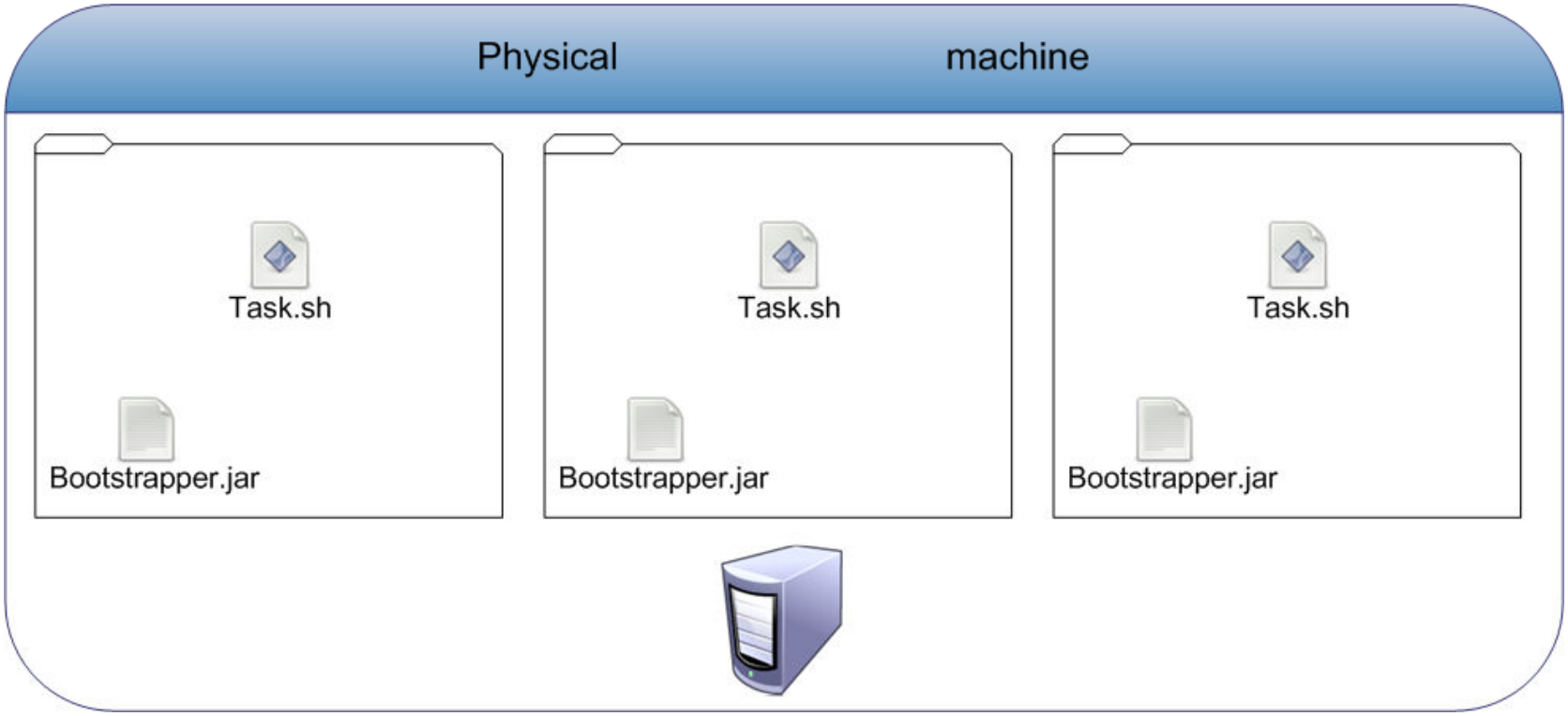


Deploying the ETICS VMLoader



Deploying multiple virtual machines on the same node



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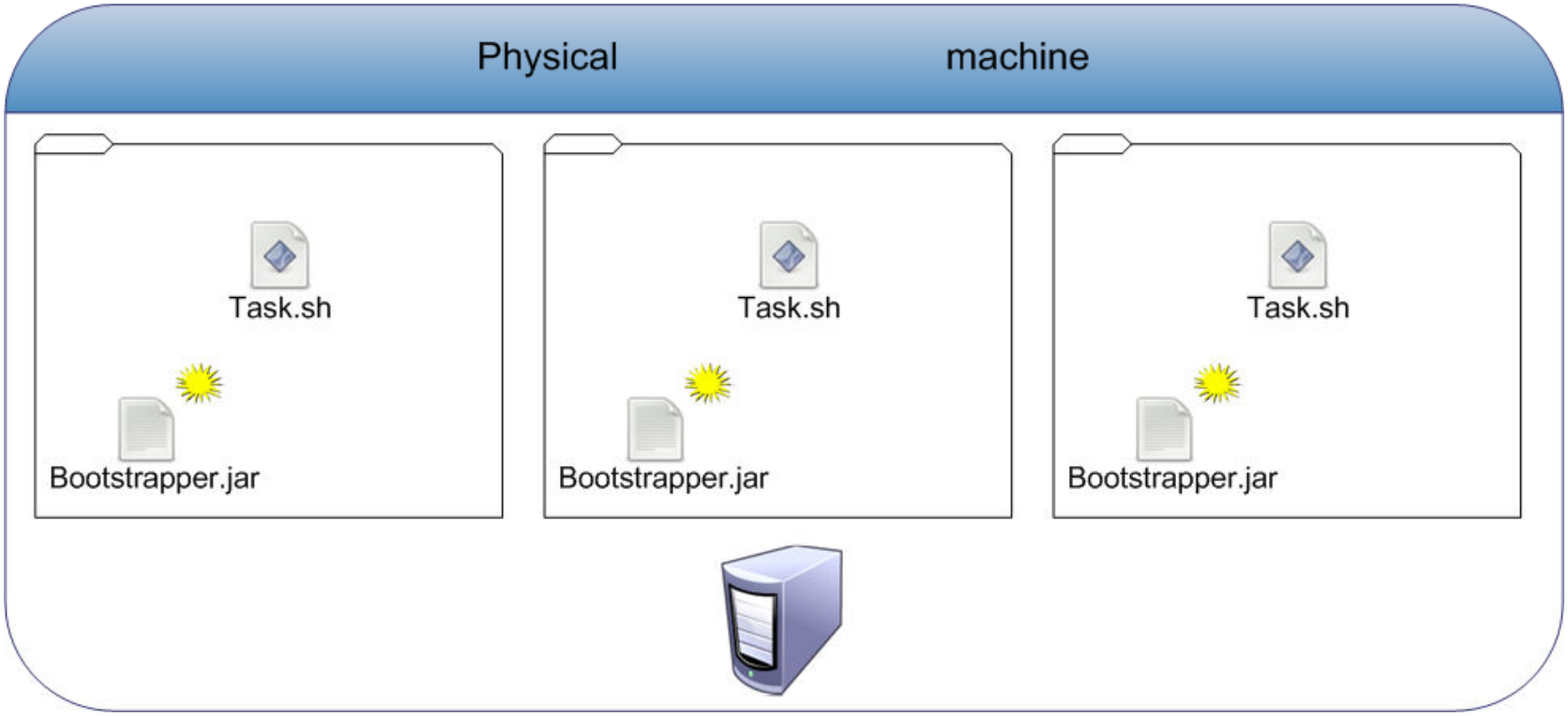

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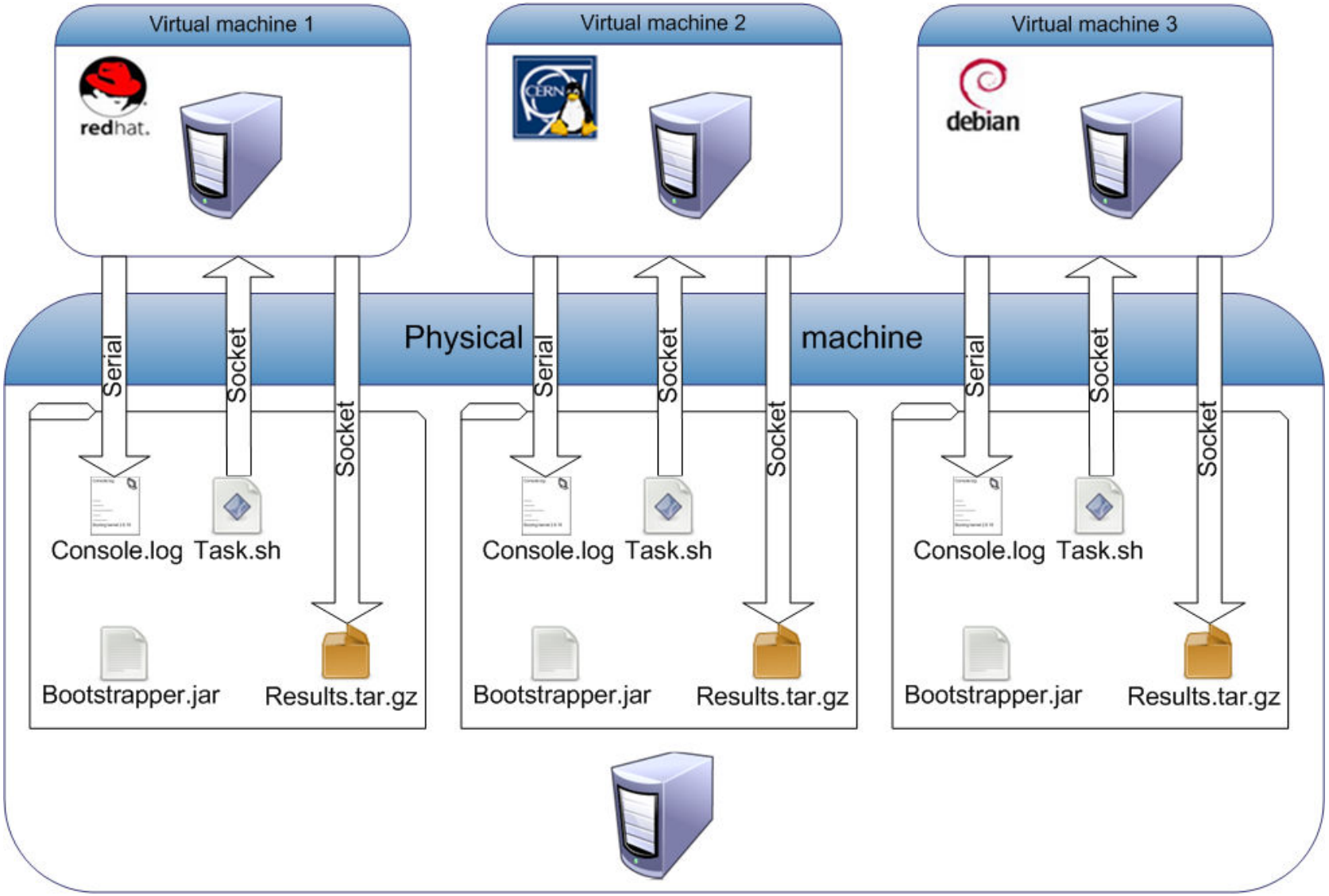

Benefits

- Increase **availability** and **capability**
- **Reduce maintenance**
- Offer **privileged access** (VM, not the host)
- Enable post build analysis (VM **snapshots**)
- Virtual machine image **customization**
- Provide **reproducible** environments

Benefits: Local Testing

- **Developers** can **test** locally
- Testing on **multiple** platforms
- **Official platforms** made available
- Provide **reproducible** environments
- Virtual Machines can be provided with **already installed and running** software

Thanks!

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http://www.eticsproject.eu