Open Science Grid

OSG Security

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Largest Scientific Environments

- May very well be in experimental High Energy Physics.
  - Global collaborations > 2000 scientists
  - Nations make contributions to build the accelerator and experimental equipment.
  - Tremendous amounts of data,
    - need to constantly calibrate, select and analyze.
  - Experiment
    - has pledged computing resources.
    - Has non-pledged resources.

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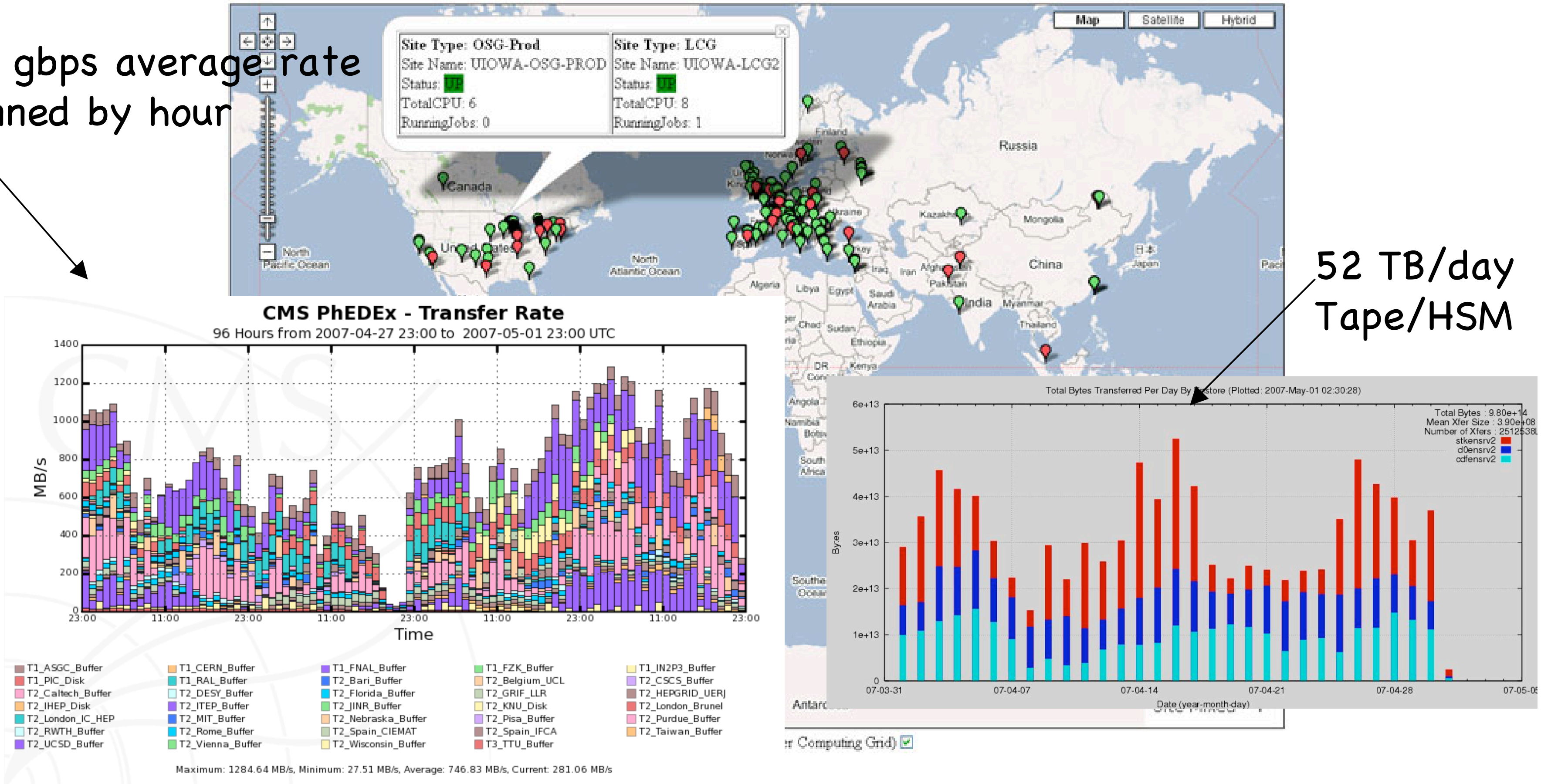
The OSG

- **Proposal:** “We propose to build a cyber-infrastructure that can grow to provide thousands of users effective access to 100,000 CPUs, 10s of PB of storage, located at hundreds of sites and interconnected by multiple 10Gb/s network links.”
- **Technical Basis:**
  - Service-based access to compute and storage services.
  - A software stack used by experiments to manage their users, their jobs, and their jobs.
  - The environment **interoperates** with other similar grid environments.
    - LCG, teragrid, et al.

Example Capabilities

9.6 gbps average rate
(binned by hour

52 TB/day
Tape/HSM



Site Type: OSG-Prod	Site Type: LCG
Site Name: UIOWA-OSG-PROD	Site Name: UIOWA-LCG2
Status: UP	Status: UP
TotalCPU: 6	TotalCPU: 8
RunningJobs: 0	RunningJobs: 1

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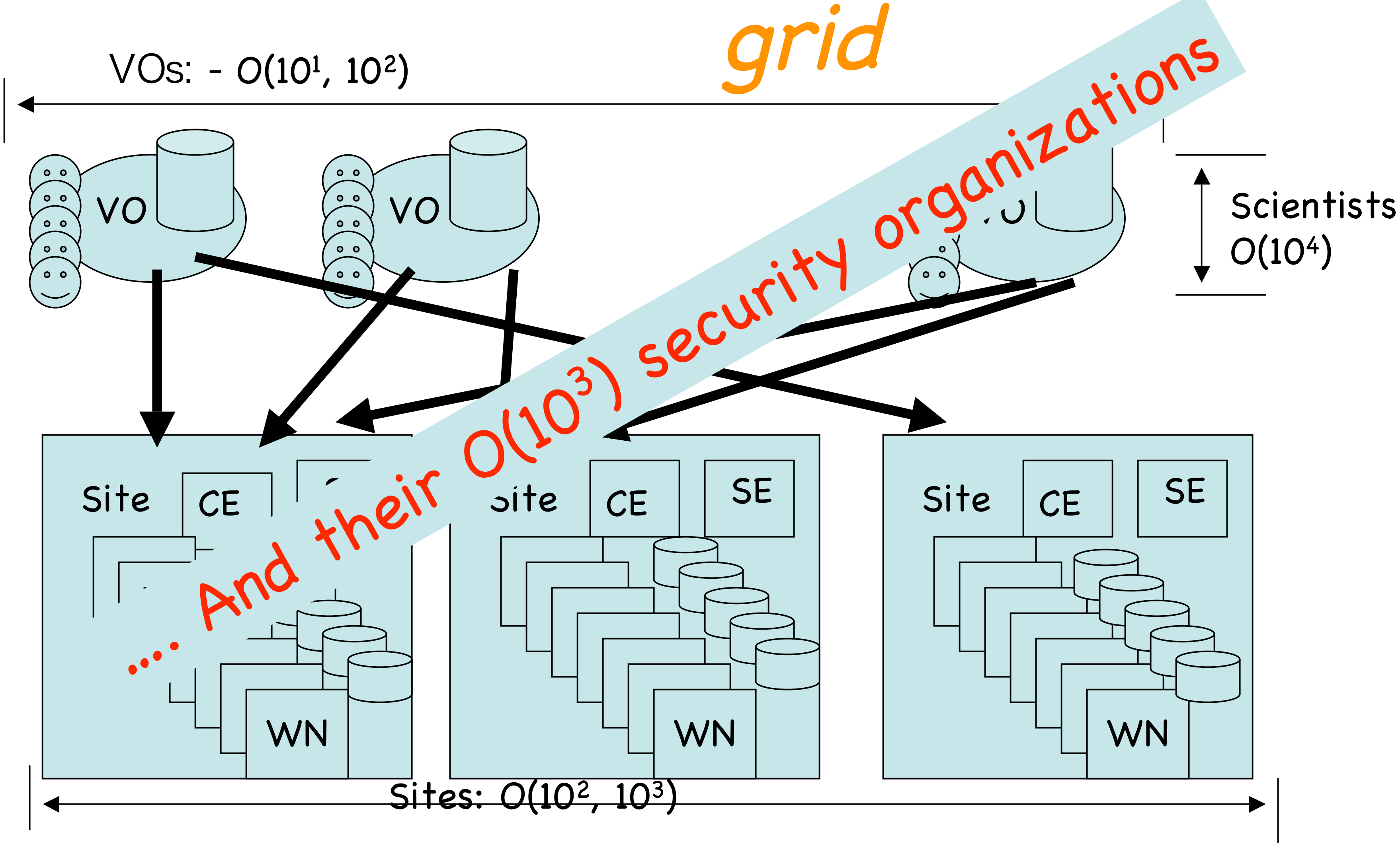
OSG Capacity Targets

	MSI2000				Petabytes			
Org	2006	2007	2008	2009	2006	2007	2008	2009
ATLAS	3	5	14	24	1.1	2.6	7.6	11.8
CMS	4	8	16	22	1.0	2.5	4.5	4.9
LIGO	4	5	6	6	0.2	TBD	TBD	TBD
STAR	2	3	6	12	0.04	0.06	0.1	0.2
other	10	13	17	22	1.0	1.0	1.4	1.9
Total	**23**	**34**	**59**	**86**	**3.3**	**6.1**	**13.6**	**18.8**

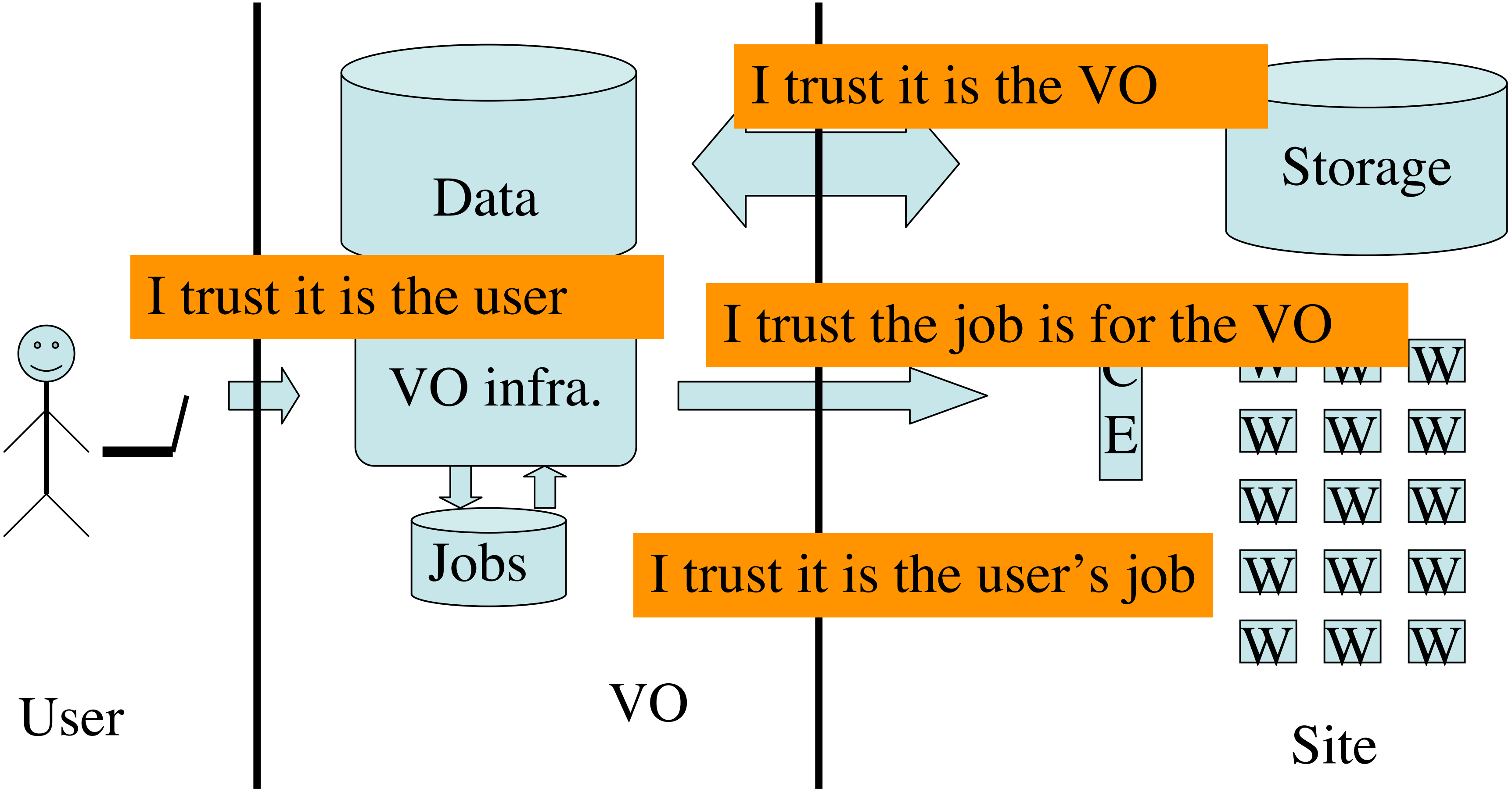
In 2008 we estimate: 53 MSI2K = 26,000 CPUs; 74 MSI2K = 37,000 CPUs;

Me, my friends, the grid



…. And their $O(10^3)$ security organizations

Illustrative example



I trust it is the VO

I trust it is the user

I trust the job is for the VO

I trust it is the user’s job

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Grid Security

- The goal of grid security is establish trust that computing organized along these lines will have appropriate integrity, availability, and confidentiality.
- OSG cannot bear the security responsibilities of sites or VO’s.
- Therefore, initially, inter-entity security is conceptually a set of pair-wise agreements.
    - We have more than a few autonomous parties
    - Not a small task.

Operational Grid Security

- Based on NIST model -- Controls based on risk, rooted in policy.
  - Risk == f(vulnerability, threat)
  - Goal: Achieve acceptable risk
    - Recall -- context is open science.
  - Means: Controls
    - Management (what did we decide?)
    - Operational (we count on behaviors)
    - Technical (stuff done in HW/SW)

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Some Specifics

- OSG security seeks to ***compliment, not replace*** site and VO security organizations.
  - Recall Roadmap: O(10^4) parties. Now: O(10^3)
    - Make the security discussion scalable by standardizing the many elements of the discussion.
  - Foster a secure software stack for grid services.
  - Foster communications
  - Know what's going on from the perspective of the whole grid

Scaling:

- Make the discussion standard.
  - Think of the market in mortgages
    - Many standard terms
- Model security policies
  - JSPG: sites, VOs, users.
  - IGTF: Identity providers.
  - TBD:
    - Service providers (likely JSPG),
    - software providers.

Foster secure software stack

- OSG Stack: Primary role is through the OSG software coordinator.
  - Sitess use versioned OSG stack w/OSG controls.
  - VO's -- Less standard, less enumerable
- Absolute dependency on the skills and quality of our system software community.
  - Success depends on sponsors of these groups
  - OSG job is to
    - Demand good qualities
    - Recognize good qualities.
    - Proselytize the scale changes

Foster communications

- Grid operating organization assembles, and maintains list of site security contacts.
- Two levels
  - Incident/urgent matters.
  - Discussion/thinking
- Communication is available for non-grid matters. (e.g sniffed password of a person w/ distributed administration responsibilities).

Current work: Situational Awareness

- Is the configuration of deployed stack at sites as expected?
- Is someone rattling the doorknob systematically at OSG sites?
- Has compromise of a server compromised the grid?
- Are AUP's abided by?

Summary

- Grid security is federated - O($10^{4)}$ entities.
  - The problem is made more tractable
    - By the service oriented access to resources.
    - By standardizing the terms of discussion.
    - Because interoperation is viewed as essential by all parties
- Currently, the security structure of sites is more standard than the structure of VO's.
- Grid security is complimentary to site and VO security organizations.
- Absolutely dependent on the quality of community written software components.