

UniHUB

OpenStack

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2D 3D
, .)

OpenStack

: web-

1.

web-

[1]. Web-

(. .)

1.

web-

web-

web-

2.

web-

3.

4.

web-

web-

5.

6.

7.

web-

2

web-

3

UniHUB.

UniHUB

web-

2.

web-

(

service

(Platform as a Service

(Infrastructure as a service

IaaS),

PaaS),

(Software as a

IaaS

CPU,

CPU,

PaaS

SaaS

[2].

web-

1.

web-

web-

web-

2.1.

web-

web-

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web-

(
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:

web-

web-

1.

web-

2.

3.

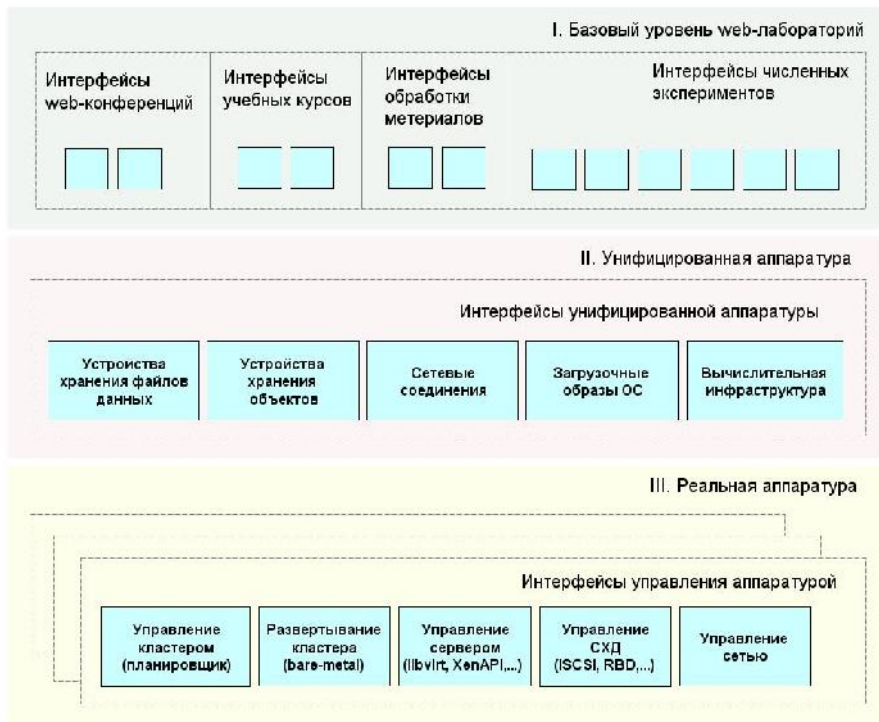
web-

4.

5.

6.

web-



1. Web-

web-

web-

web-

, web-

2.2.

web-

IaaS

metal").

bare-metal

$$D_{INF} = D_S | D_{SN} | D$$

D_S - , D_{SN} - , D_C - ,

$$D_S = \langle D_{HW}, D_{OS} \rangle ,$$

D_{HW} -
 D_{OS} -

$$D_{HW} = \langle N_{CORE}, RAM, T_A, N_{ACC}, HDD, D_{HDD} \rangle ,$$

N_{CORE} -
 RAM - ()
 T_A - (NVIDIA® Kepler, Intel® Xeon Phi)
 N_{ACC} -
 HDD -
 D_{HDD} -

$$D_{HDD} = \langle S_{HDD}, T_{HDD} \rangle ,$$

S_{HDD} -
 T_{HDD} - (Regular, Fast)

:

$$D_{OS} = \langle ISA, T_{OS}, V_{OS}, T_{ENV} \rangle ,$$

ISA - (x86, x86-64, PowerPC, ARM)

T_{OS} - : Linux, Windows

V_{OS} -

T_{ENV} - (Red Hat Enterprise Linux, Windows Server, Windows 7, SUSE Linux Enterprise, Ubuntu Linux, Fedora Linux, Gentoo Linux, Debian, CentOS)

$$D_{SN} = \langle L_{DS}, T_{NIC} \rangle ,$$

L_{DS} -

T_{NIC} - (GigE, Ethernet 10G)

:

$$D_S^{control} = \langle D_S^1, T_{MPI}, T_{PBS} \rangle$$

$$D_S^{comp} = \langle D_S^2, T_{MPI}, T_{PBS} \rangle,$$

D_S^1, D_S^2 –

T_{MPI} – (OpenMPI, MVAPICH, MPICH)

T_{PBS} – (TORQUE, SLURM, LSF, MOAB)

:

$$D = \langle D_S^{control}, D_S^{comp}, N_{max}^{comp} \rangle,$$

$D_S^{control}$ –

D_S^{comp} –

N_{max}^{comp} –

2.3.

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– ;

– ;

(;) ;

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3.

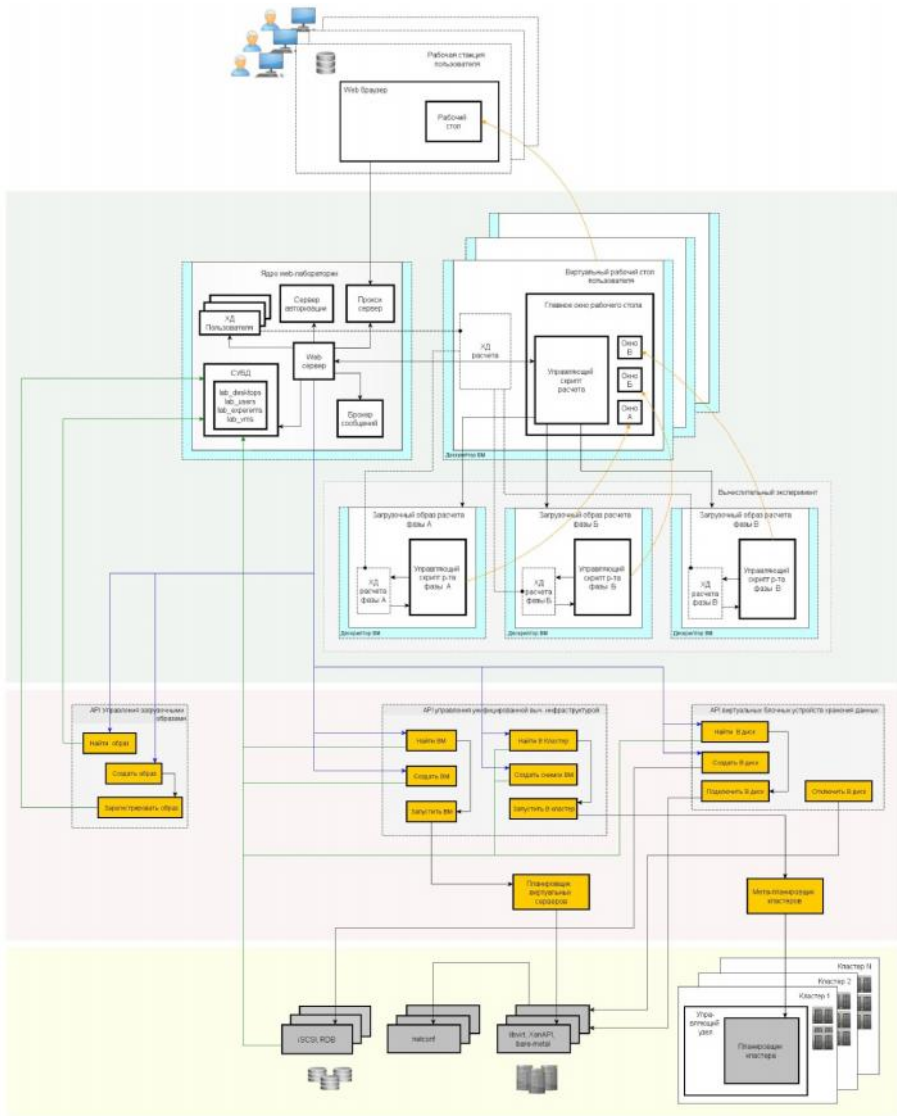
UniHUB [3], [4], [5], web- ; ;

web- (web-);

; ;

web- web- ; VNC-proxy ;

web- VNC- web- 2 web-



2.

web-

web- : Apache ; OpenLDAP
 RabbitMQ , MongoDB
 web- :
 Mediawiki – , Openqwaq –
 web- :
 , OpenMOOC –
 , Web2Project –
 ,
 OpenStack,

LXC, ESX, : XenServer/XCP, KVM/QEMU,
 bary-metal; Slurm;
 grid- GlobusToolki; - grid-
 GridWay.

4. UniHUB
 UniHUB web-

UniCFD (<https://www.unicfd.ru>) [6], [7], [8].
 web-
 : SALOME –
 ; OpenFOAM –

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. 20.10.2011-21.10.2011

The web-laboratory architecture based on the cloud and the UniHUB implementation as an extension of the OpenStack platform.

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Abstract. A web-laboratory is a web based software platform to support scientific collaboration, research, and education. It has unique combination of capabilities that allows to conduct numerical experiments, discussion of results in workshops and meetings, planning activities, to prepare reports and articles, to support the educational processes (training courses, workshops, labs, etc.). It lets researchers and engineers: run simulation tools; upload and share datasets, documents and other materials; work together in a private space, send messages to one another; ask questions and post responses; work collaboratively on the source code of their simulation programs and share those programs with the community.

Web laboratory implementation is related with need to enable dispatching of different remote computational resources (supercomputers, high performance clusters, including accelerators computing, development of 2D and 3D visualization, servers, storage and processing of large data sets, etc.) and software in a way that is completely transparent to users. It is also necessary to provide scalability, reliability and security.

Modern method to solve this problem is to use a cloud computing model. In this model computational resources are provided to user as remotely set of elastic services with on demand access.

The paper describes an architecture of web laboratory developed in scope of the cloud model. The UniHUB platform implementation based on this architecture is represented. The UniHUB is as an extension of the OpenStack platform.

Keywords: web laboratory, cloud computing, parallel computing, mass collaboration system

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