

A decorative graphic on the left side of the slide. It consists of a vertical bar with a gradient from light orange to white, overlaid with several thin, solid orange vertical lines. To the right of the bar are five orange circles of varying sizes, arranged in a cluster.

GRID MIDDLEWARE AND SECURITY

Suchandra Thapa
Computation Institute
University of Chicago

THE OSG COMPUTE ELEMENT

2

Introduction to OSG terms
The OSG compute element
Grid Middleware
Web Resources
Security
Q&A time

BASIC TERMS

- CE – Compute Element
- SE – Storage Element
- VO – Virtual Organization
- WN – Worker Node
- VDT – Virtual Data Toolkit
- DN – Distinguished name
- GUMS – Grid User Management Server
- CA – Certificate Authority
- CRL – Certificate Revocation List

THE OSG COMPUTE ELEMENT

4

Introduction to OSG terms
The OSG compute element
Grid Middleware
Web Resources
Security
Q&A time

OSG SOFTWARE STACK

- Consists of:
 - VDT Software
PLUS
 - Additional OSG Specific bits
- E.g. CE
 - VDT Subset
 - Globus
 - RSV
 - PRIMA
 - ... and another dozen
 - OSG bits:
 - Information about OSG VOs
 - OSG configuration script (configure_osg.py)

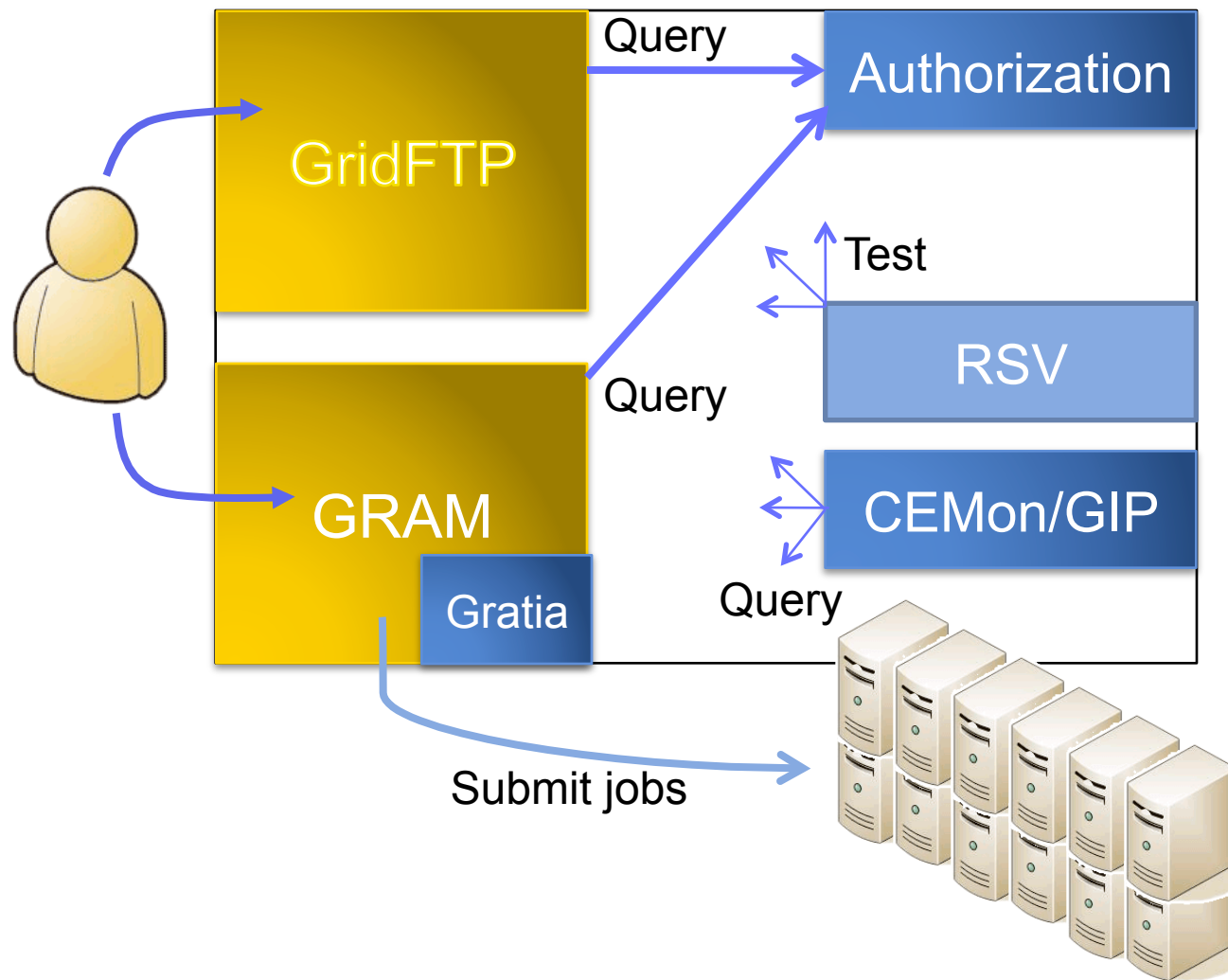
OVERVIEW OF OSG COMPONENTS

- CE – Compute Element
 - Provides point of interface for tools attempting to run jobs or work on a cluster
 - Users submit jobs to this system
 - OSG provides a package that installs all software needed for this component
- SE – Storage Element
 - Several implementations
 - dCache
 - Bestman
 - Manages data and storage services on cluster
- WN – Worker Node
 - Software found on each compute node on grid
 - Provides software that incoming jobs may depend on (e.g. curl, srmcp, gsiftp, etc.)
- Client – Client Software
 - Provides software that users can use to submit and manage jobs and data on OSG
 - May be superseded by VO specific software
- Other tools (more specific and not necessarily used by many people)

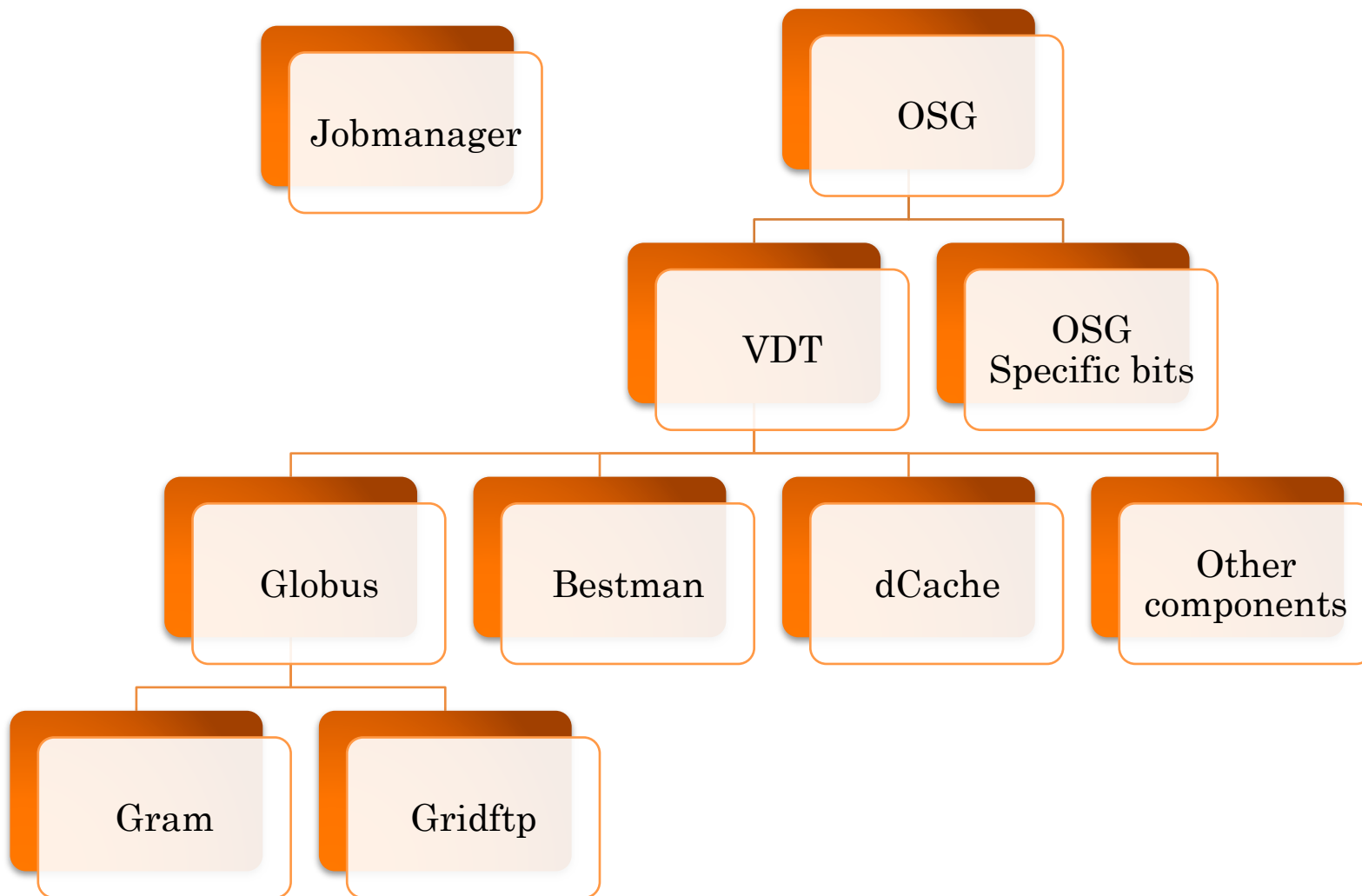
OVERVIEW OF CE

- GRAM : Allows job submissions and passes them on to local batch manager
- Gridftp : Provides data transfer services into and out of cluster
- CEMon / GIP : Provides information to central services
- Gratia : Sends accounting information on jobs run to central server
- RSV : Provides probes to monitor health of the CE
- User authorization : Needed to connect certificates to user accounts

BASIC CE



SOFTWARE OVERVIEW



GRAM

- Two different flavors
 - OSG provides and supports both
 - Very different implementations
- GT2
 - What most users and VOs use
 - Very stable and well understood
 - On the other hand, fairly old
- GT4 (aka ws-gram)
 - Web services enabled job submission
 - Currently in transition
 - Used primarily by LIGO

GRATIA

- Collects information about what jobs have run on your site and by whom
- Hooks into GRAM and/or job manager
- Sends information to a central server
- Can connect and query central service to get reports and graphs

CEMon / GIP

- These work together
 - Essential for accurate information about your site
 - End-users see this information
- Generic Information Provider (GIP)
 - Scripts to scrape information about your site
 - Some information is dynamic (queue length)
 - Some is static (site name)
- CEMon
 - Reports information to OSG GOC's BDII
 - Reports to OSG Resource Selector (ReSS)

RSV

- System to run tests on various components of your site
- Presents a web page with red/green overview and links to more specific information on test results
- Optional interface to nagios
- Can be run on a server other than CE

GRID SECURITY

14

Introduction to OSG terms
The OSG compute element
Grid Middleware
Web Resources
Security
Q&A time

CERTIFICATES USED

- OSG uses X.509 certificates for authentication and authorization
- Most certificates are from the DOEGrids certificate chain
- Obtained from GOC / Need someone to “vouch” for you
- All tools use and verify using certificates
 - User submissions (job submission, gsiftp) use proxies signed by user’s X.509 certificate
 - Sites and services have certificates which are verified by user tools

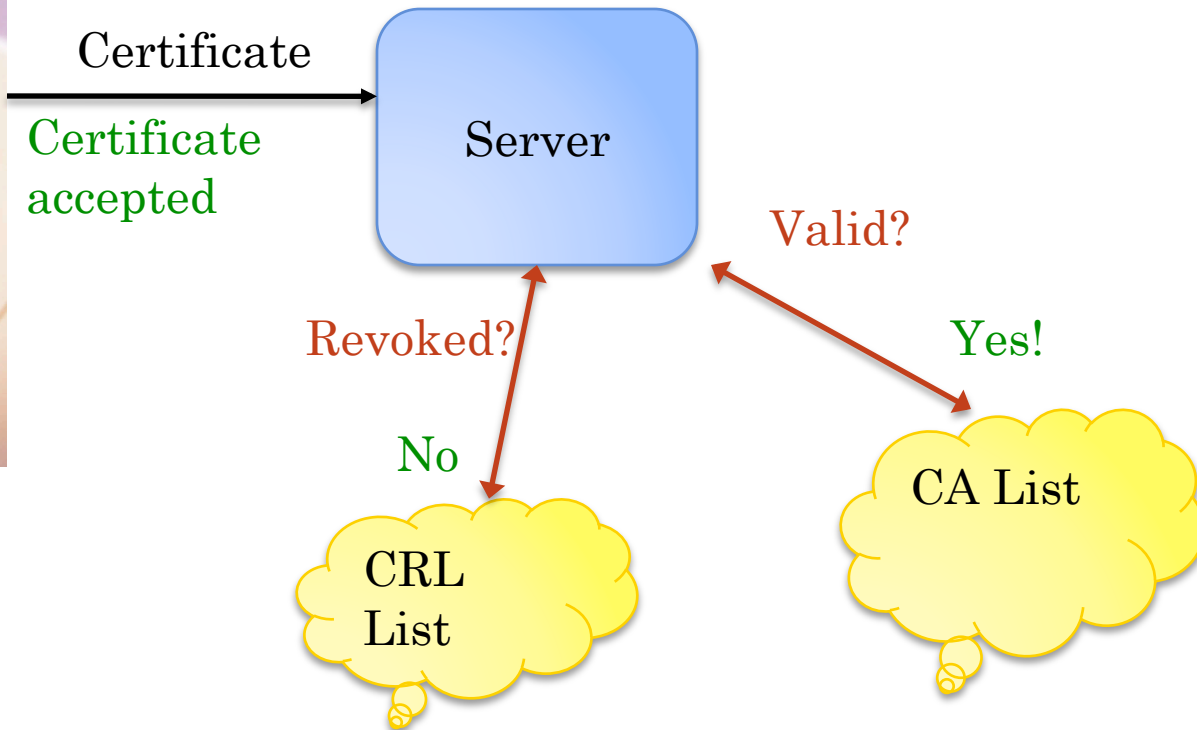
CA CERTIFICATES

- What are they?
 - Public certificate for certificate authorities
 - Used to verify authenticity of user certificates
- Recommended: OSG CA distribution
 - IGTF + TeraGrid-only

CERTIFICATE REVOCATION LISTS (CRLs)

- It's not enough to have the CAs
- CAs publish CRLs: lists of certificates that have been revoked
 - Sometimes revoked for administrative reasons
 - Sometimes revoked for security reasons
- On OSG, default settings are to update these lists once a day

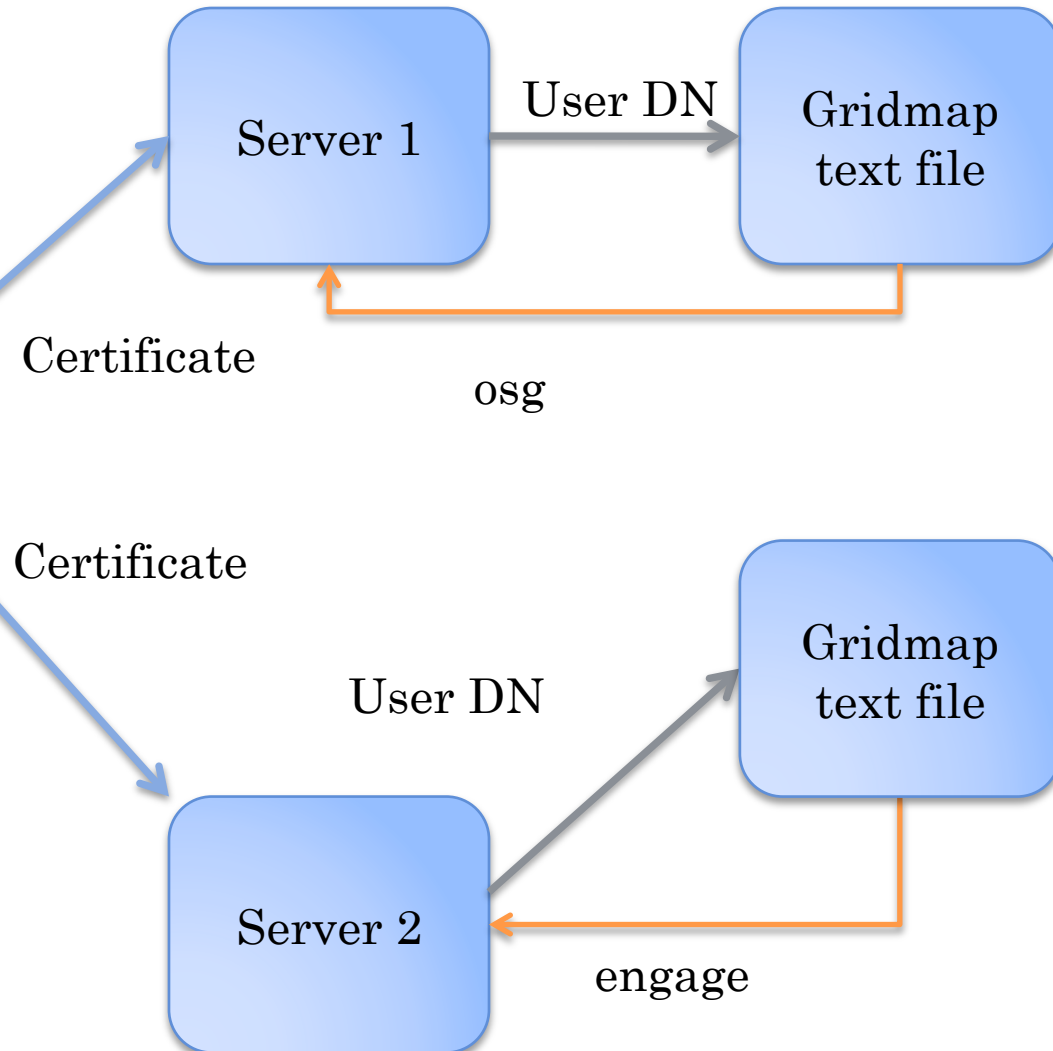
CERTIFICATE CHECKING



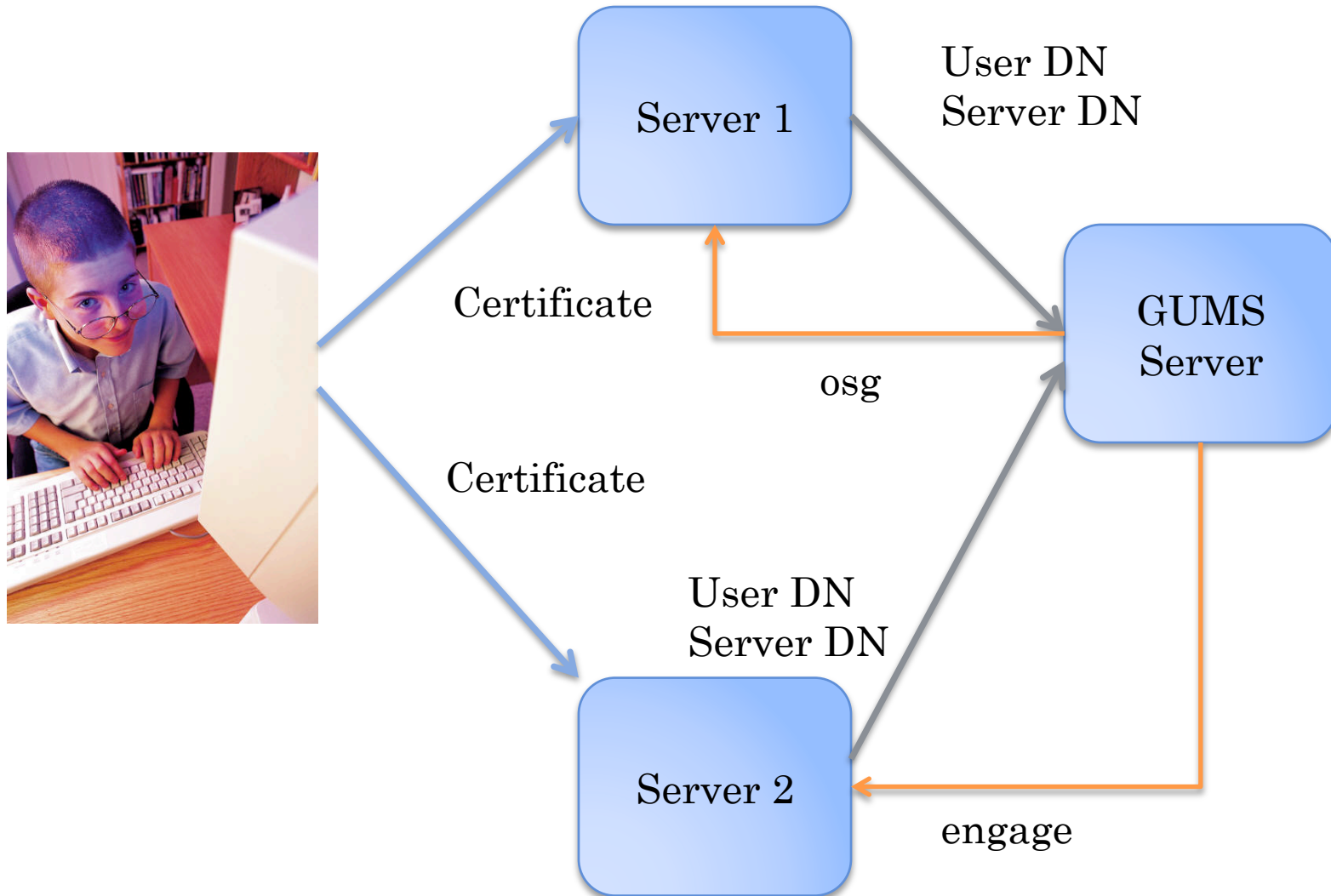
AUTHORIZATION

- Done by gridmap files or GUMS
- Gridmap files are fairly simple
 - Text file with DN followed by local account
- GUMS is preferred solution for larger site
 - Central location for authorization decisions
 - Allows for vo roles and multiple vo membership

GRIDMAP AUTHORIZATION PROCEDURE



GUMS AUTHORIZATION PROCEDURE



QUESTIONS? THOUGHTS? COMMENTS?

22

Introduction to OSG terms and operations

Installing an OSG site

Maintaining a site

Q&A time

ACKNOWLEDGEMENTS

- Alain Roy
- Terrence Martin