

Networks for IT: A new Opportunity for Optical Network Technologies

Organised by the IST project PHOSPHORUS and the ePhoton/ONe+ Network of Excellence

Dimitra Simeonidou, University of Essex, UK

Mario Pickavet, Ghent University - IBBT, Belgium

Anna Tzanakaki, Athens Information Technology, Greece

Ioannis Tomkos, Athens Information Technology, Greece



IT and Communications Convergence



■ Commoditisation of Resources

- From individual computers to Internet and WWW
- From specialist supercomputers to clusters
- From individual servers to virtualized, dynamically provisioned server farms
- From applications to services
- From ownership to computing on demand and Grids

ALSO

- BW is becoming a commodity
- **Global distributed IT facility**
 - Distributed but connected resources (computing, storage, content servers...)
 - Linked supercomputers
 - Distributed data management
 - Storage-on-demand
 - Utility computing
 - Collaboration Grids

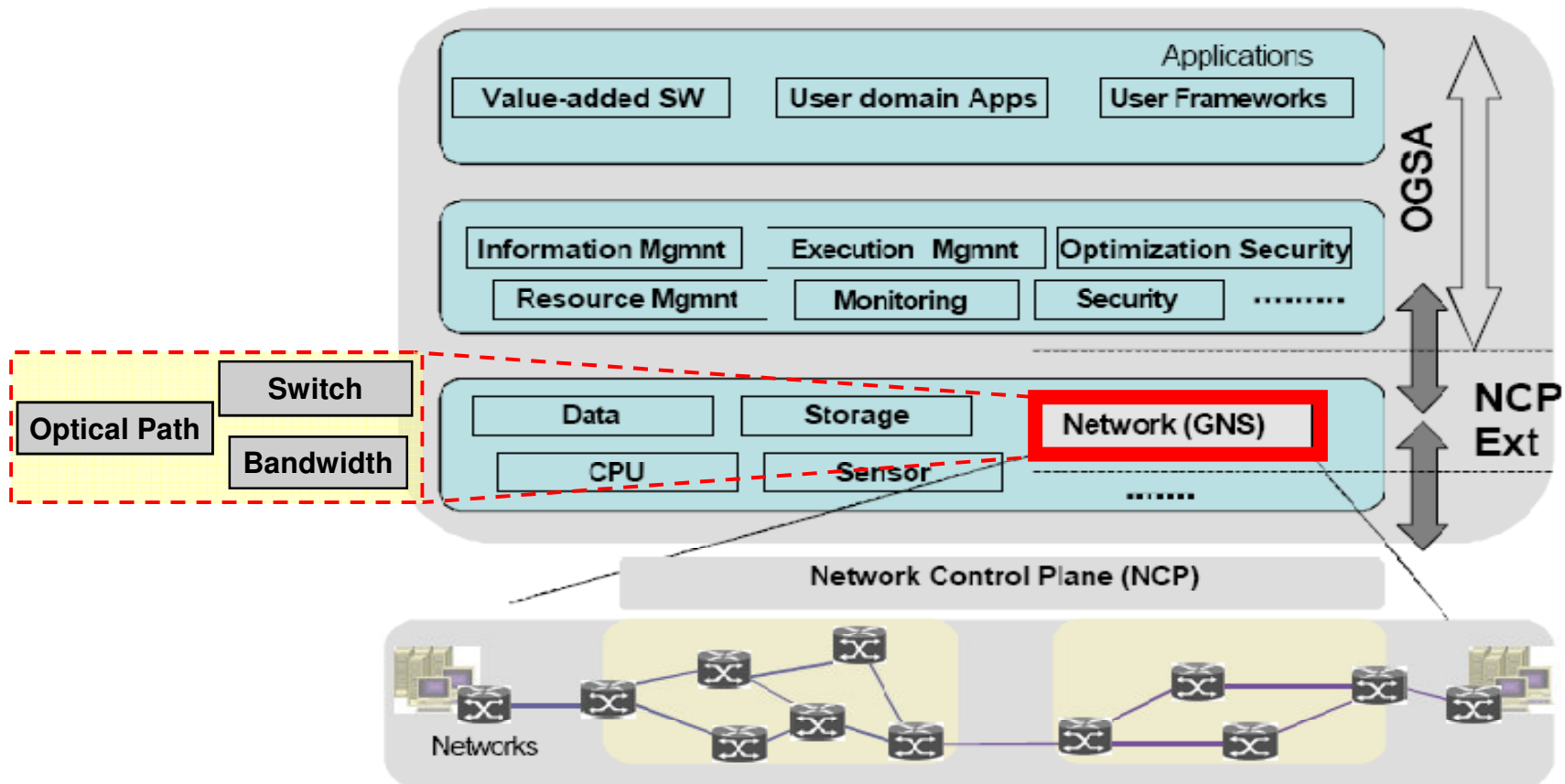


- **Aim:**
 - Coordinating on-demand, secure access to distributed and heterogeneous resources (cpu, storage, bandwidth ...)
- **Motivations**
 - Scale up computing and/or data sets
 - Reduce costs via capex/opex efficiencies
 - Reduce time-to-results
 - Reduce time to market for new services
 - Increase reliability, availability
 - Enable collaborations
 - Support a market in software services



First Bridging of Network and IT+ Recourses

The network as a 1st-class resource akin to CPU and Data



Courtesy GGF-GHPN draft-ggf-ghpn-netserv-2 (May 2005)



■ Tera-scaling in traffic, link capacity, network elements, IT devices, users

■ Terabit edge to edge capacity: several Tb/s logical flows in the network

- High performance LANs, TeraLans
- 100 GE LAN and carrier grade technologies,
- Optical peering solutions (>160 Gbps)

■ Tera-scale applications programming models:

- TFlops → MPI / Globus
- TBytes → OGSA/DAIS, DEISA
- TPixels → SAGE, CineGrid
- TSensors → LOFAR, LOON

The Tera Internet

Billions of user

Exponential growth of the quantity of on demand services

Potential users able to access new giga-scale services

Consumer grids

■ Increased parallelism:

- Multi-Core CPU chips
- Storage Arrays
- DWDM



The Tera Networking Question

- Is there a role of optical network technologies?



Workshop Program

- Dominique Verchere (Alcatel-Lucent, France), "Orchestrating optimally IT and network resource allocations for stringent distributed applications over ultrahigh bit rate transmission networks"
- Artur Binczewski (PSNC, Poland), "The PHOSPHORUS project - new face of bandwidth on demand services"
- Tomohiro Kudoh (AIST, Japan), Gigi Karmous Edwards (MCNC, USA), "EnLIGHTened and G-lambda: reserving inter-domain lambda and compute resources across US and Japan"
- Peter Tomsu (Cisco Systems, Europe), "New requirements coming from entertainment, media and digital content for optical networks and control planes"
- Piero Castoldi (SSSUP, Italy), "Virtualization and service abstraction for network and non-network resources"
- Franco Callegati (University of Bologna, Italy), "SIP-based service virtualization for future IT services and applications over high speed optical networks"
- Wei Guo, (Shanghai Jiao Tong University, China), "Task scheduling in optical grid networks; A 3TNET approach"

