UNICORE Desktop Grid

Jakub Jurkiewicz, Piotr Bała

Interdisciplinary Center for Mathematical and Computational Modelling,
University of Warsaw

Unicore Summit 2010

18-19 May 2010

Outline

Dekstop Grids, Community Grids

Architecture of UNICORE desktop grid

Communication UNICORE desktop grid

Security

Simple efficiency test

Conclusion and future work

1 Dekstop Grids, Community Grids

2 Architecture of UNICORE desktop grid
- Communication UNICORE desktop grid
- Security

3 Simple efficiency test

4 Conclusion and future work

Community Grids

- Example Seti@Home
- The most popular middleware BOINC
- Huge number of working nodes - Internet scale
- Disadvantage - hard job submission

Desktop Grids

- The most popular middlewares based on BOINC
- Not that many working nodes - institution scale
- Easy job submission

Why we need desktop grid based on Unicore?

Unicore Desktop Grid

Jakub Jurkiewicz, Piotr Bała

Dekstop Grids, Community Grids

Architecture of UNICORE desktop grid

Communication UNICORE desktop grid

Security

Simple efficiency test

Conclusion and future work

- Connecting to normal Unicore Grid
- Unicore authentication and authorisation

Outline

1 Dekstop Grids, Community Grids

2 Architecture of UNICORE desktop grid
- Communication UNICORE desktop grid
- Security

3 Simple efficiency test

4 Conclusion and future work

Dekstop Grids, Community Grids

Architecture of UNICORE desktop grid

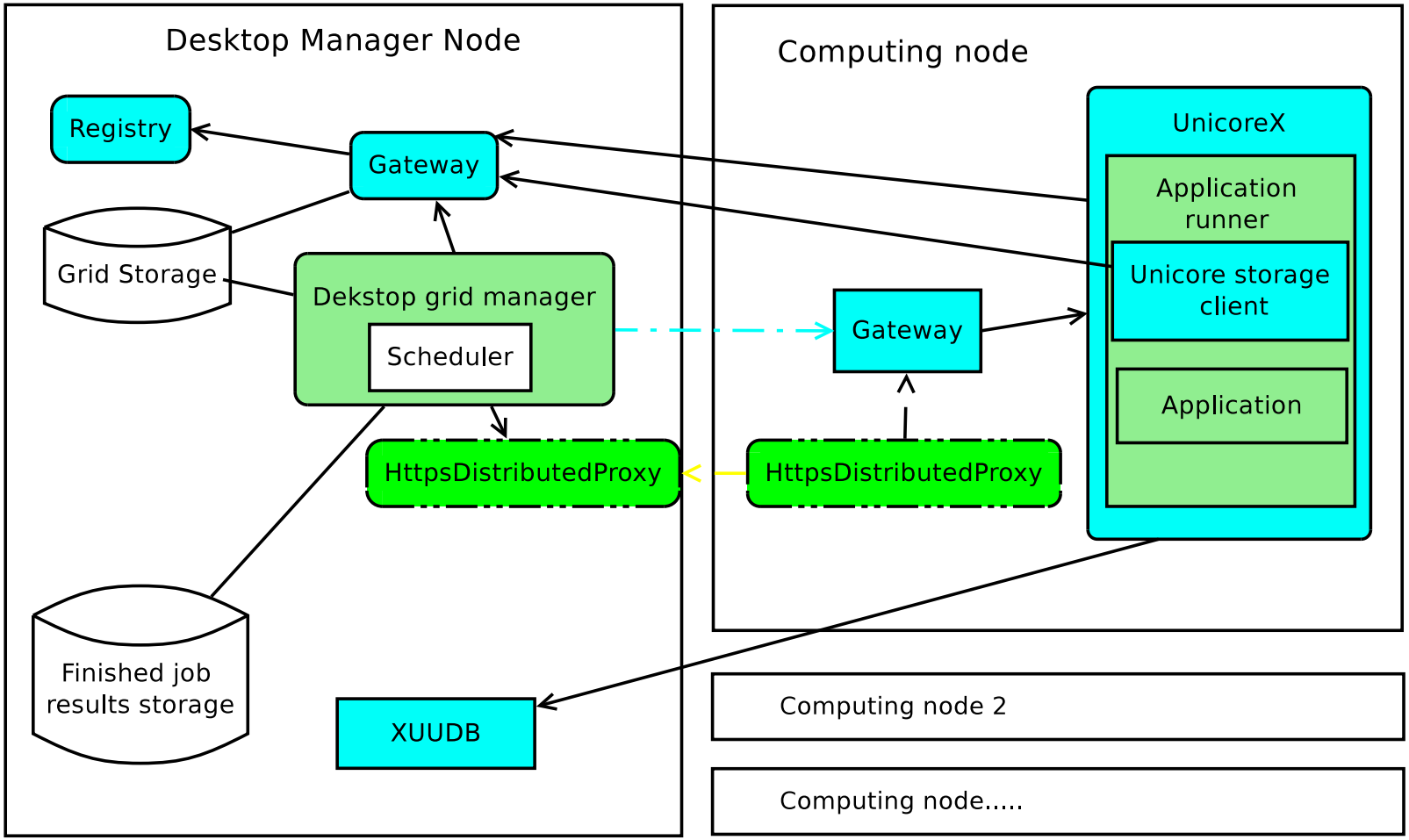
Communication UNICORE desktop grid

Security

Simple efficiency test

Conclusion and future work

General view



Not Unicore modules

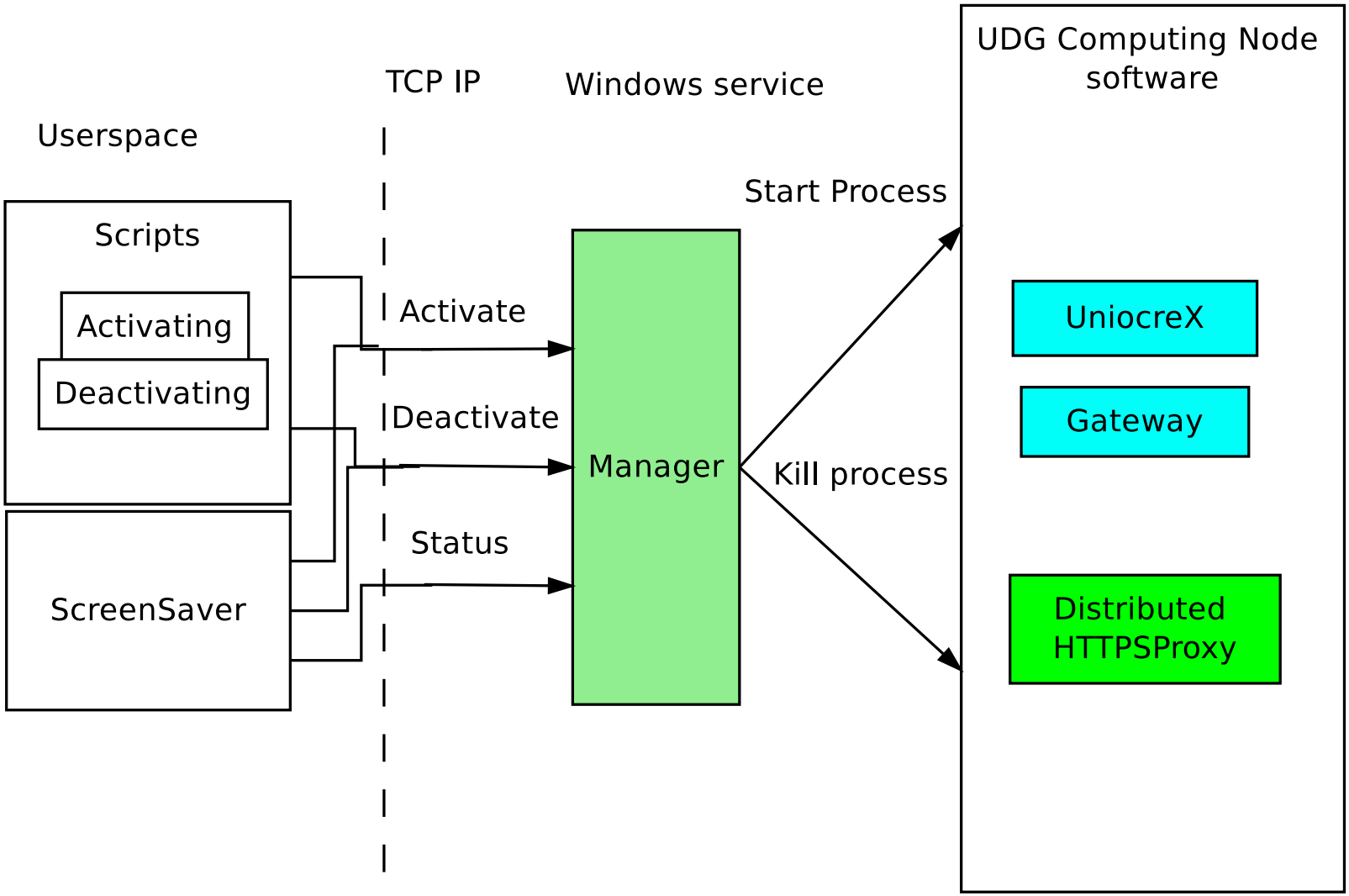
- HTTPs distributed proxy
- Desktop grid manager

Https distributed proxy

- server is waiting from connections from clients and nodes
- node side connects to server and registers which address should be redirected to it
- allows running nodes behind NAT and firewall

Windows desktop grid node

Unicore Desktop Grid
Jakub Jurkiewicz, Piotr Bała
Dekstop Grids, Community Grids
Architecture of UNICORE desktop grid
Communication UNICORE desktop grid
Security
Simple efficiency test
Conclusion and future work



Connecting node to desktop grid

Unicore Desktop Grid

Jakub Jurkiewicz, Piotr Bała

Dekstop Grids, Community Grids

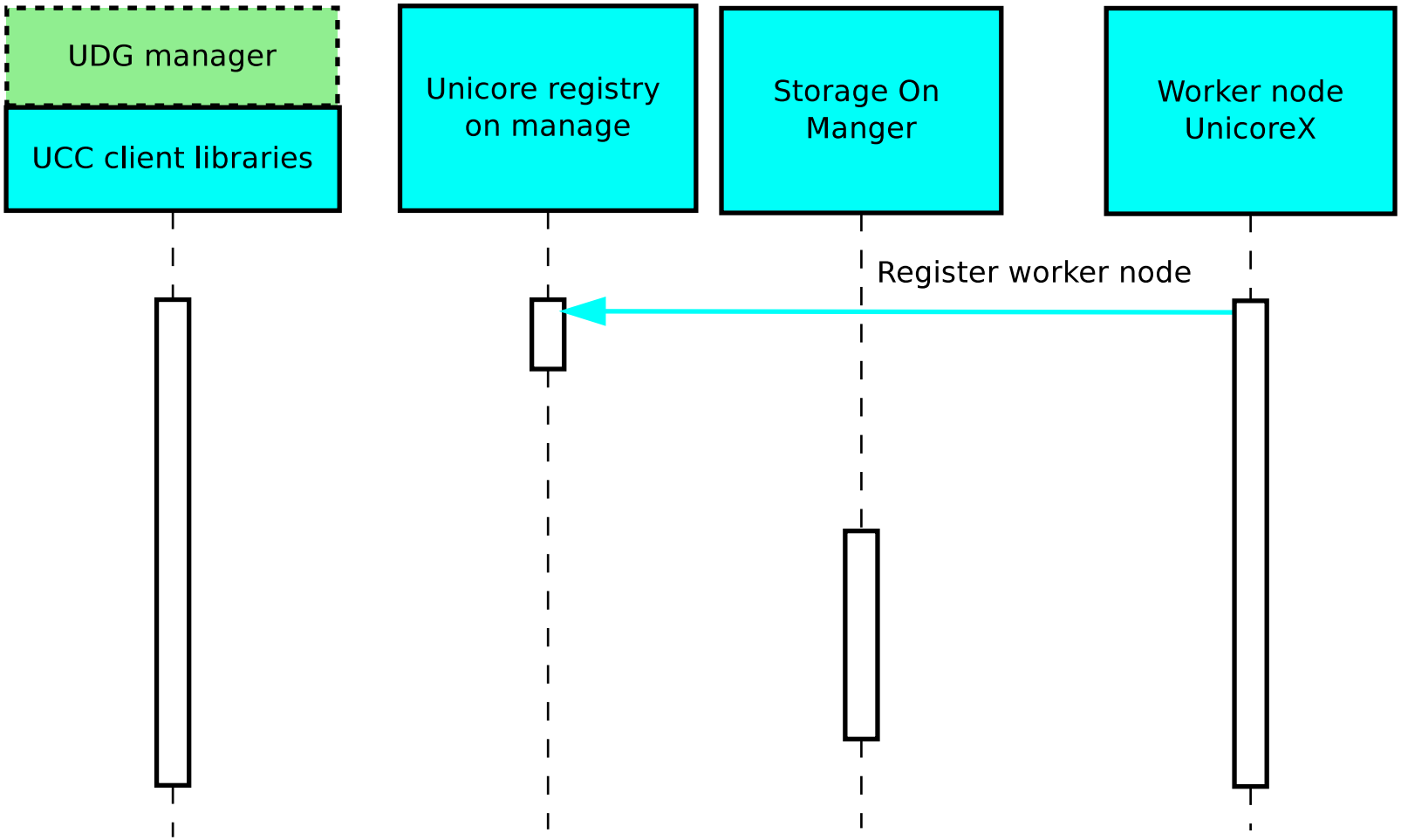
Architecture of UNICORE desktop grid

Communication UNICORE desktop grid

Security

Simple efficiency test

Conclusion and future work



Connecting node to desktop grid - httpsProxyView

Unicore Desktop Grid

Jakub Jurkiewicz, Piotr Bała

Dekstop Grids, Community Grids

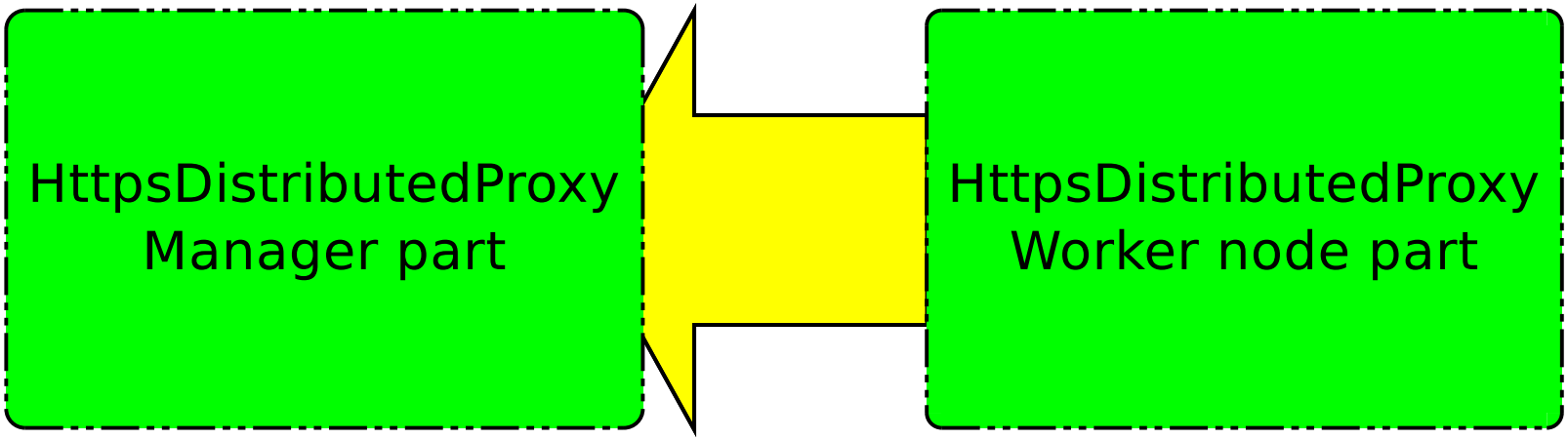
Architecture of UNICORE desktop grid

Communication UNICORE desktop grid

Security

Simple efficiency test

Conclusion and future work



Connecting node to desktop grid

Unicore Desktop Grid

Jakub Jurkiewicz, Piotr Bała

Dekstop Grids, Community Grids

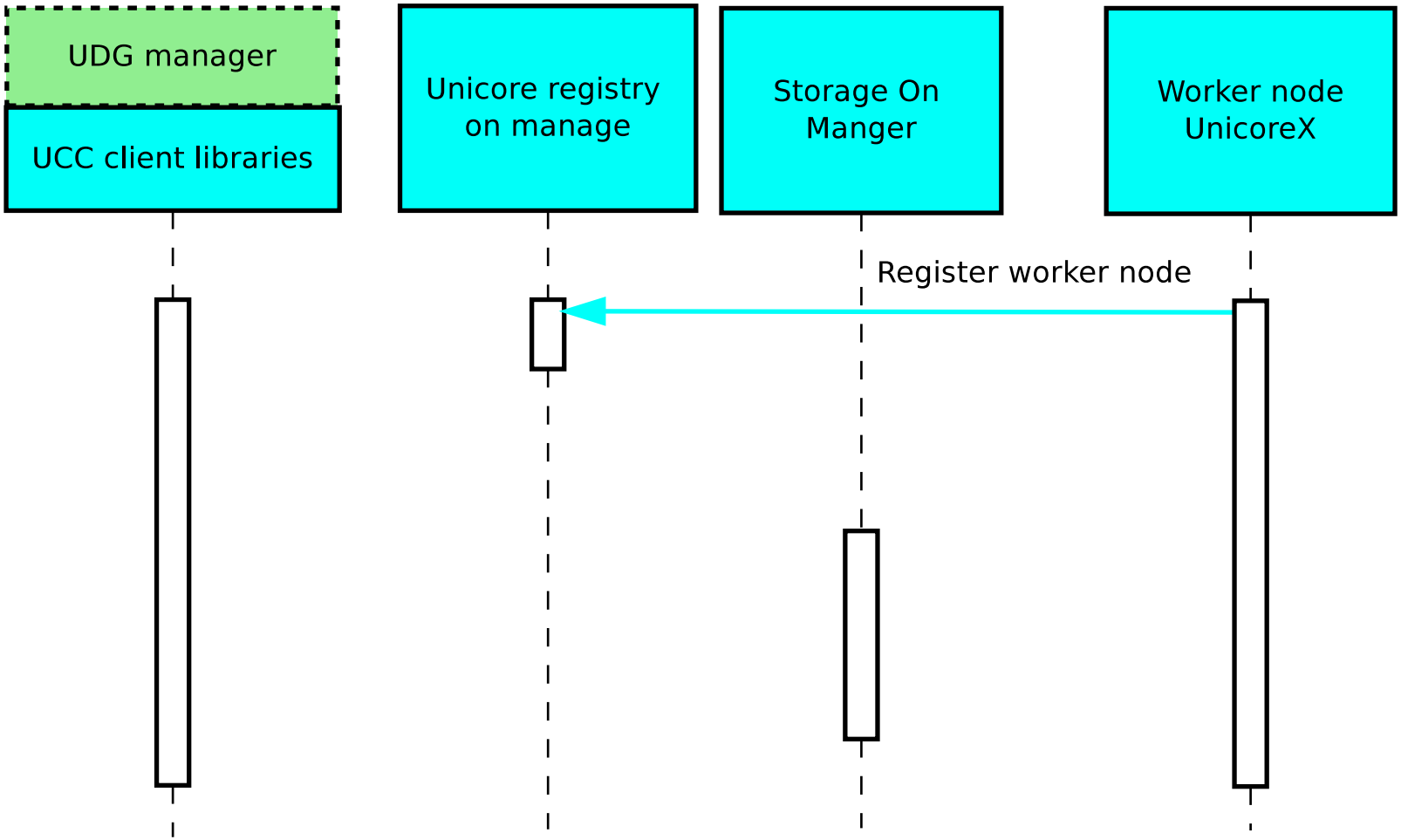
Architecture of UNICORE desktop grid

Communication UNICORE desktop grid

Security

Simple efficiency test

Conclusion and future work



Discovering working nodes

Unicore Desktop Grid

Jakub Jurkiewicz, Piotr Bała

Dekstop Grids, Community Grids

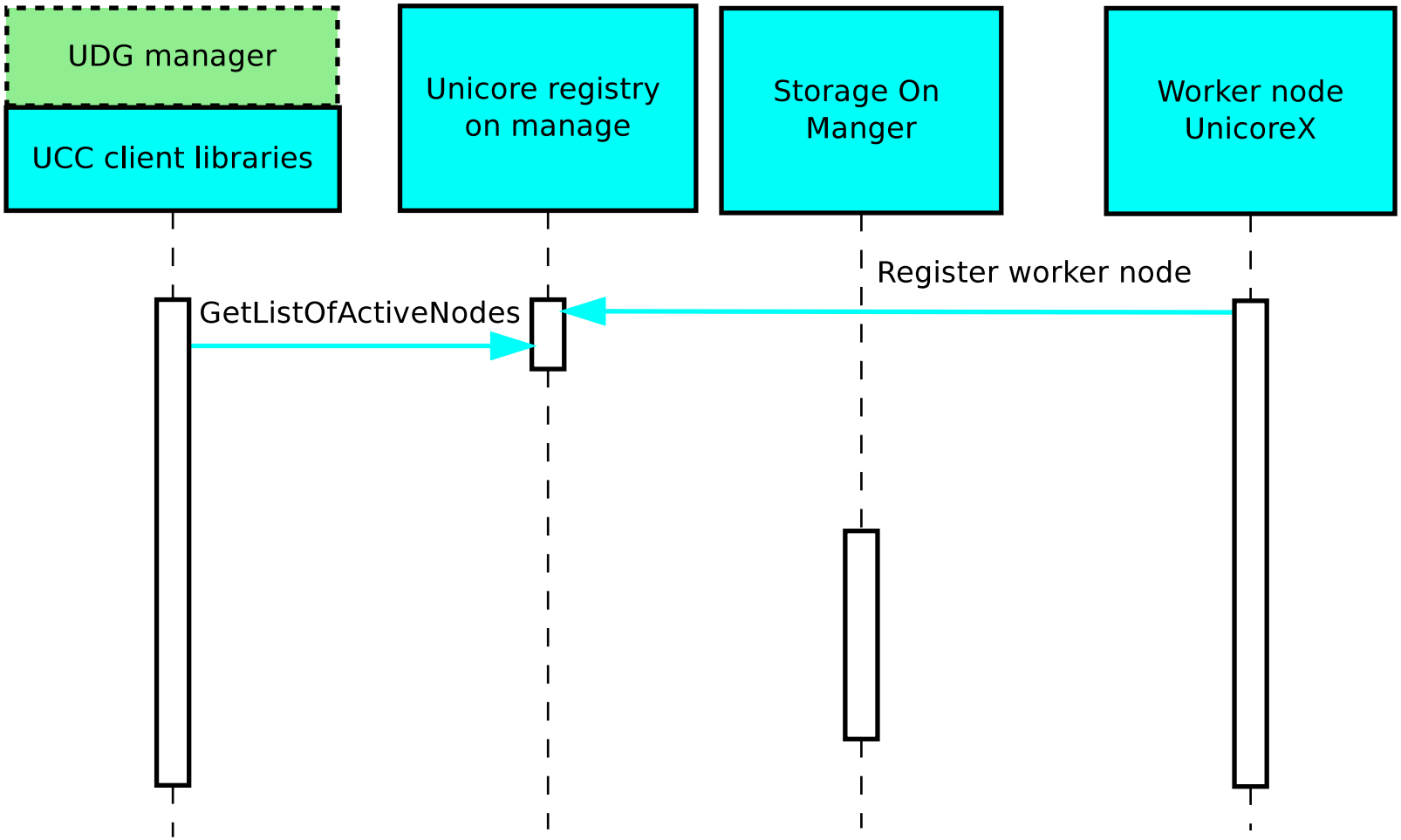
Architecture of UNICORE desktop grid

Communication UNICORE desktop grid

Security

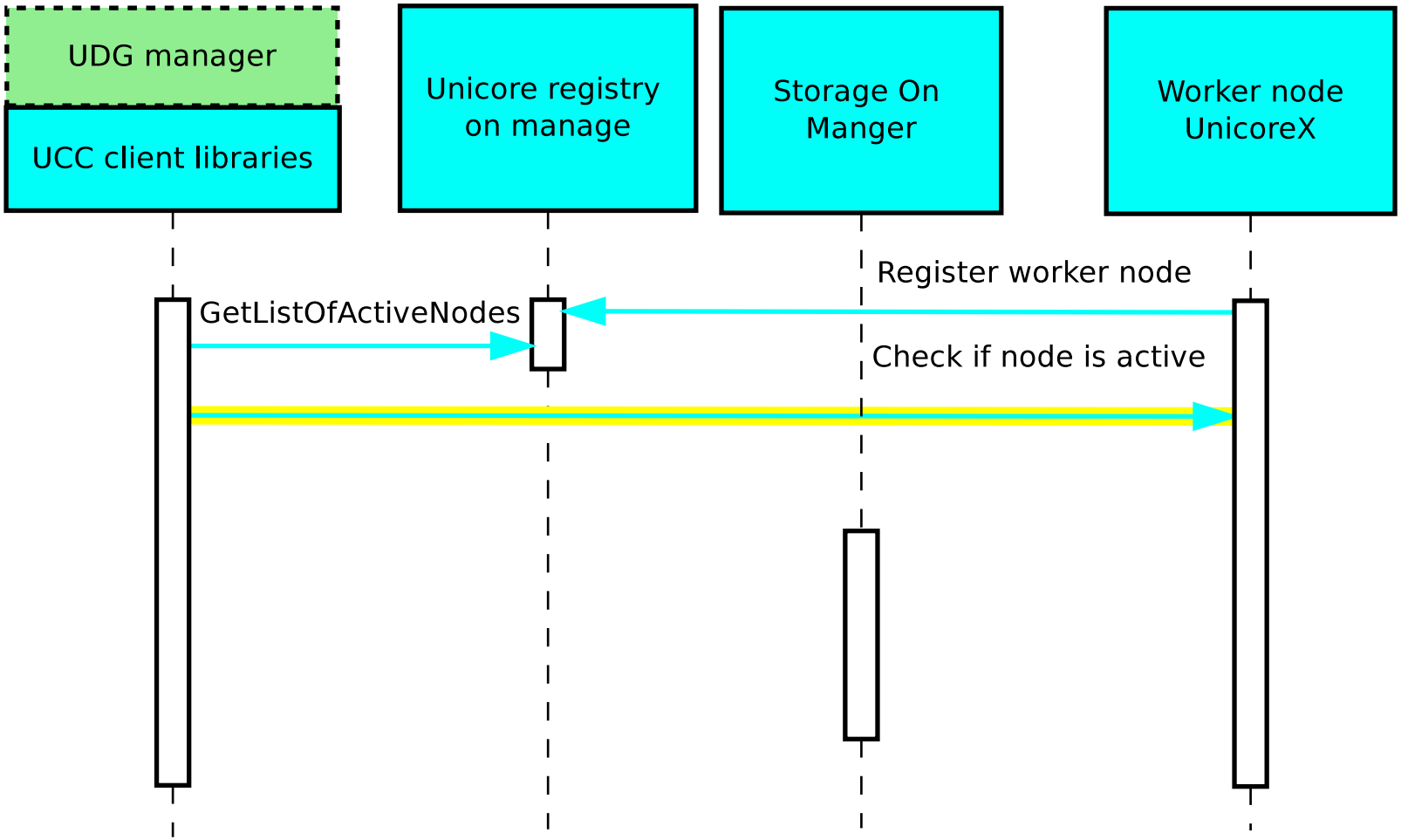
Simple efficiency test

Conclusion and future work



Checking node state - get node time

Unicore Desktop Grid
Jakub Jurkiewicz, Piotr Bała
Dekstop Grids, Community Grids
Architecture of UNICORE desktop grid
Communication UNICORE desktop grid
Security
Simple efficiency test
Conclusion and future work



Communication desktop grid manager node - httpsProxyView

Unicore Desktop Grid

Jakub Jurkiewicz, Piotr Bała

Dekstop Grids, Community Grids

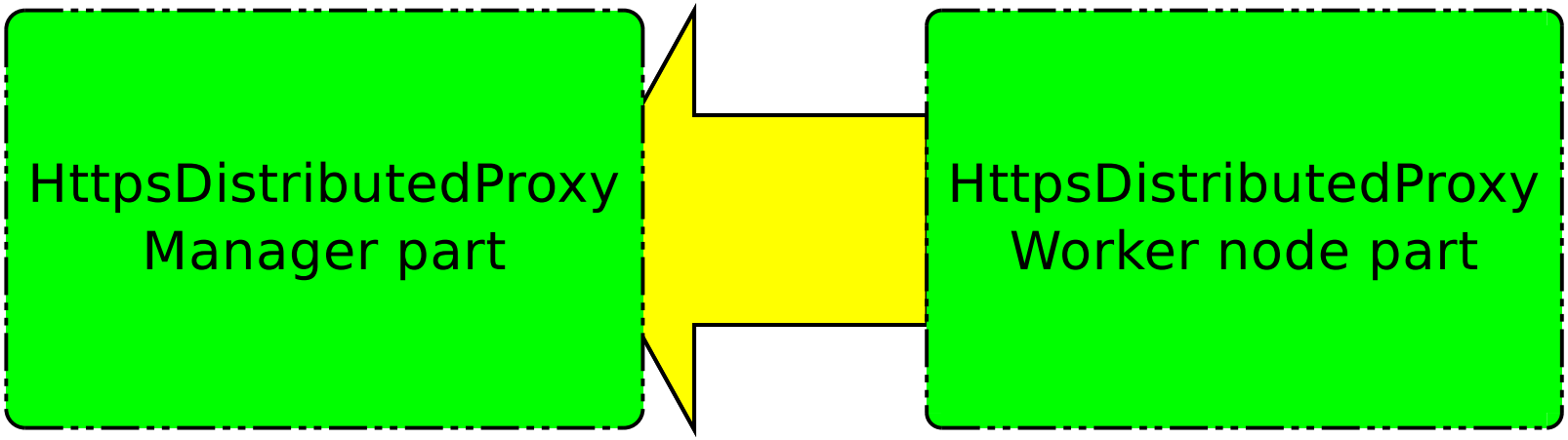
Architecture of UNICORE desktop grid

Communication UNICORE desktop grid

Security

Simple efficiency test

Conclusion and future work



Communication desktop grid manager node - httpsProxyView

Unicore Desktop Grid

Jakub Jurkiewicz, Piotr Bała

Dekstop Grids, Community Grids

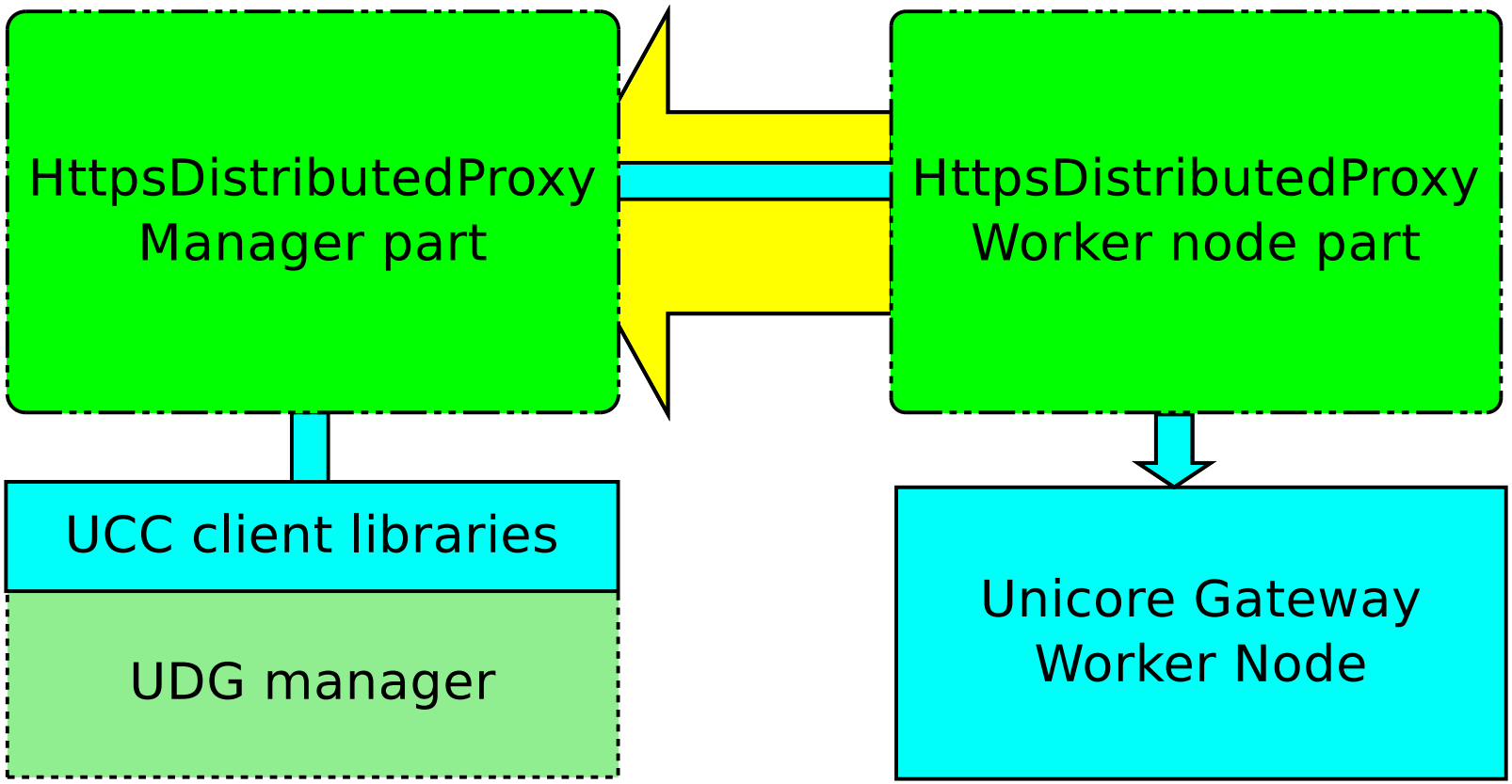
Architecture of UNICORE desktop grid

Communication UNICORE desktop grid

Security

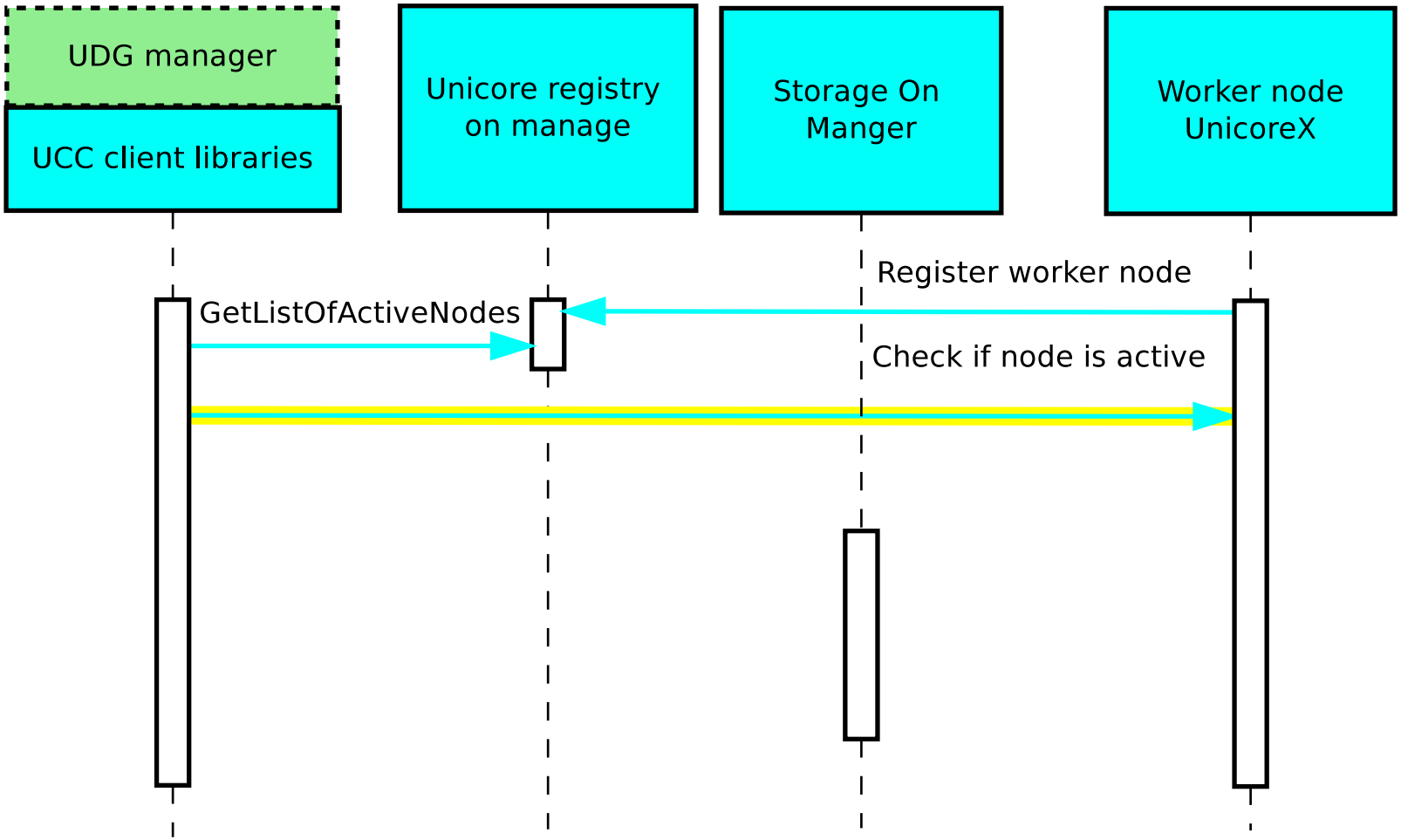
Simple efficiency test

Conclusion and future work



Checking node state - get node time

Unicore Desktop Grid
Jakub Jurkiewicz, Piotr Bała
Dekstop Grids, Community Grids
Architecture of UNICORE desktop grid
Communication UNICORE desktop grid
Security
Simple efficiency test
Conclusion and future work



Running job

Unicore Desktop Grid

Jakub Jurkiewicz, Piotr Bała

Dekstop Grids, Community Grids

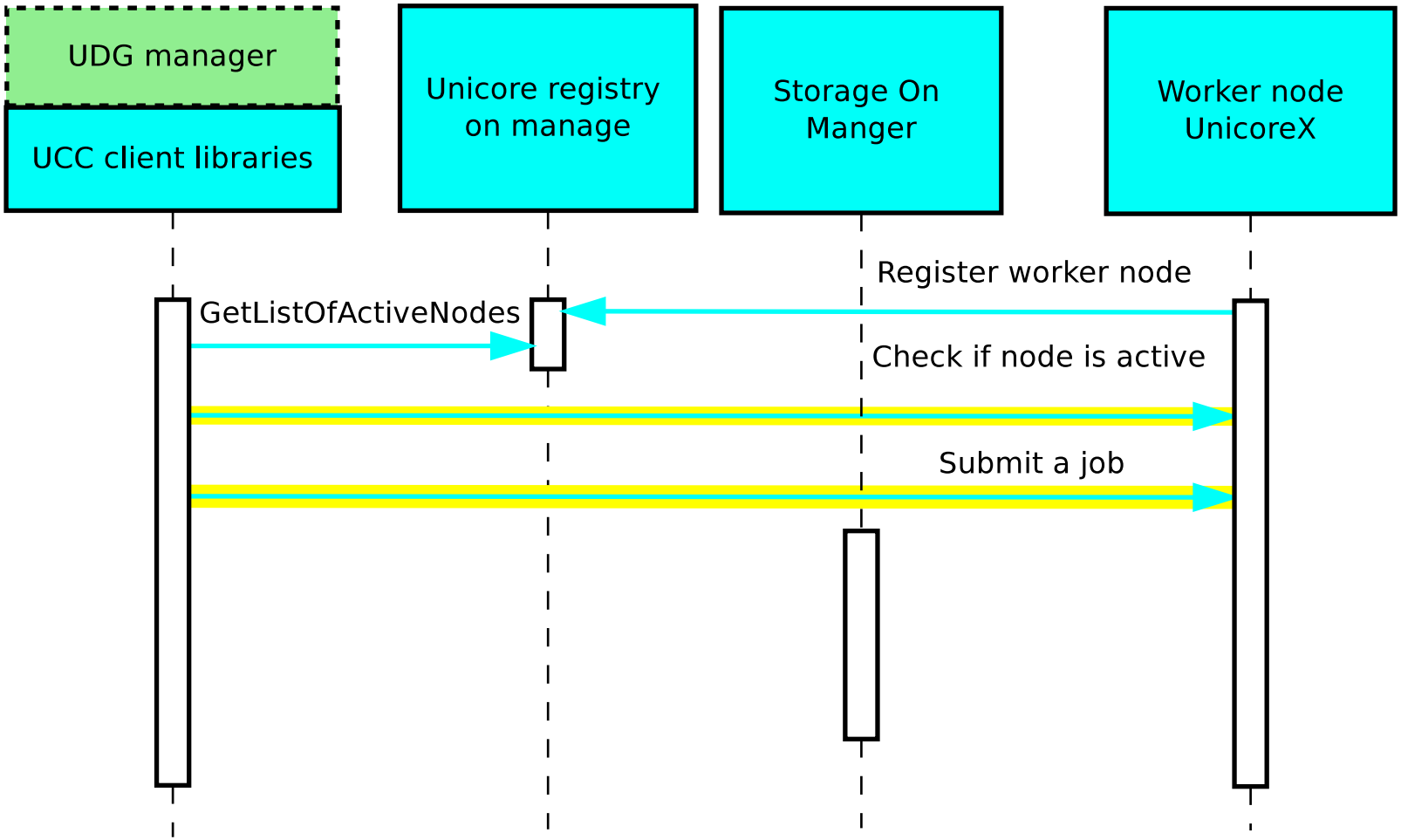
Architecture of UNICORE desktop grid

Communication UNICORE desktop grid

Security

Simple efficiency test

Conclusion and future work



Getting data for computations

Unicore Desktop Grid

Jakub Jurkiewicz, Piotr Bała

Dekstop Grids, Community Grids

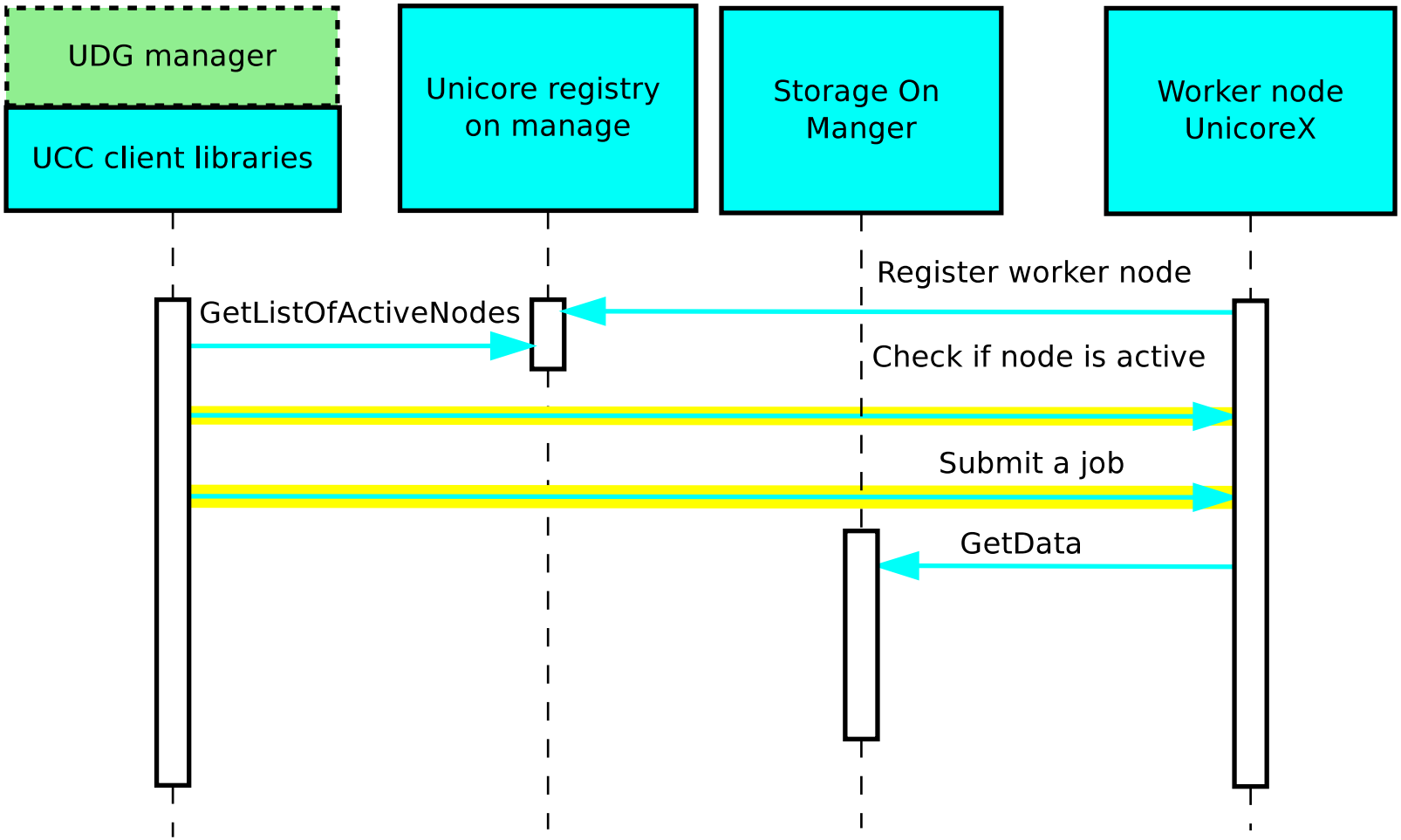
Architecture of UNICORE desktop grid

Communication UNICORE desktop grid

Security

Simple efficiency test

Conclusion and future work



Checking computations state

Unicore Desktop Grid

Jakub Jurkiewicz, Piotr Bała

Dekstop Grids, Community Grids

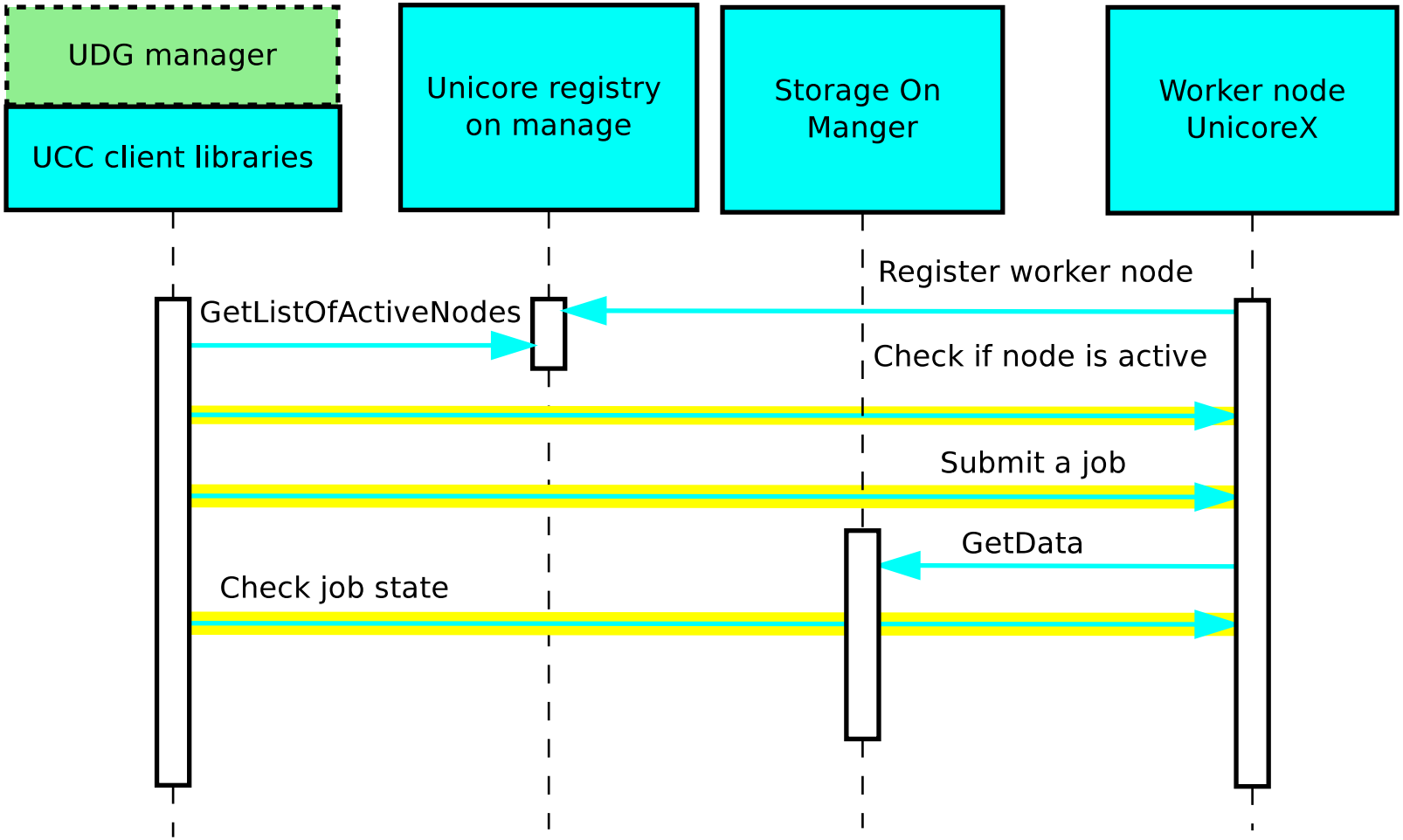
Architecture of UNICORE desktop grid

Communication UNICORE desktop grid

Security

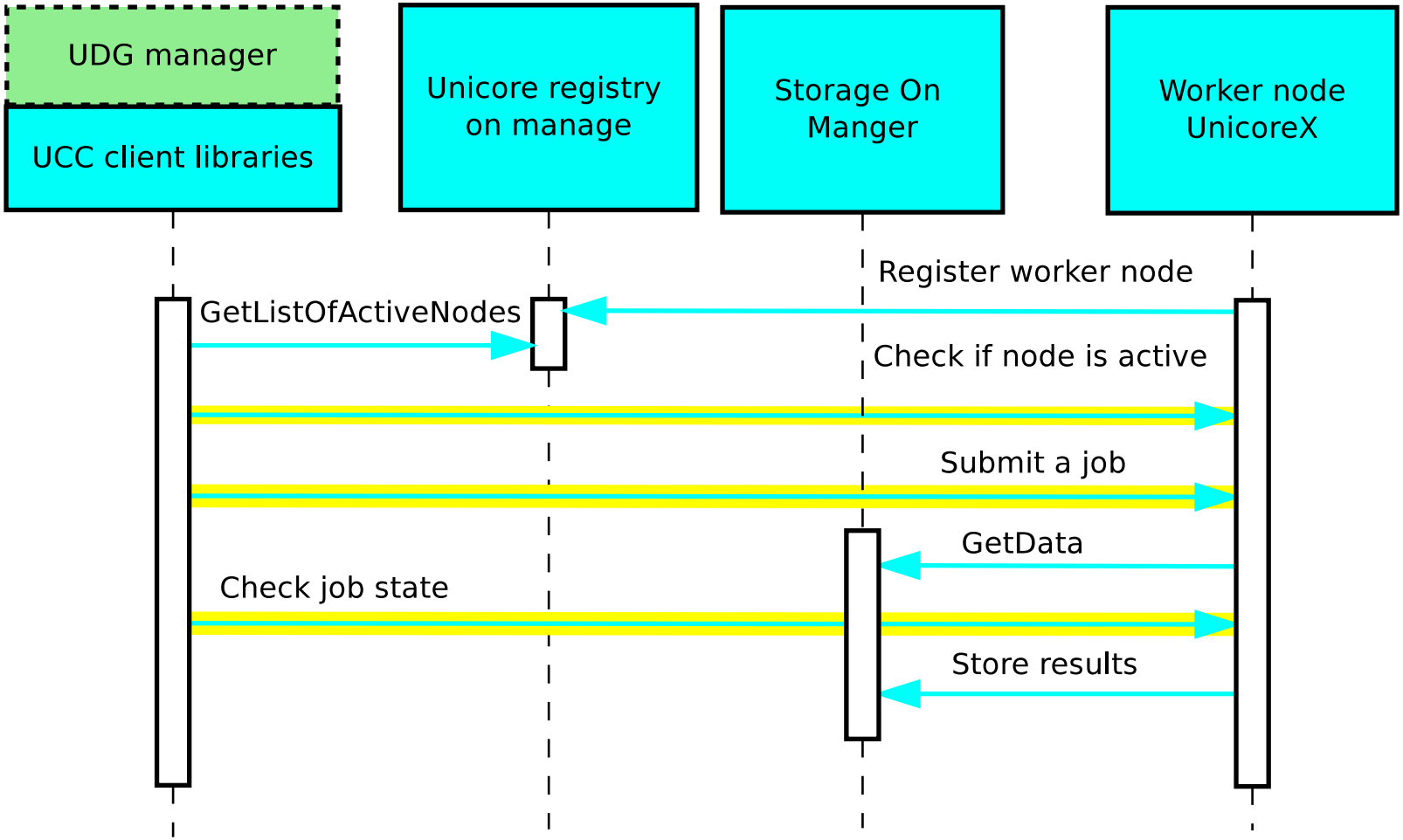
Simple efficiency test

Conclusion and future work



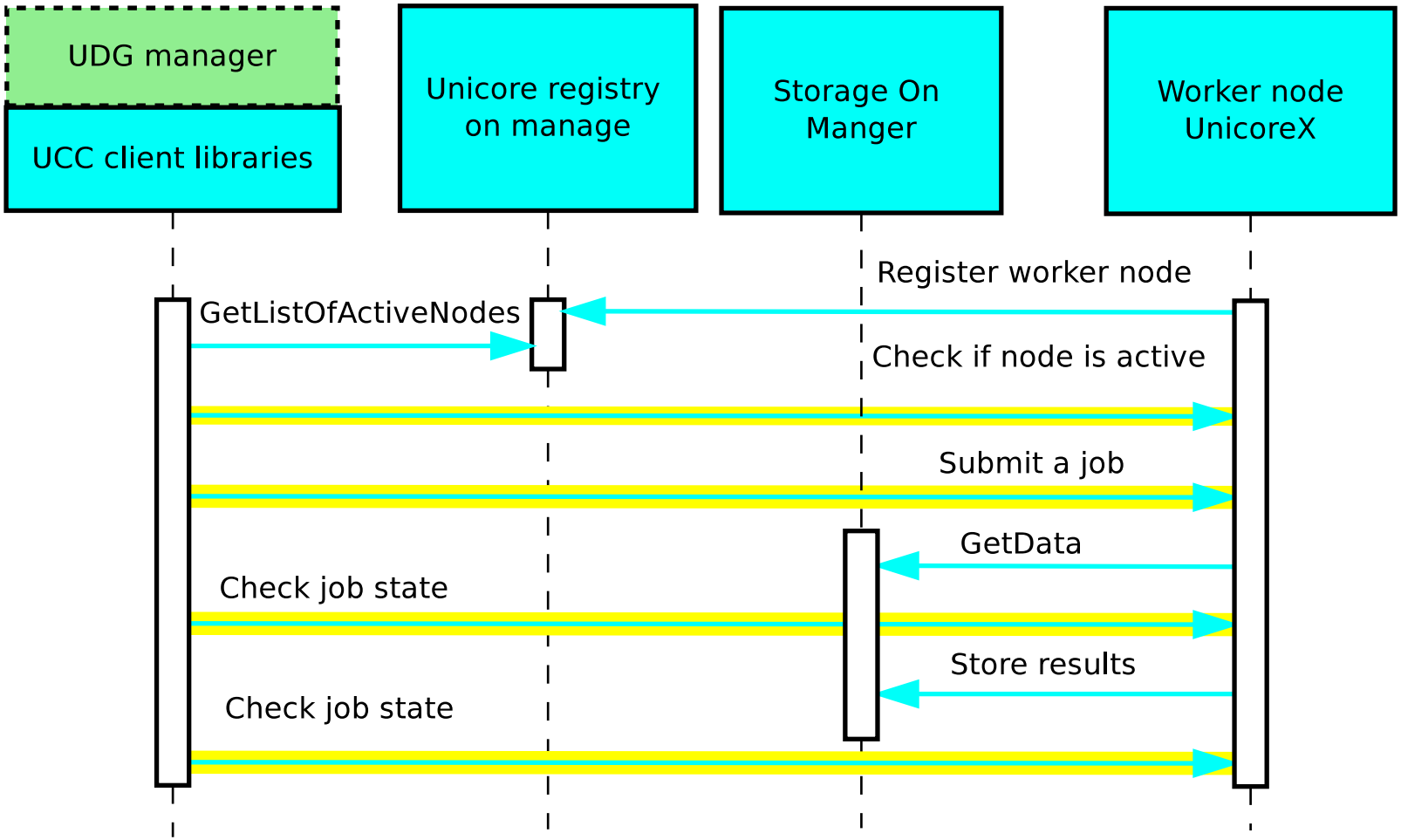
Storing results by the node

Unicore Desktop Grid
Jakub Jurkiewicz, Piotr Bała
Dekstop Grids, Community Grids
Architecture of UNICORE desktop grid
Communication UNICORE desktop grid
Security
Simple efficiency test
Conclusion and future work



Complete communication diagram

Unicore Desktop Grid
Jakub Jurkiewicz, Piotr Bała
Dekstop Grids, Community Grids
Architecture of UNICORE desktop grid
Communication UNICORE desktop grid
Security
Simple efficiency test
Conclusion and future work



Grid Manager

Grid manager uses his own certificate. In Future we could use explicit trust delegation for allowing running propare jobs on propare machines.

Nodes

Nodes use one certificate (they are identical).
We assume that in future nodes would be allowed to use more than one type of certificate. This would allow users to run jobs to only part of Desktop Grid - security of data.

Job

Job while connecting to data storage uses any certificate provided by manager in job description. Now it's one certificate for all, but it could be easy changed.

Node security

Actually all data stored now on disk are for:

- running job in UnicoreX: stdin, stdout, stderr – not job date
- work of Unicore - logging

Outline

Dekstop Grids, Community Grids

Architecture of UNICORE desktop grid

Communication UNICORE desktop grid

Security

Simple efficiency test

Conclusion and future work

1 Dekstop Grids, Community Grids

2 Architecture of UNICORE desktop grid
- Communication UNICORE desktop grid
- Security

3 Simple efficiency test

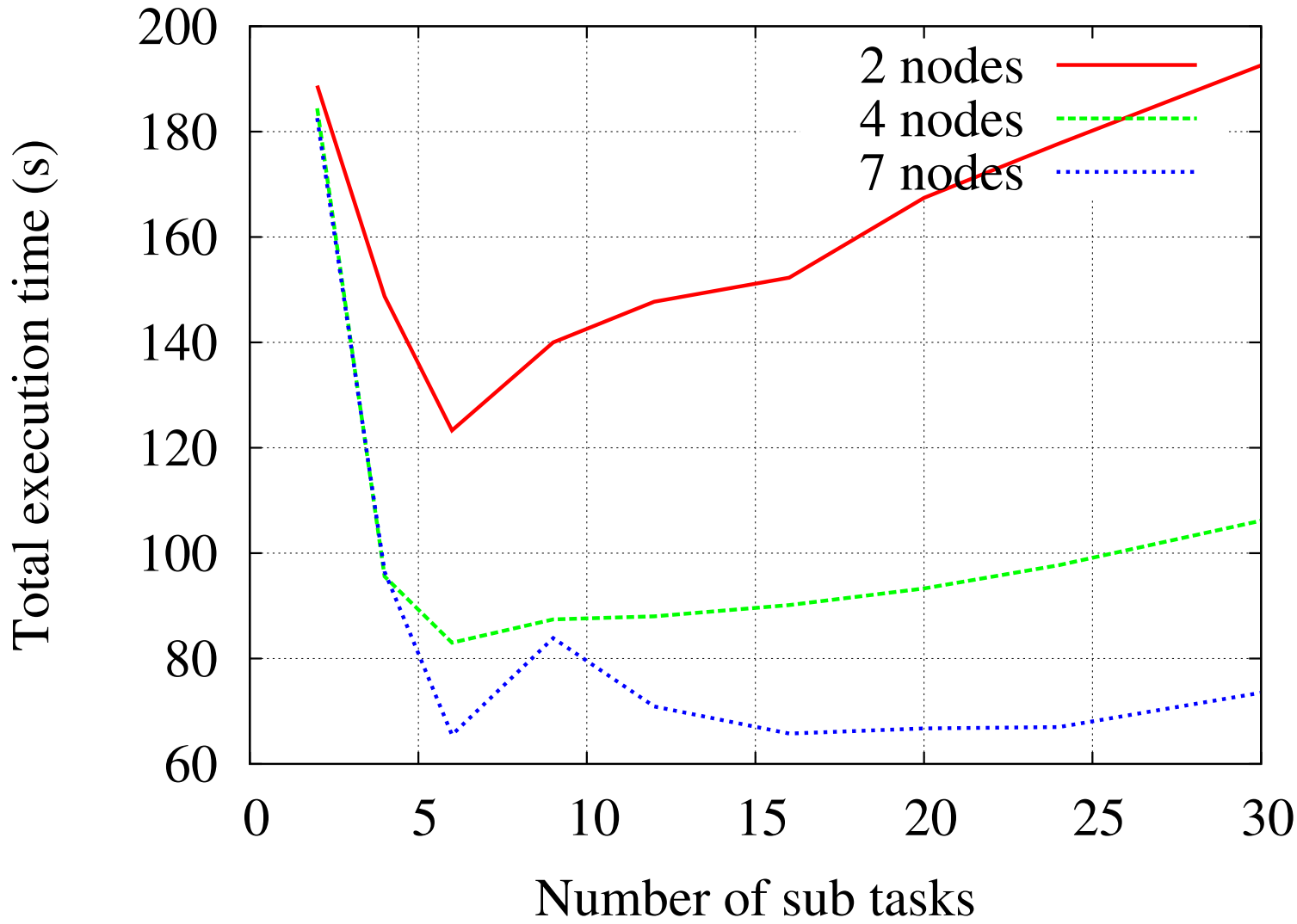
4 Conclusion and future work

Description

- tests before introducing https distributed proxy
- full availability of computers
- job - naive implementation of concurrent Mandelbrot set computing algorithm - pure balancing - may need more tasks then nodes
- jobs that took 236 seconds on a single computer

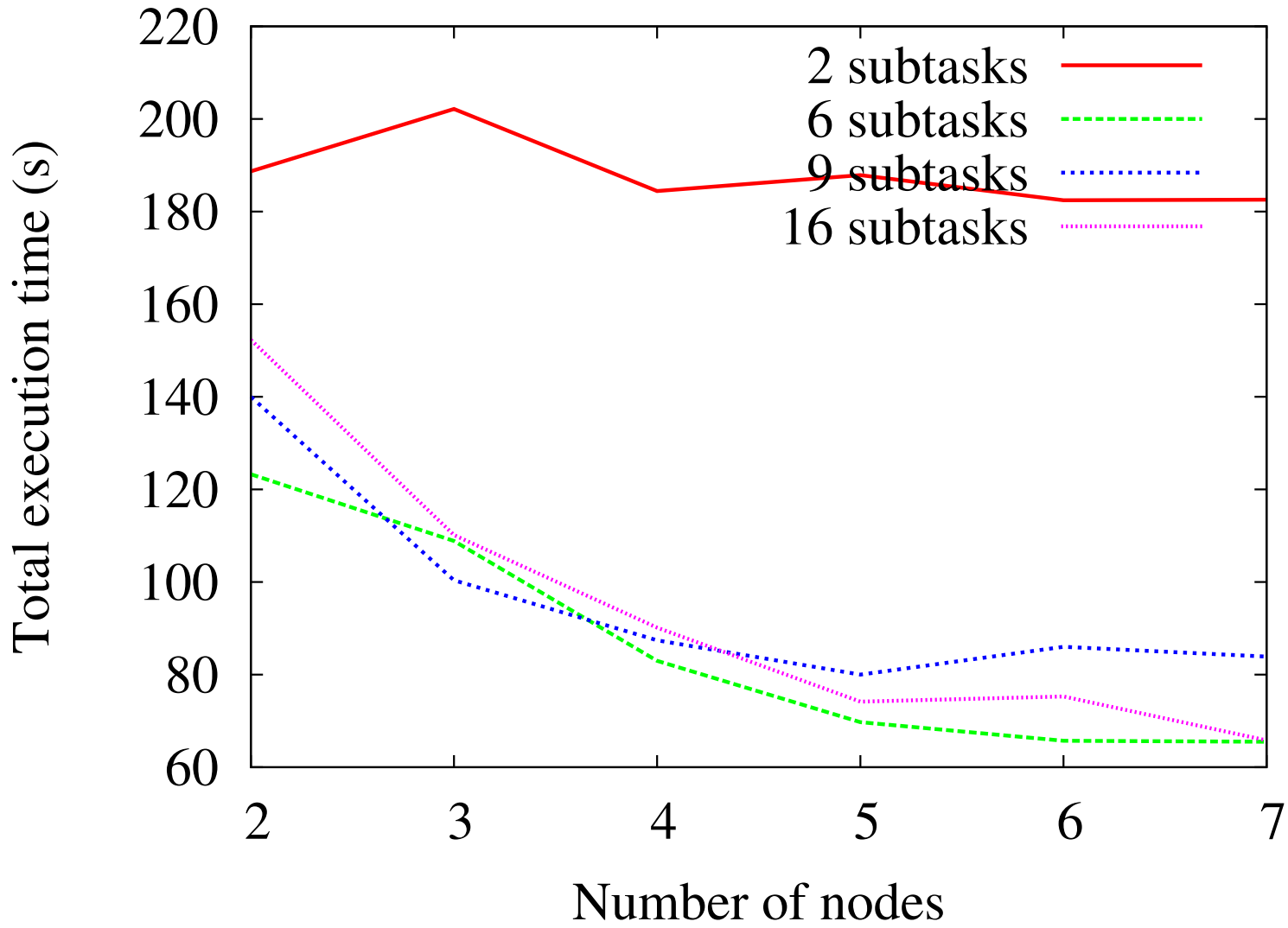
Time of computations for constant number of nodes

Unicore Desktop Grid
Jakub Jurkiewicz, Piotr Bała
Dekstop Grids, Community Grids
Architecture of UNICORE desktop grid
Communication UNICORE desktop grid
Security
Simple efficiency test
Conclusion and future work



Time of computations for constant number of tasks

Unicore Desktop Grid
Jakub Jurkiewicz, Piotr Bała
Dekstop Grids, Community Grids
Architecture of UNICORE desktop grid
Communication UNICORE desktop grid
Security
Simple efficiency test
Conclusion and future work



Scalability - speedup in test system

Unicore Desktop Grid

Jakub Jurkiewicz, Piotr Bała

Dekstop Grids, Community Grids

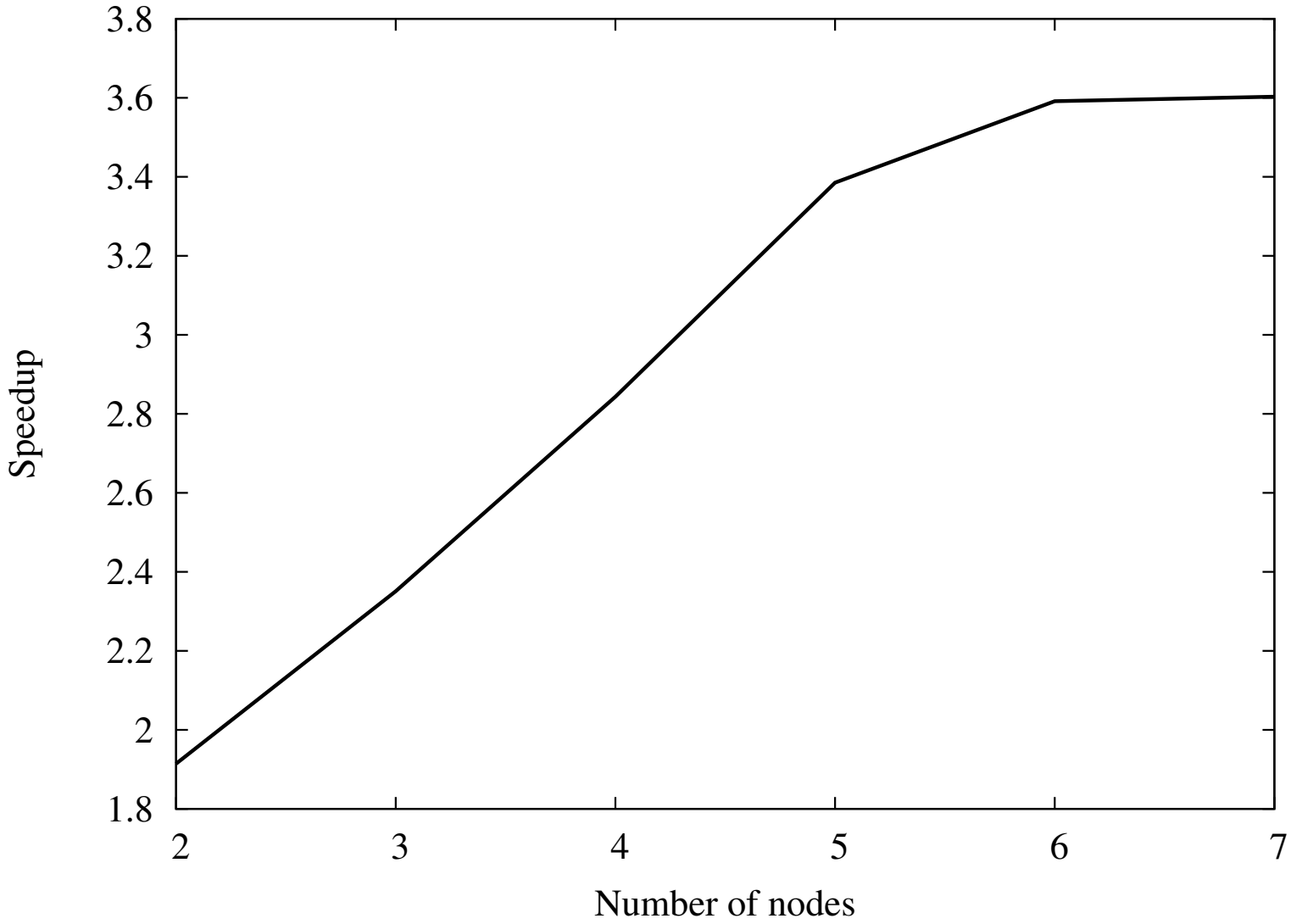
Architecture of UNICORE desktop grid

Communication UNICORE desktop grid

Security

Simple efficiency test

Conclusion and future work



Outline

Dekstop Grids, Community Grids

Architecture of UNICORE desktop grid

Communication UNICORE desktop grid

Security

Simple efficiency test

Conclusion and future work

1 Dekstop Grids, Community Grids

2 Architecture of UNICORE desktop grid
- Communication UNICORE desktop grid
- Security

3 Simple efficiency test

4 Conclusion and future work

Conclusions

- It is possible to create Desktop grid using Unicore middleware.

Future work

- Efficiency tests using more computing nodes in real environment with test jobs
- Deployment of real application, without UI
- Creation UI for submitting jobs
- Creating multi manager desktop grid.

Acknowledgements

Unicore Desktop Grid

Jakub Jurkiewicz, Piotr Bała

Dekstop Grids, Community Grids

Architecture of UNICORE desktop grid

Communication UNICORE desktop grid

Security

Simple efficiency test

Conclusion and future work

Work supported by:

- the joint project ICM UW and Telekomunikacja Polska S.A 22/06/6727/K/2006/YCZ268 Grid System Monitoring and Control Tools under grant FSO 023/2006.
- the project kardionet