



# Arnes and Slovenian Grid Infrastructure

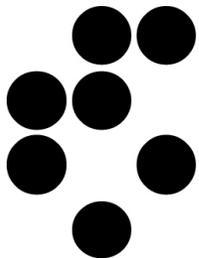


Avgust Jauk, Arnes

Jan Jona Javoršek, Jožef Stefan Institute

thanks to Barbara Krašovec, Andrej Filipčič, Dejan Lesjak

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# SLING Partnership

- Consortium of interested partners  
(academia and industry)
- Founding members:
  - Arnes (legal representative):  
Academic and Research Network of Slovenia
  - Jožef Stefan Institute  
SiGNET Cluster



# Ingredients

- Grid Knowledge (JSI)
  - JSI manages a growing grid cluster
  - integrated in both NorduGrid and EGEE
  - supporting several international VOs
- Infrastructure (Arnes)
  - networking and infrastructure know-how
  - project management capability
  - established support infrastructure
  - discipline-neutral position in academia



# Arnes

- Arnes: Academic and Research Network of Slovenia
- Public institute
- Service provider for Research & Education in SI
  - Network
  - Services
- Mission: to provide efficient infrastructures and services in order to allow Slovenia equal opportunities for cooperation in the unified European research and educational area.



# Arnes – int. collaboration

- member of TERENA, CEENet, RIPE, CENTR, EURid, FIRST, Euro-IX
- co-founder of DANTE
- works with SAFE-SI & European Safer Internet



# Arnes – User Community

- Closed user group!
- 1.100 connected institutions:
  - Universities, institutes, research laboratories
  - Museums, schools, (digital) libraries
- 200.000 individual users



# Arnes - Services

- Connectivity (IPv4, IPv6, multicast, point-to-point)
- Mobility (ArnesAAI, Eduroam)
- Multimedia (videoconferencing, streaming, VoD)
- Hosting (email, CMS, LMS, forums, virtual servers)
- Security (Si-Cert, server certificates)
- NTP, FTP, usenet news, IRC, ...
- SIX, Domain registration for .SI + DNS
- User support : Helpdesk, NOC, Pert
- User education, conferences
- Development (International collaboration!)



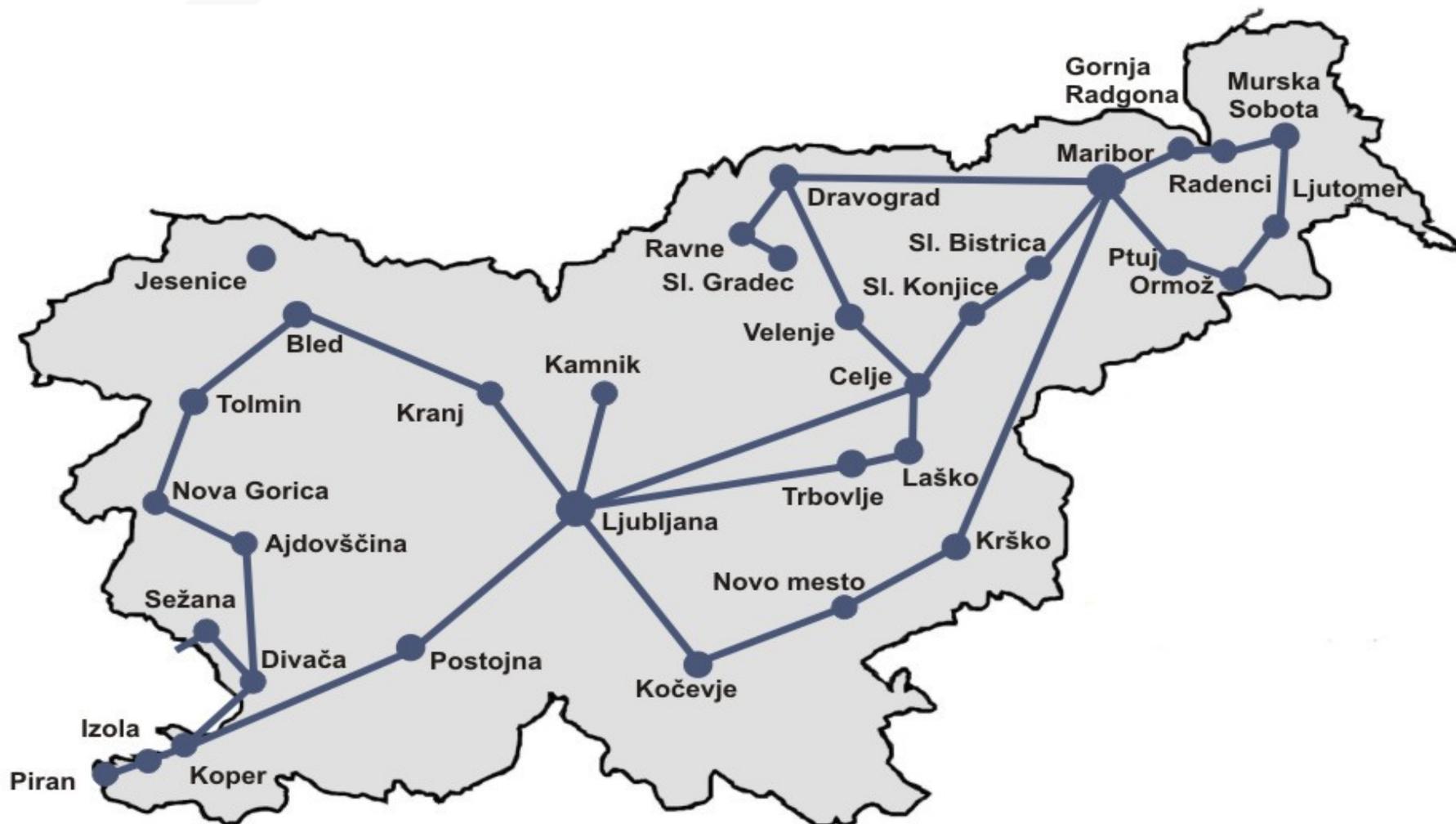
# Connectivity Services

Support for “advanced” as well as “ordinary” users

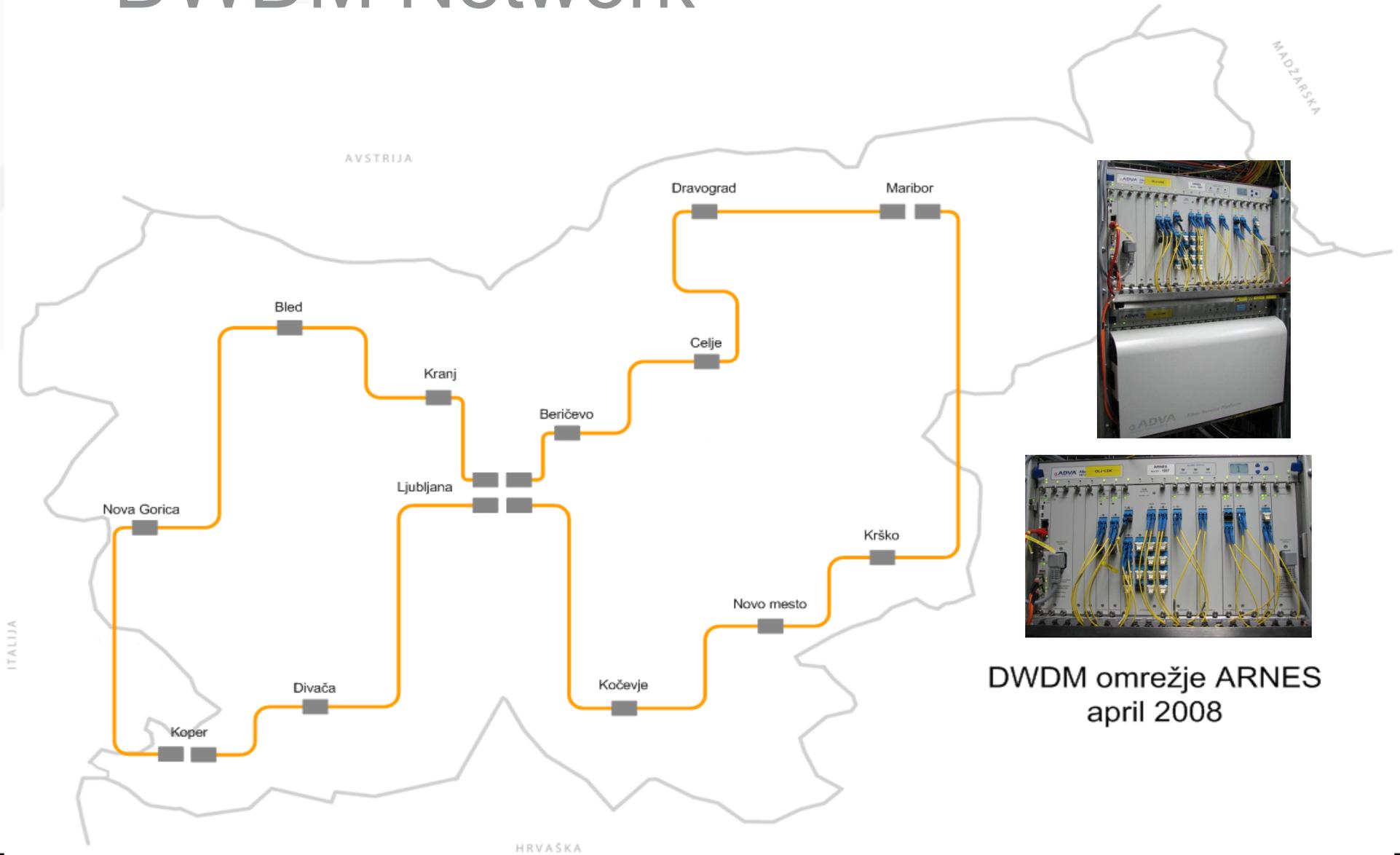
- Advanced users
  - Research experiments, Grids, ...
    - Physics, Chemistry, Meteorology, ...
  - Business Continuity, Disaster Recovery
    - Data replication, remote backup, ...
- Hybrid network model
  - IP (IPv4, IPv6)
    - QoS, multicast
  - Dedicated point-to-point links (Gbps, 10Gbps)
- International connectivity (GÉANT)



Foundation: 1600 km of leased fiber

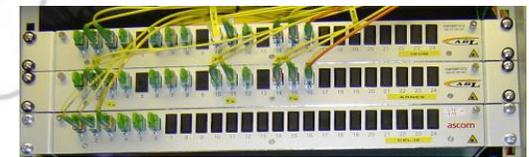
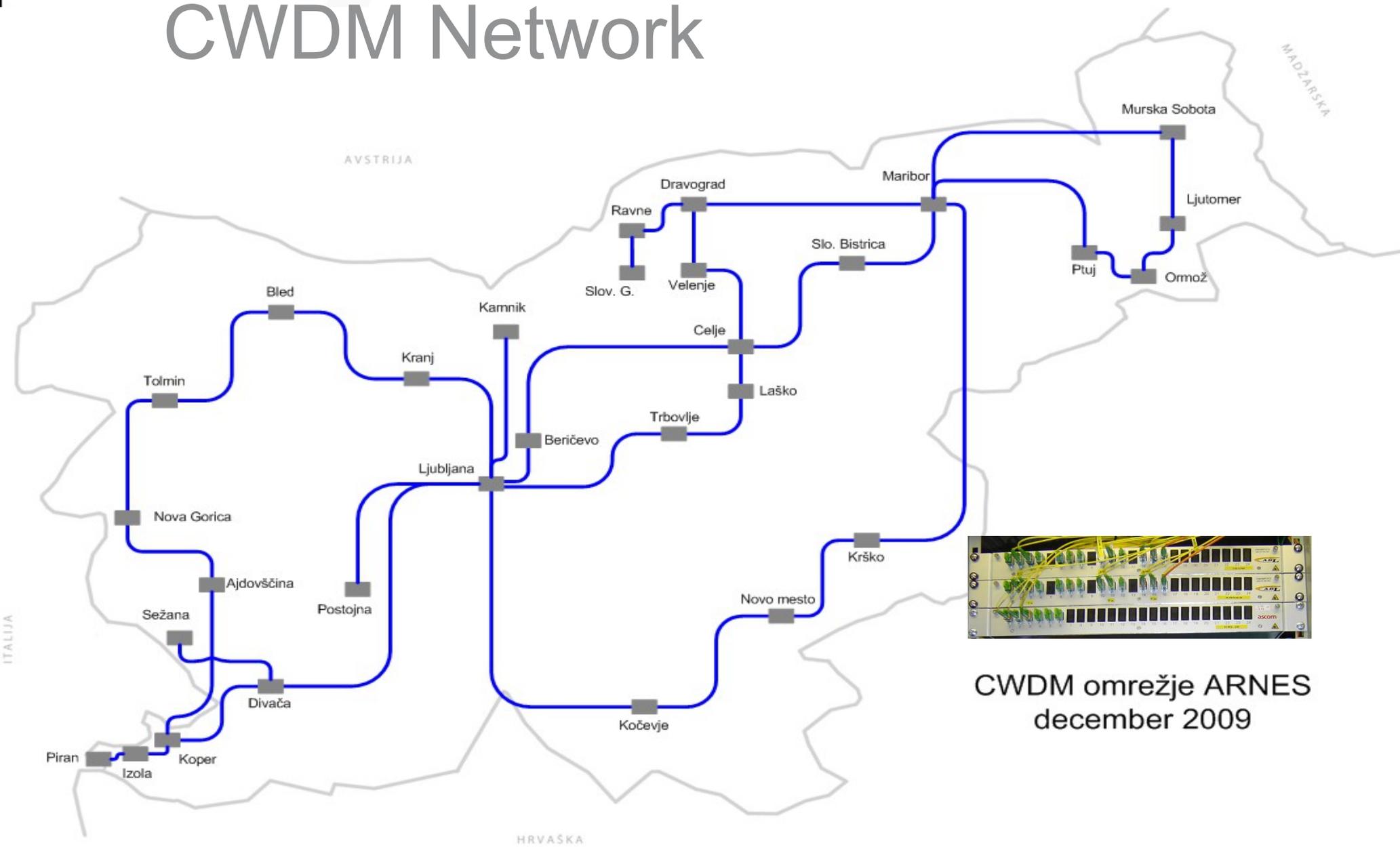


# DWDM Network



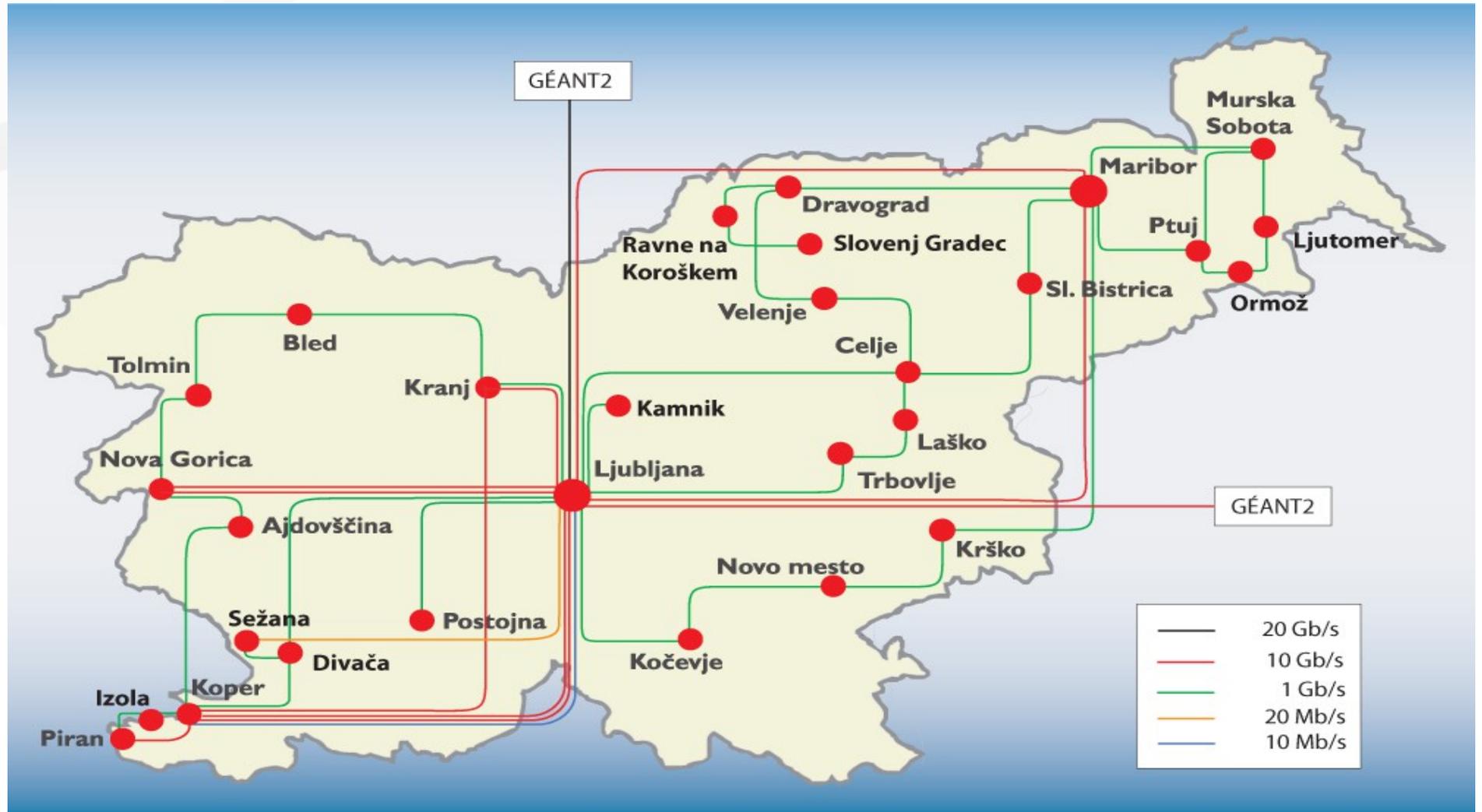
DWDM omrežje ARNES  
april 2008

# CWDM Network



CWDM omrežje ARNES  
december 2009

# ARNES Network – link capacity



# JSI: Evolving National Grid

- SiGNET cluster from 2004 (1152 64-bit cores)
- NorduGrid ARC  
gLite support for EGEE
- Support for:
  - ATLAS (distributed Nordic Tier1, dCache)
  - Pierre Auger
  - Belle
  - smaller VOs (including new HLT VO)



# Slovenian Grid Network



- Consortium of Institutions
- Network of Grid Centres
- Based on NorduGrid ARC, optional gLite
- Pluggable chrooted execution environments
- Support for EGI.eu:
  - central services for gLite
  - optional dual-middleware support for clusters where needed by VOs



# SLING Infrastructure

- Central services at Arnes  
(ARC and backup services at IJS)
- Testing/Demo cluster at Arnes  
(288 cores, 48TB of disk space)
- Support for national VOs:
  - ops
  - demo/testing VOs
  - national discipline/project VOs



# International Services

- Middleware / VO software testing  
(pluggable chroot environments)
- Control Tower for Atlas on ARC
- Nagios checking for EU Grid PMA  
(mirrored at other PMAs)
- Pluggable chroot environments  
(used in Swiss UBELIX cluster)



# Slovenian Grid Initiative

- SLING: JRU under Arnes <http://www.sling.si/>
- a funding member of EGI.eu
- part of EGI Inspire
- successful migration from EGEE (CE ROC) to EGI



# SLING and EGL.eu

## EGL.eu infrastructure

- national level:
  - info services, VOMS
  - monitoring, support (helpdesk, NOC)
- central:
  - ticketing, accounting
  - releases



# Infrastructure under EGI.eu



- NGI top BDII
- monitoring: NGI Nagios
- VOMS (with dteam infrastructure)
- testing site:  
NGI site BDII  
SE (dCache)  
CE (CREAM)

The screenshot displays the Nagios monitoring interface. On the left is a navigation sidebar with sections like 'General', 'Current Status', 'Reports', and 'System'. The main area is titled 'Current Network Status' and shows a table of service status details for various hosts. The table has columns for 'Host', 'Service', 'Status', 'Last Check', 'Next Check', 'Output', and 'Comments'. The 'Status' column uses color-coded icons: green for OK, yellow for WARNING, red for CRITICAL, and blue for UNKNOWN. The 'Comments' column provides detailed error messages or status descriptions for each service.

Host	Service	Status	Last Check	Next Check	Output	Comments
egi-nagios-01	egi-nagios-01	OK	05-20-2010 11:45:41	05-20-2010 11:50:41	01:00:00	OK
egi-nagios-02	egi-nagios-02	OK	05-20-2010 11:45:41	05-20-2010 11:50:41	01:00:00	OK
egi-nagios-03	egi-nagios-03	OK	05-20-2010 11:45:41	05-20-2010 11:50:41	01:00:00	OK
egi-nagios-04	egi-nagios-04	OK	05-20-2010 11:45:41	05-20-2010 11:50:41	01:00:00	OK
egi-nagios-05	egi-nagios-05	OK	05-20-2010 11:45:41	05-20-2010 11:50:41	01:00:00	OK
egi-nagios-06	egi-nagios-06	OK	05-20-2010 11:45:41	05-20-2010 11:50:41	01:00:00	OK
egi-nagios-07	egi-nagios-07	OK	05-20-2010 11:45:41	05-20-2010 11:50:41	01:00:00	OK
egi-nagios-08	egi-nagios-08	OK	05-20-2010 11:45:41	05-20-2010 11:50:41	01:00:00	OK
egi-nagios-09	egi-nagios-09	OK	05-20-2010 11:45:41	05-20-2010 11:50:41	01:00:00	OK
egi-nagios-10	egi-nagios-10	OK	05-20-2010 11:45:41	05-20-2010 11:50:41	01:00:00	OK



# The Future

- Current infrastructure: 2 centres, 3 to join
  - 1300+ cores, 600 TB, year end 3000 cores
- Industry to join: 2 large clusters (~3000 cores)
- Nascent grid centres: universities, research centres
- Involvement in projects:
  - EGI Inspire (international infrastructure)
  - ARC: the middleware for the future
  - UMD: seeking interoperability, supporting large VOs



# Questions?

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