

Minimum intrusion Grid

Grid research in the Nordic
Region – by example

MiG Motivation

(not every problem found in every middleware)

- Single point of failure
- Lack of scheduling
- Poor scalability
- No means of implementing privacy
- No means of utilizing 'cycle-scavenging'
- Firewall dependency
- Highly bloated middleware

MiG Idea

- MiG should address all the previous concerns
- GRID should be a system
 - not just a protocol between sites
- By having a set of servers that **are** GRID we get full control of GRID
 - we upgrade all machines at the same time
- Users and resources do not have to maintain anything

The desired user view of MiG

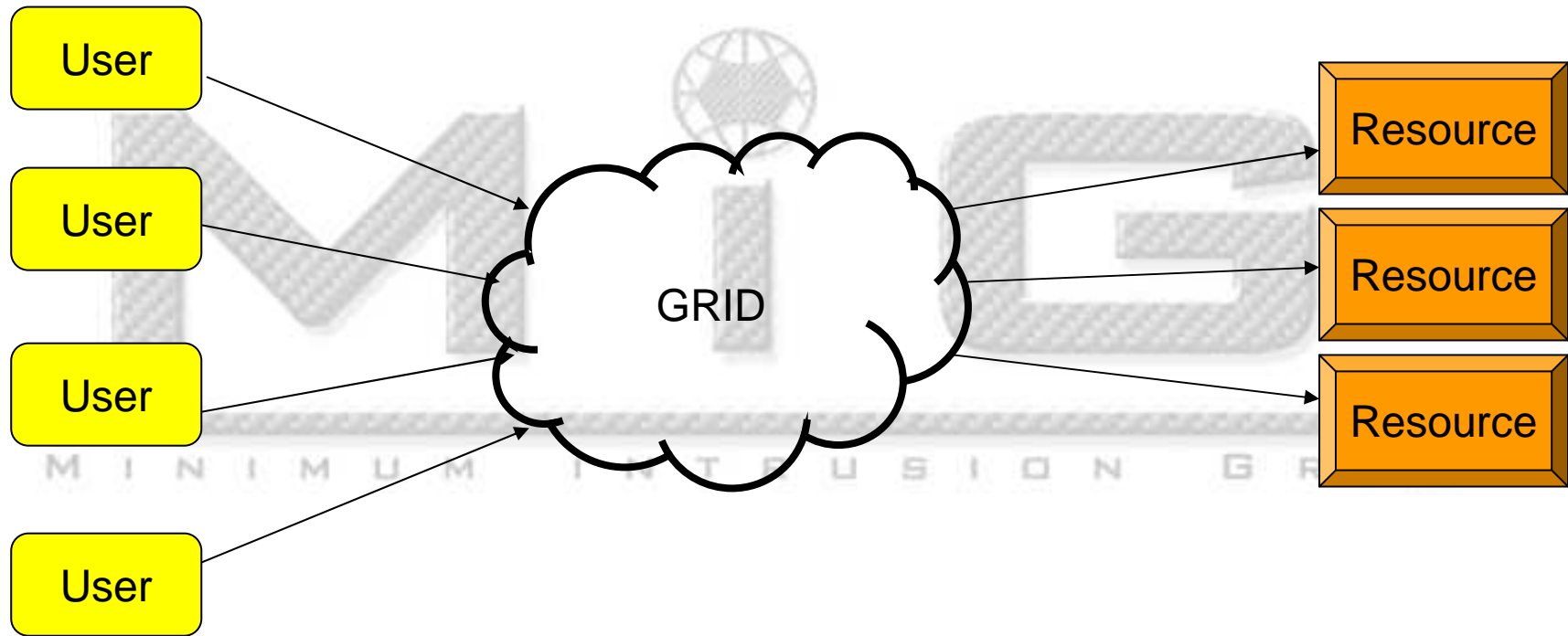
- MiG should be a virtual computer to the user
- Files are stored within MiG – each user has his own home-directory
 - In job descriptions files are relative to the users home-directory
- Eventually we'd like interactive application support
- Economically MiG should be fair

The desired resource view of MiG

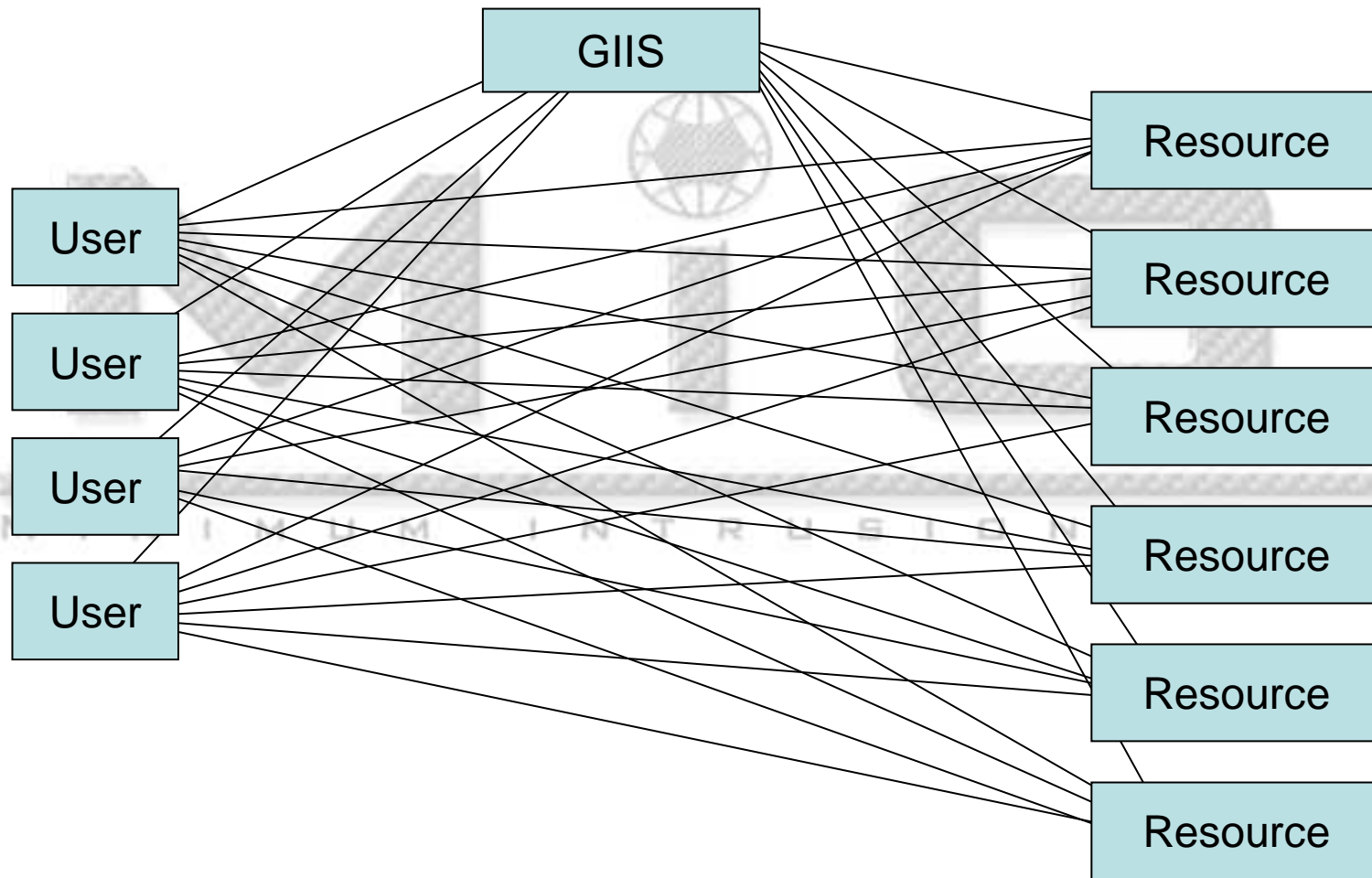
- MiG is just another user
 - or set of users
- Economically MiG should be fair



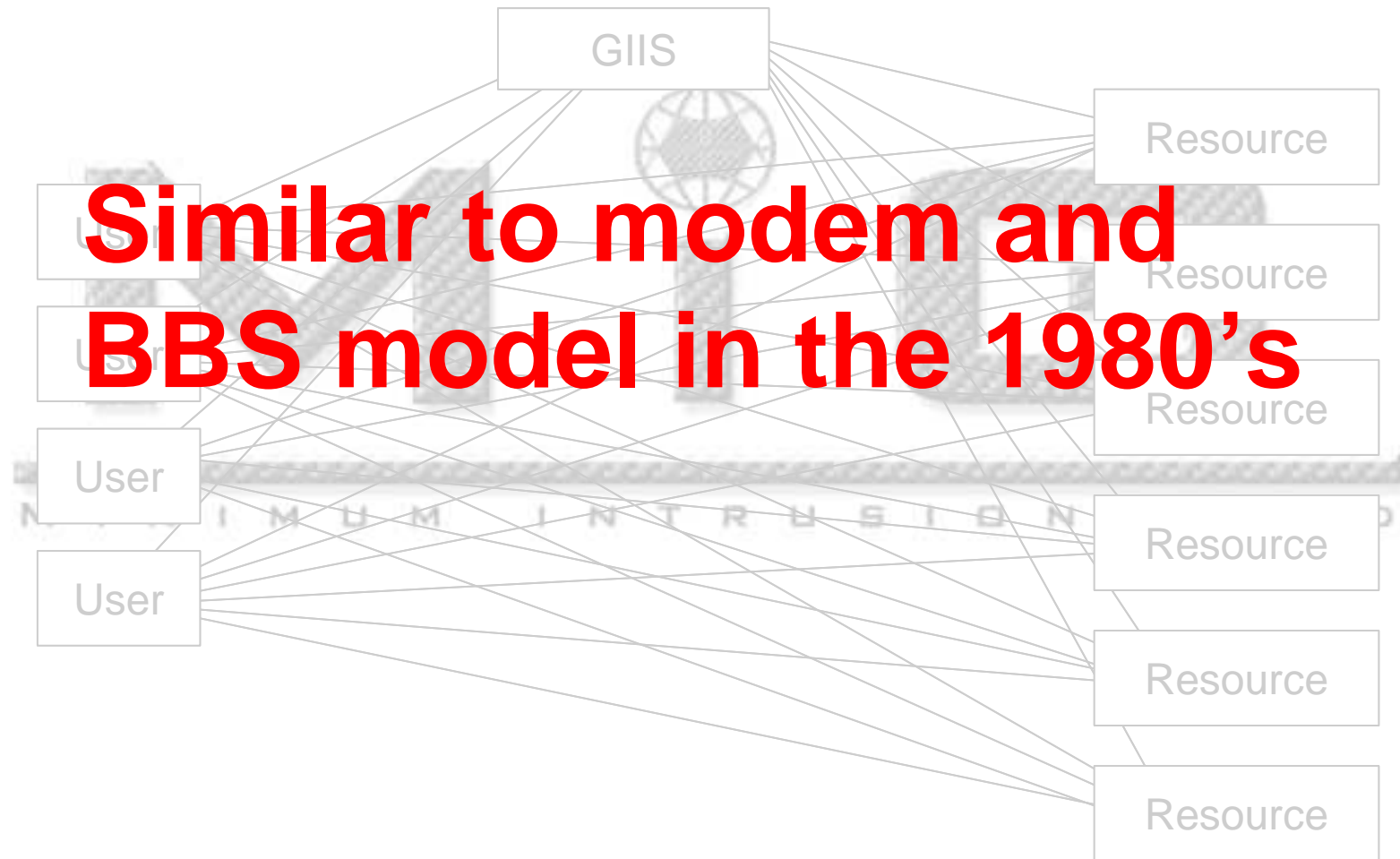
The abstract MiG model



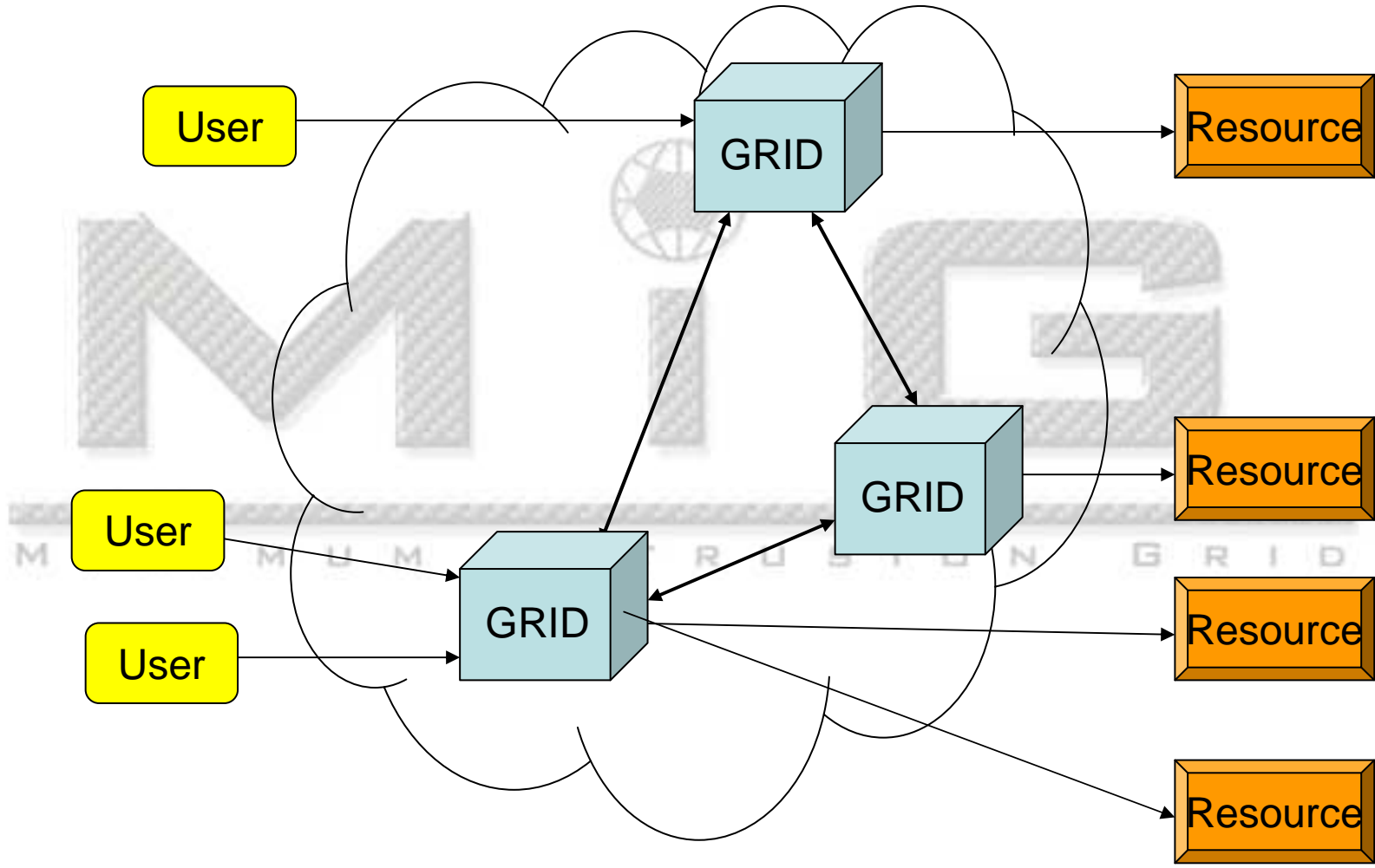
Classic Grid



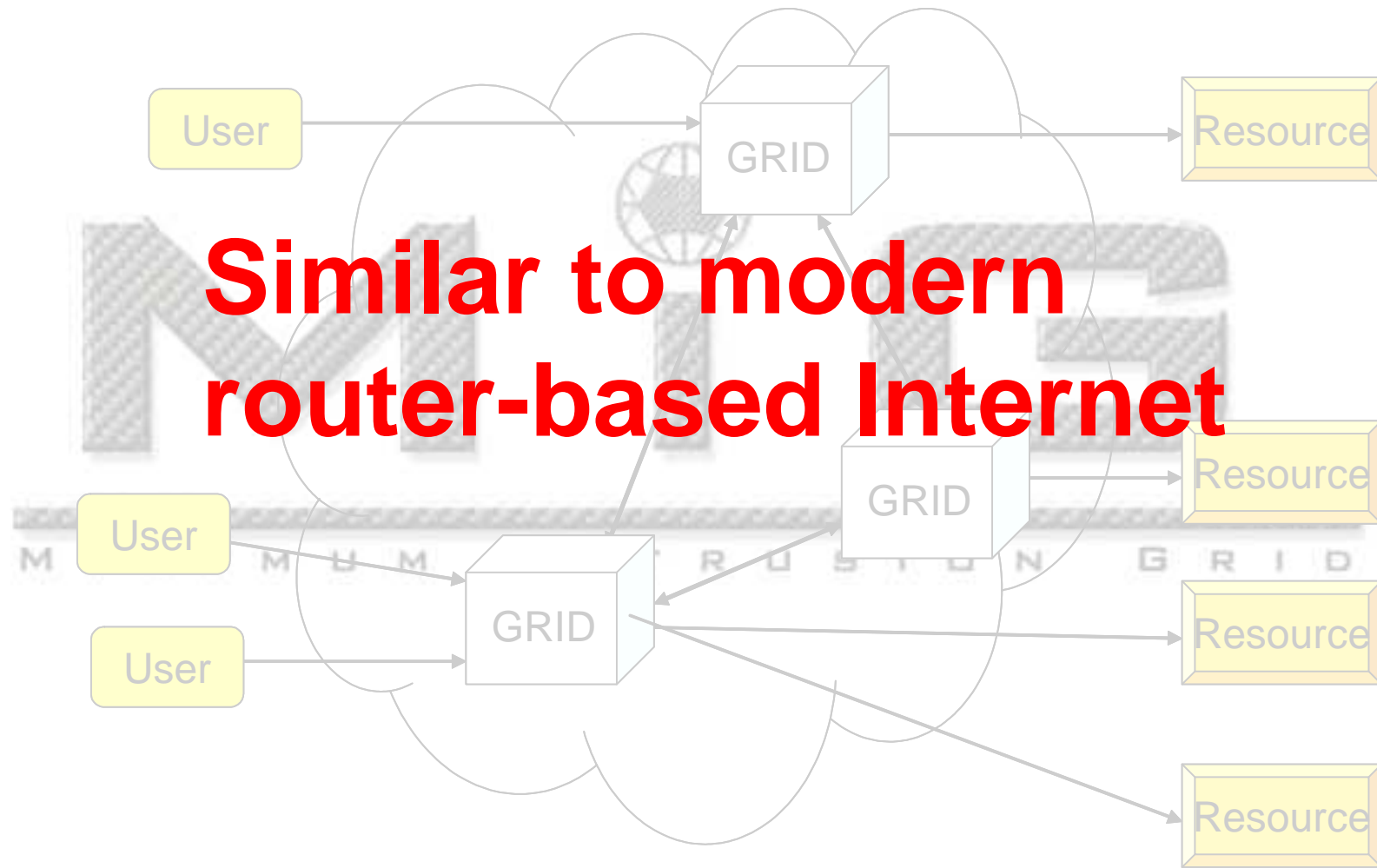
Classic Grid



Minimum intrusion Grid



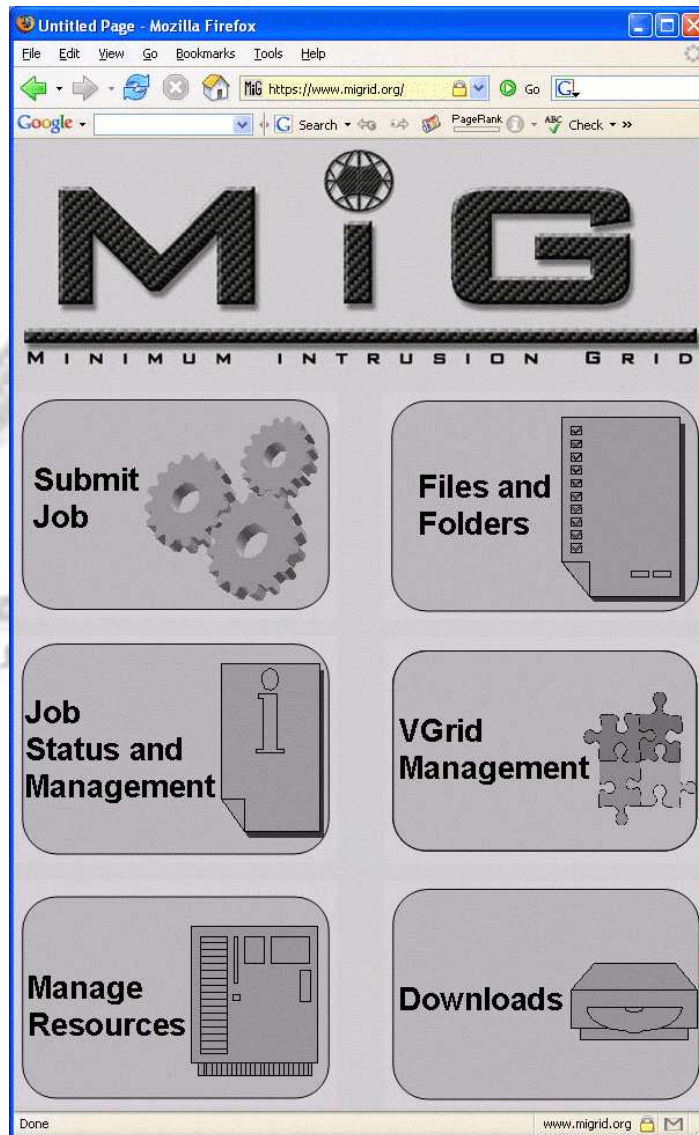
Minimum intrusion Grid



MiG Rules

- i. **Nothing** produced by MiG can be **required** to be installed on either the resource or client end
- ii. Everything within MiG must be implemented in Python unless another language is absolutely required
- iii. Any design and implementation decision must optimize towards transparency for the users
- iv. Anything that is not right must be thrown away

Welcome to MiG



Transparent Remote File Access

- Huge input files incur a number of problems:
 - Download time vs. total execution time
 - Job execution on the resource is delayed
 - Storage requirements on resources
 - Often only small scattered fragments of input files are needed
- We seek to fix this using automatic on-demand download

Baseline Performance (100Mb LAN)

Experiment	Local	Copy	Remote
1B file	0.002	0.152	0.008
Checksum	50.11	130.10	114.30
Balanced	632.83	721.22	600.72
B+ Tree	0.002	30.692	0.019

The One-Click resource

- The web-browser as a Grid resource
 - Uses java applet plugin
 - No installation required
 - No administrative work required
 - All devices capable of running a JVM can be addressed
- Security
 - Secure communication through https
 - Sandboxed through the java applet security model
 - No local file access
 - No local process execution

One Click

The screenshot shows a Mozilla Firefox browser window titled "MiG Ressource - Mozilla Firefox". The address bar displays the URL "https://amigos18.diku.dk:3044/cgi-bin/oneclick". The browser's search bar contains "owner:ucberkeley". The main content area features a black background with white text and two 3D protein structure models. The text includes: "MiG Resource: oneclick.1", "MiG Server: https://amigos18.diku.dk:3044", "MiG Status: Retrieving new job.", "MiG Jobs done: 36", and "MiG Jobs failed: 0". The first model is a white and purple helix, and the second is a yellow and pink beta-sheet structure. The status bar at the bottom shows "Applet MiG.oneclick.Applet started" and "amigos18.diku.dk:3044" with a "siteadvisor" icon.

MiG Resource: oneclick.1
MiG Server: https://amigos18.diku.dk:3044
MiG Status: Retrieving new job.
MiG Jobs done: 36
MiG Jobs failed: 0

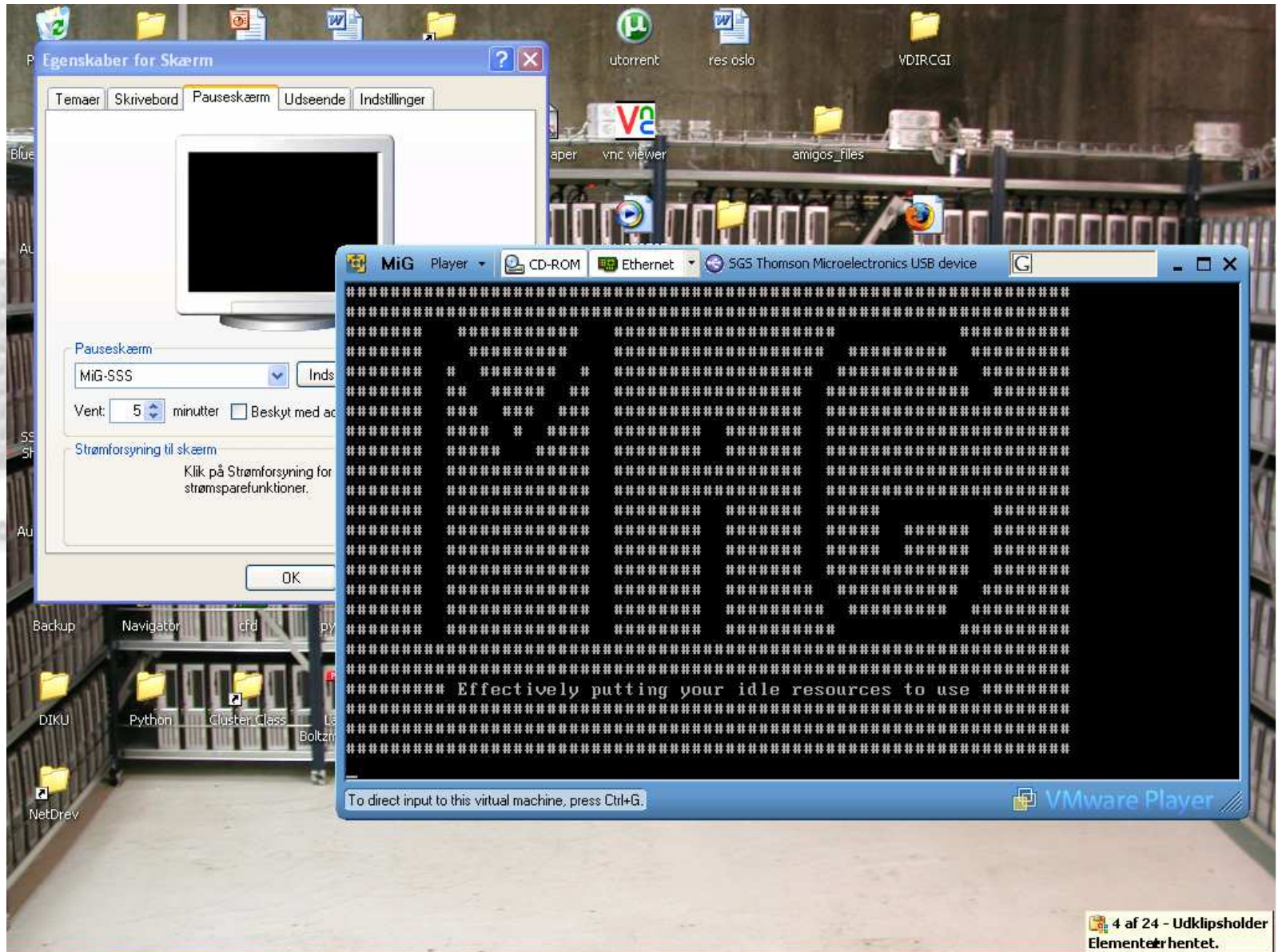
Applet MiG.oneclick.Applet started

amigos18.diku.dk:3044 siteadvisor

MiG-SSS

- The goal is to combine Screen Saver Science and Public Resource Computing:
 - Harvest idle compute cycles from computers in screen saver mode
 - Put them on tap for grid jobs!
- Implemented as a virtual machine that is controlled by the screen-saver component
- Got a migration feature
 - But this requires high bandwidth and is currently not suited for ADSL lines

MiG-SSS



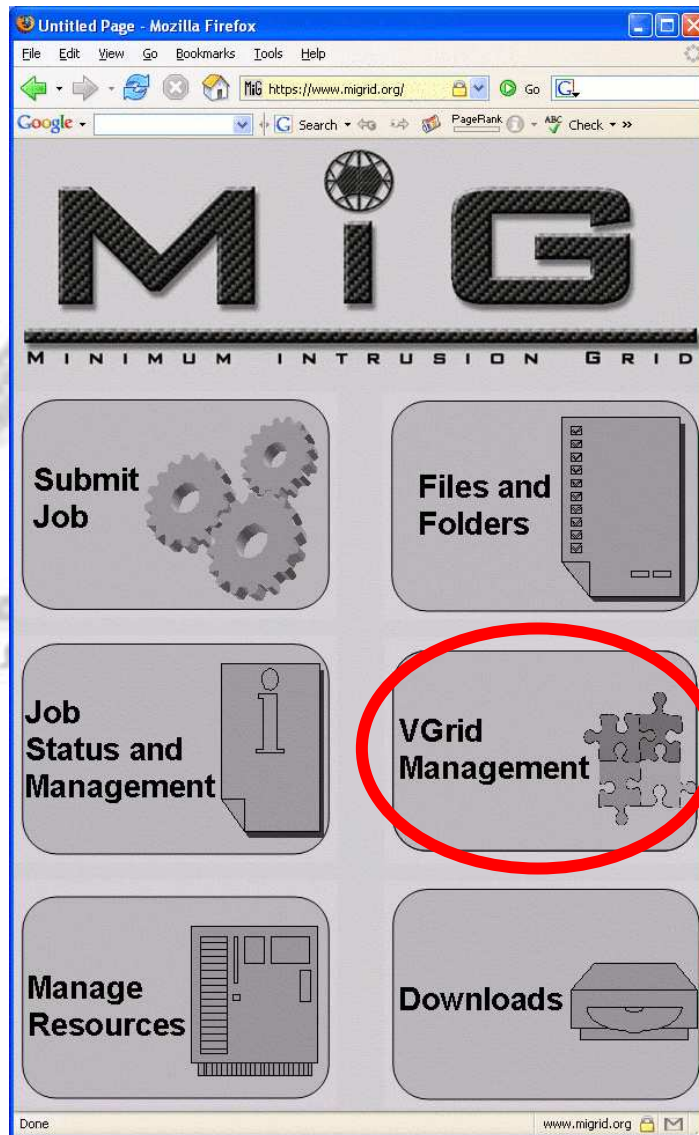
PS3 on MiG

- The Cell CPU is a multi-core microprocessor (9 cores)
 - Basically a (1 master)/(8 node) cluster on a chip
- 200+ GFlops (SP) @ 3.2 GHz
- 20+ Gflops (DP) @ 3.2 Ghz
- A lot of PS3's will be available
- A live Linux CD puts PS3's on MiG

VGrids

- Best thing since sliced bread ☺
- VGrids are Virtual Organizations in MiG
- They are a dead easy way to create collaborations
 - Share files
 - Share resources
 - Private entrypage
 - Public Webpage

VGrids



VGrid creation

MiG vgrid list - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

Go

Google ion webdav server Search PageRank Check AutoLink

MiG

MINIMUM INTRUSION GRID

MiG vgrids owned by Brian_Vinter

List of vgrids where you are registered as owner:

Select	Name	Action	Private page	Public page	Wiki	Monitor
<input type="checkbox"/>	dalton	Administrate	Enter --- Edit	Enter --- Edit	Enter	View
<input type="checkbox"/>	poverty	Administrate	Enter --- Edit	Enter --- Edit	Enter	View
<input type="checkbox"/>	RAGE	Administrate	Enter --- Edit	Enter --- Edit	Enter	View
<input type="checkbox"/>	MiG-Middleware	Administrate	Enter --- Edit	Enter --- Edit	Enter	View
<input type="checkbox"/>	Preprint	Administrate	Enter --- Edit	Enter --- Edit	Enter	View
<input type="checkbox"/>	MiG-developers	Administrate	Enter --- Edit	Enter --- Edit	Enter	View
<input type="checkbox"/>	GMT	Administrate	Enter --- Edit	Enter --- Edit	Enter	View
<input type="checkbox"/>	VGrid	Administrate	Enter --- Edit	Enter --- Edit	Enter	View
<input type="checkbox"/>	GTA-2006	Administrate	Enter --- Edit	Enter --- Edit	Enter	View
<input type="checkbox"/>	eInformation	Administrate	Enter --- Edit	Enter --- Edit	Enter	View
<input type="checkbox"/>	Sandbox	Administrate	Enter --- Edit	Enter --- Edit	Enter	View
<input type="checkbox"/>	MDGrid	Administrate	Enter --- Edit	Enter --- Edit	Enter	View
<input type="checkbox"/>	Display-Wall	Administrate	Enter --- Edit	Enter --- Edit	Enter	View
<input type="checkbox"/>	SUN-VLab	Administrate	Enter --- Edit	Enter --- Edit	Enter	View
<input type="checkbox"/>	RAGE/BLAST	Administrate	Enter --- Edit	Enter --- Edit	Enter	View
<input type="checkbox"/>	Preprint/Grid	Administrate	Enter --- Edit	Enter --- Edit	Enter	View

List of vgrids where you are registered as member:

You aren't listed as member of any vgrids.

Create vgrid

Find: python Find Next Find Previous Highlight all Match case Reached end of

Done mig-1.imada.sdu.dk siteadvisor

Type VGrid name and press Create VGrid

VGrid creation

MiG vgrid list - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

Go

Google ion webdav server Search PageRank Check AutoLink

MiG

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<input type="checkbox"/>	RAGE	Administrate	Enter --- Edit	Enter --- Edit	Enter	View
<input type="checkbox"/>	MiG-Middleware	Administrate	Enter --- Edit	Enter --- Edit	Enter	View
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<input type="checkbox"/>	eInformation	Administrate	Enter --- Edit	Enter --- Edit	Enter	View
<input type="checkbox"/>	Sandbox	Administrate	Enter --- Edit	Enter --- Edit	Enter	View
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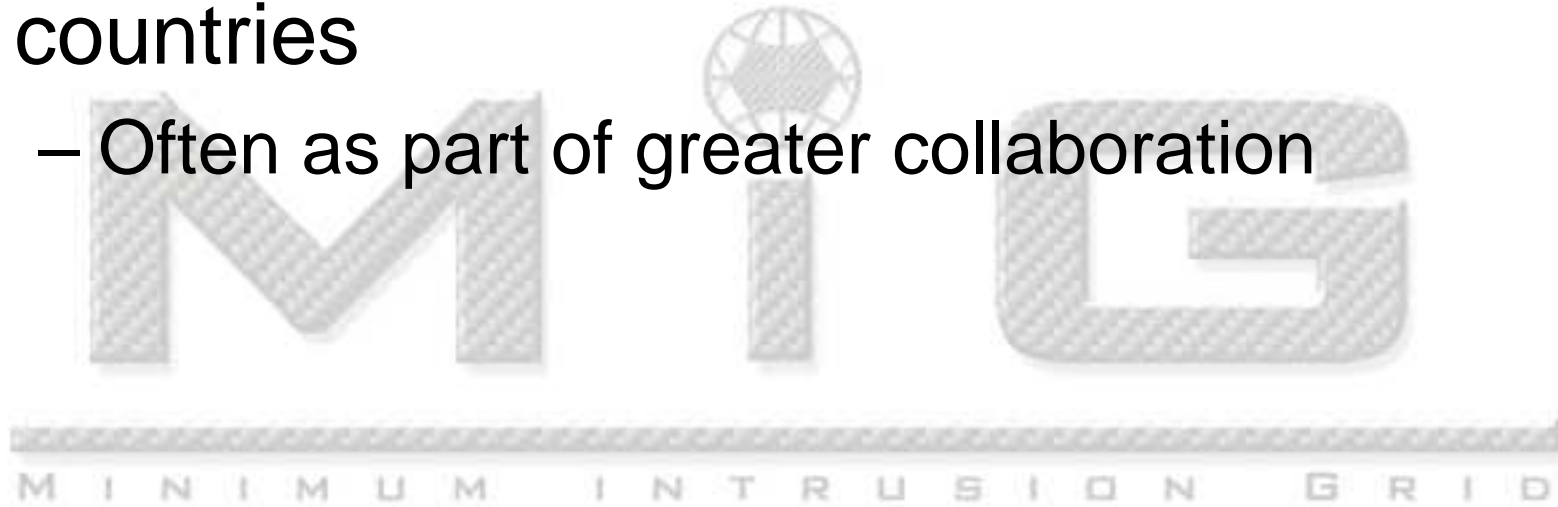
Done mig-1.imada.sdu.dk siteadvisor

You can even create VGrids within VGrids – just name the VGrid as a subdirectory

Type VGrid name and press Create VGrid

MiG is just the example

- Grid research similar to MiG goes on in all countries
 - Often as part of greater collaboration



QADPZ - NTNU

- Desktop PC oriented Grid system
- Open Source
- Designed for very dynamic applications
- Several happy users around the world

MINIMUM INTRUSION GRID

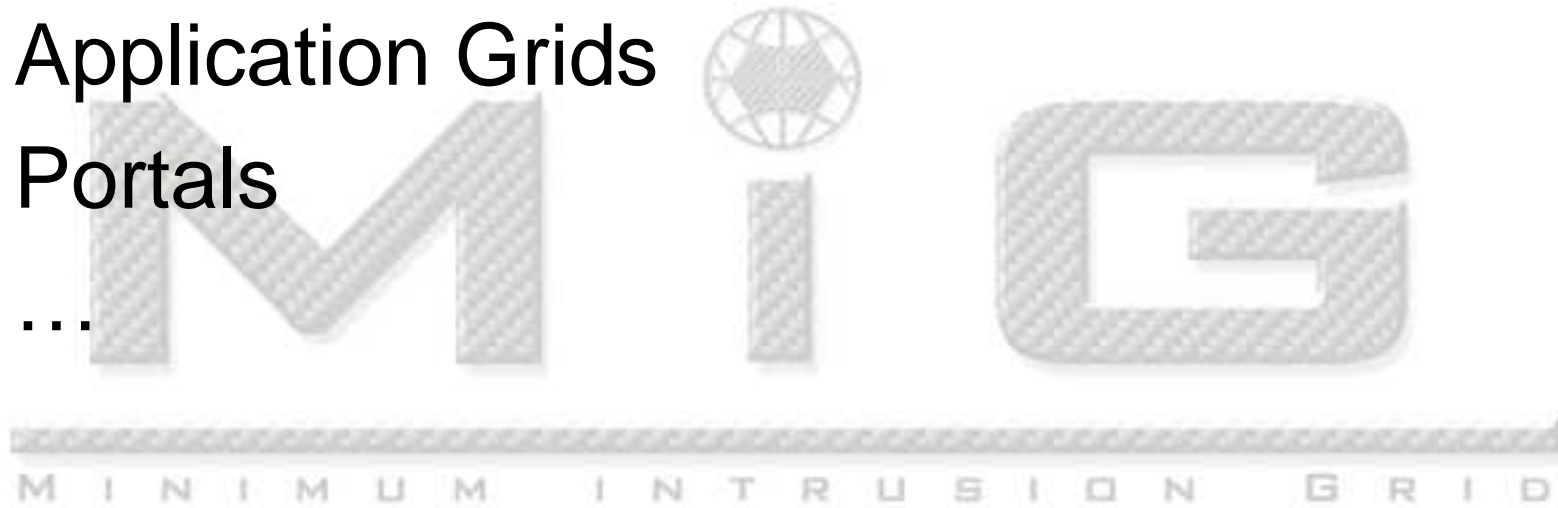
GIRD - Umeå

- Adds value to existing middlewares and glues them together
 - Accounting
 - Scheduling
 - Multi-Grid submission

M I N I M U M I N T R U S I O N G R I D

Other Grid activities

- Semantic Grid
- Application Grids
- Portals
- ...



Collaborations

- CoreGRID

- gLite

- DEISA

- Globus

- ...



For more information

The logo for MIGRID features the letters 'M', 'I', and 'G' in a large, bold, sans-serif font. The 'M' and 'G' are filled with a diagonal hatching pattern, while the 'I' is a solid black vertical bar. Above the 'I' is a small globe icon with latitude and longitude lines. The text 'www.migrid.org' is overlaid in a large, black, sans-serif font across the middle of the logo.

www.migrid.org

MINIMUM INTRUSION GRID