EDGI
JRA2
JRA2.4 Virtualization technology

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ToC

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1. Deploy Virtual Machines in XtremWeb-HEP desktop grid to:

   ✓ protect volunteer resources
   ✓ allow any user to deploy its own VM
   ✓ extend grid infrastructure
   ✓ enable customized OS
   ✓ deploy complex applications
   ✓ easy application deployment
   ✓ reduce application test phase

➡   This does not make DG a cloud

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ToC

1. Objectives
2. <u>State of the art</u>
3. VM over XWHEP
4. VM/XWHEP : contextualization
5. VM/XWHEP : use case
6. VM over EDGI bridges
7. Submitted paper

Desktop Grids using VM

Centralized and securized services store applications and data
- scheduler
- repository
- etc.

Submitretrieve

Downloadupdate

Distributed User
- monitor the platform
- upload applications jobs, datas..
- download job results

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Submit/retrieve

Downloadupdate

Distributed User
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- download job results

Distributed ressource (volunteer PC)
- download jobs, applications, data
- compute jobs
- upload results

- run jobs in CernVM
- use a **preinstalled** CernVM

These solutions use pre built VM, not customized ones

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VM OVER XWHEP

Centralized and securized services store applications and data
- scheduler
- repository
- etc.

Distributed ressource may declare the virtualbox application.

- StratusLab proposes distributions with the IaaS paradigms.
- CernVM is a baseline Virtual Software Appliance for the participants of CERN LHC experiments

Distributed User
- submit a virtualbox job with a virtual disk

Distributed ressource (volunteer PC)
- download the virtual disk
- create and run a new VM inside **its local** VirtualBox
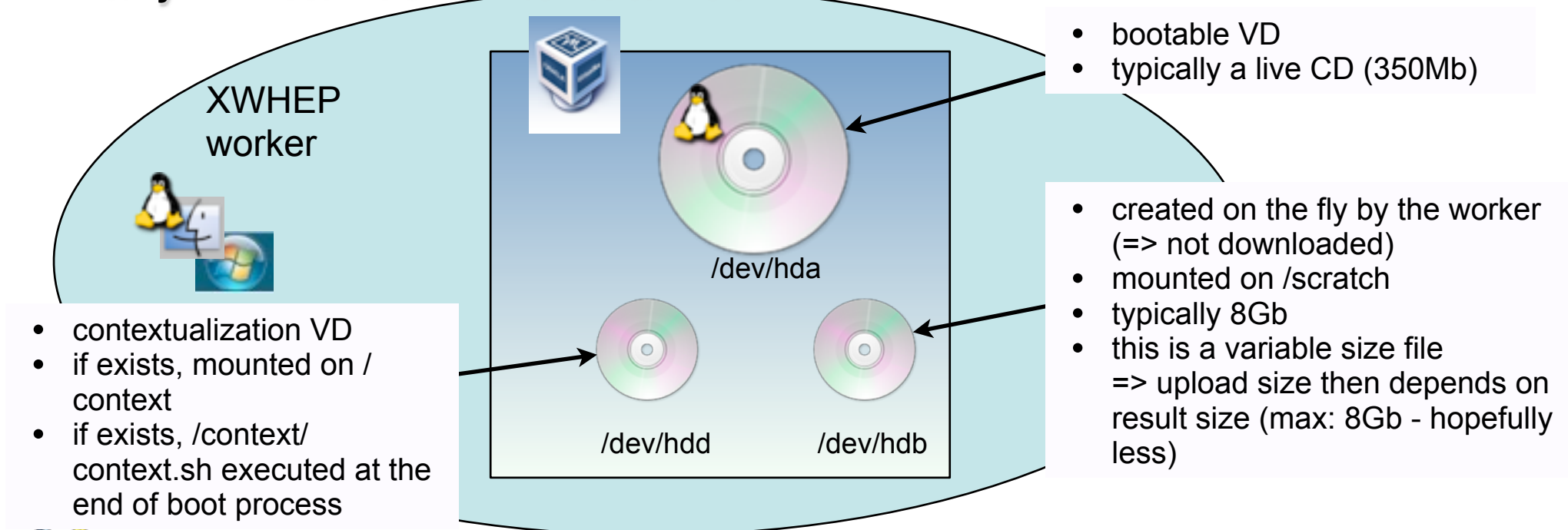
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VM : Contextualization

It is not simple to create a virtual disk (VD) containing a virtualized OS.

➡ we need a repository of «template» VD to ease the user life

➡ any user can still create and use its own VD

➡ any VD can be contextualized

XWHEP worker

/dev/hda

/dev/hdd   /dev/hdb

- bootable VD
- typically a live CD (350Mb)

- created on the fly by the worker (=> not downloaded)
- mounted on /scratch
- typically 8Gb
- this is a variable size file => upload size then depends on result size (max: 8Gb - hopefully less)

- contextualization VD
- if exists, mounted on /context
- if exists, /context/context.sh executed at the end of boot process

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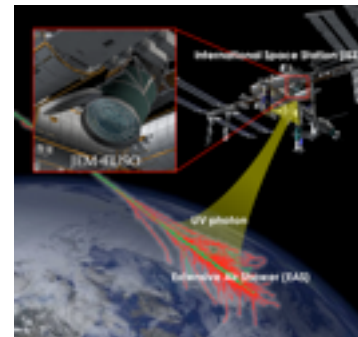5. <u>VM/XWHEP : use case</u>
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VM : Use Case

HEP applications are linked to ROOT (http://root.cern.ch)

Encouraging first results on deploying CernVM over XWHEP

- Atlas : an LHC experiment
  http://atlas.ch/

- JEM EUSO : Astro physics
  http://jemeuso.riken.jp/en/index.html

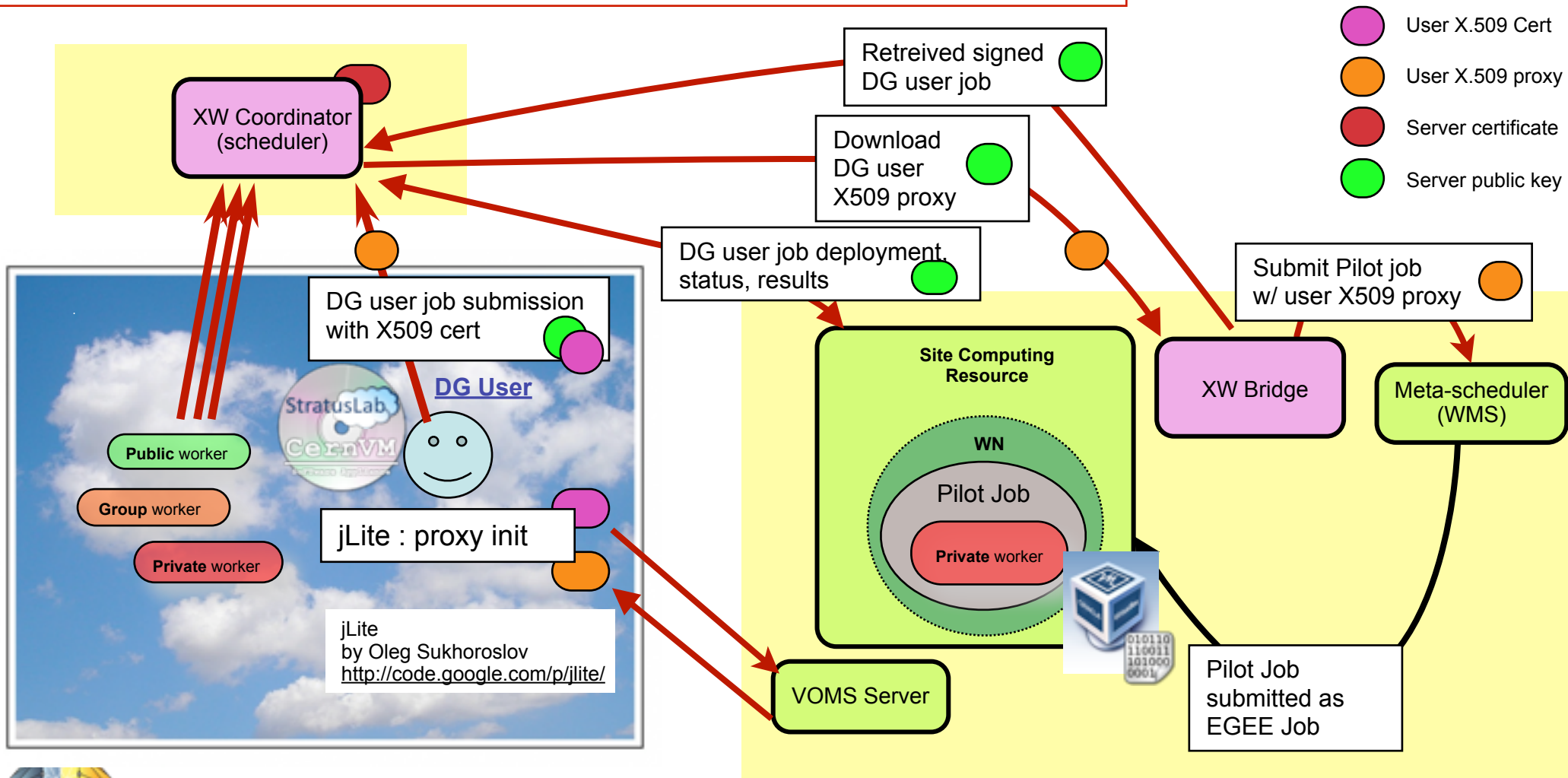- SuperNemo: HEP
  http://nemo.in2p3.fr/supernemo/

- EDGI meeting - Sicile

- Virtualization over EGI is a running idea (StratusLab, CernVM)
- We are now lobbying to get EGI WN with VB installed
- LAL will install VB on its local managed WN
  - ➡ this will be for running first tests
  - ➡ this will not be published until further notification

✓ after the hopefully successful test phase, this will be published
✓ the EDGI bridge wil then be able to submit VM over EDGI

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VM over EDGI : Pilot Jobs and VM

Security, monitoring and logging are the main issues in Pilot Jobs. (http://edms.cern.ch/document/855383)

Retreived signed DG user job

Download DG user X509 proxy

XW Coordinator (scheduler)

DG user job deployment, status, results

DG user job submission with X509 cert

DG User

StratusLab CernVM

Public worker

Group worker

Private worker

jLite : proxy init

jLite
by Oleg Sukhoroslov
http://code.google.com/p/jlite/

VOMS Server

Submit Pilot job w/ user X509 proxy

XW Bridge

Meta-scheduler (WMS)

Site Computing Resource

WN

Pilot Job

Private worker

Pilot Job submitted as EGEE Job

Legend

- User X.509 Cert
- User X.509 proxy
- Server certificate
- Server public key

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VM : PAPER

Abstract submitted at CHEP 2012 (http://www.chep2012.org/)

· FlyingGrid : from volunteer computing to volunteer cloud

Authors : O. Lodygensky, S. Dadoun, E. Urbah, G. Fedak, S. Delamare, X. Garrido, L. Duflot

Abstract:
Desktop grid (DG) is a well known technology aggregating volunteer computing resources donated by individuals to dynamically construct a virtual cluster. A lot of efforts are done these last years to extend and interconnect desktop grids to other distributed computing resources, especially focusing on so called "service grids" middleware such as "gLite", "ARC" and "Unicore".
In the former "EDGeS" european project (http://edges-grid.eu/), work has been done on standardizing and securing desktop grids to propose, since 2010, a new platform exposing an uniformed view of resources aggregated from DG run by Boinc (http://boinc.berkeley.edu/) or XtremWeb-HEP (http://www.xtremweb-hep.org/), and resources aggregated from EGEE (http://www.eu-egee.org/).
Today, the current "EDGI" european project (http://edgi-project.eu/) extends the EDGeS platform by integrating "ARC" and "Unicore" middleware. This project also includes cloud related research topics. In this paper we present our first results on integrating cloud technology into desktop grid. This work has two goals. First goal is to permit to desktop grid users to deploy and use their own virtual machines over a set of volunteer resources aggregated over DG. Second goal is to continue to propose a standardized view to the user who would wish to submit jobs as well as virtual machines.

Summary:
This paper first introduces standardization efforts done in EDGeS and EDGI. Cloud and virtualization over DG are then presented. We present our solution over XtremWeb-HEP and standardization effort to transparently submit jobs to both grid and cloud, as well a to transparently submit virtual machines to both grid and cloud. Finally we present some use cases where our platform is used by ATLAS and SuperNemo users.

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