This demonstration is an example of OIF members working together to make real world implementations of OIF technology. The objective of OIF is to foster the development and deployment of interoperable products and services for data switching and routing using optical networking technologies. The first step towards deployment is the testing and demonstration of the technical specifications.

GSN - Global Seamless Network Demonstrator

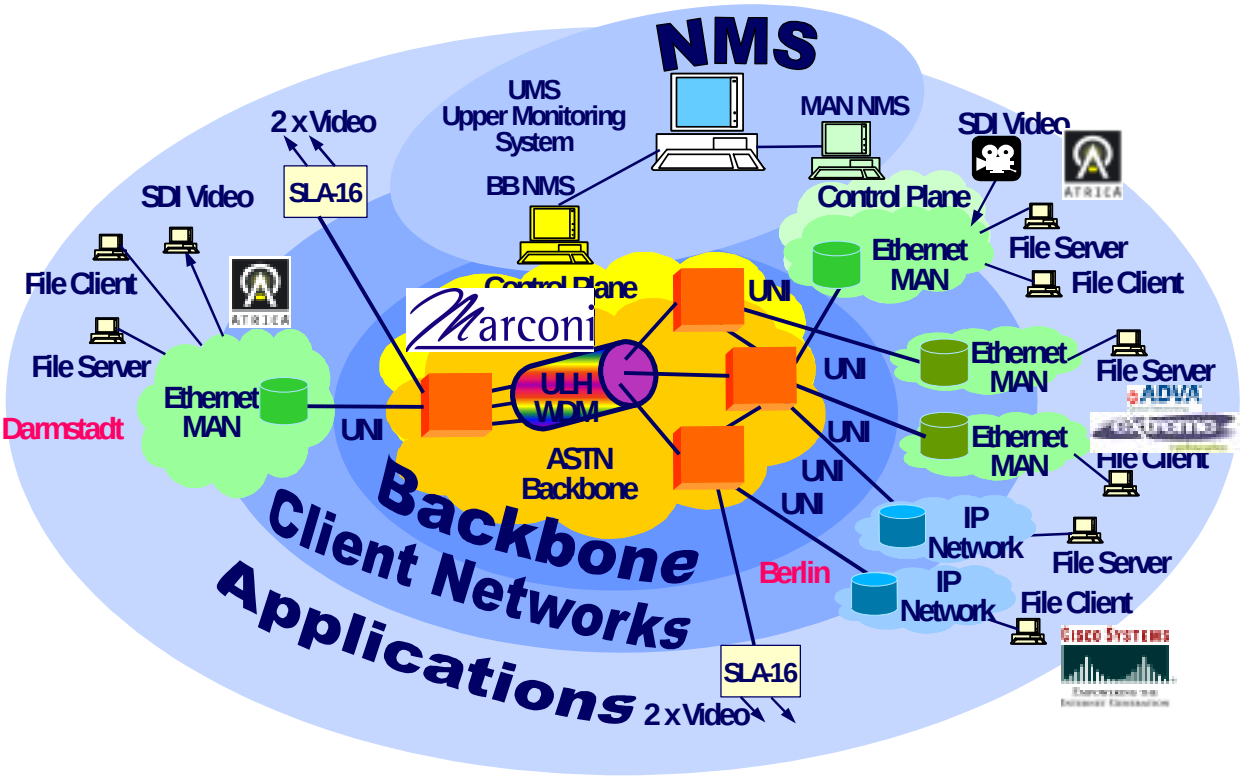
The Global Seamless Network (GSN) Demonstrator is a comprehensive ASTN implementation, including ASTN backbone network, the envisaged main backbone client networks, e.g. IP- and carrier grade Ethernet-networks, advanced broadband applications which are connected to these client networks and last but not least a network management solution providing an end-to-end view over sub-networks with their heterogeneous technologies. In a joint effort of system vendors and Deutsche Telekom Innovation this demonstrator was set up, comprising this whole end-to-end scenario, from application to application and from data transport to control plane and NMS. It enables for the first time experiences with new, carrier grade network functionality implementations.

To set up this comprehensive ASTN demonstrator (backbone, client networks, applications, NMS) strong vendor partners were needed; the following vendors have joined the GSN Demonstrator project:

- Marconi: ULH-WDM system and backbone cross connects, ASTN control plane and UNI functionality
- Cisco: IP-network backbone routers and UNI functionality
- Atrica: Metro Ethernet switches and UNI functionality
- Adva/Extreme: Metro Ethernet switches and UNI functionality

The ASTN backbone consists of an ULH-WDM system with 3x 10Gbit/s channels (OCh) between Berlin and Darmstadt, whereby each OCh is treated as a virtual fiber and four cross connects. The ASTN implementation comprises the following network functions and elements:

- Enhanced SDH switching nodes, enabling multiplexing/grooming of the ASTN client signals at VC-4 granularity and virtual concatenation capability. Therefore the increase of the transport network capacity utilization is considerable, compared to today's contiguous concatenation formats for data transport
- Distributed, control plane (CP) for the SDH layer using GMPLS protocols, enabling decentralized routing of connections, automatic discovery functions and restoration switching in meshed networks, taking into account the actual traffic load of the links. Furthermore, the decentralized control plane of the backbone enables new, dynamic transport network services for the clients attached to it via a UNI
- Backbone network management system (NMS), in charge of configuration and supervision of control plane functions
- Carrier grade user network interface, compliant to OIF UNI 1.0, including all mandatory and optional functions, like in-band signaling and automatic neighbor and service discovery; this interface is based on STM-16 signals. Via this interface the client networks, Ethernet based MAN and IP networks, are attached to the ASTN backbone.



GSN Demonstrator topology

Metro Ethernet networks are packet switched metro area networks (MAN) optimized for data transport, which enable new types of data services and functionalities, e.g. multi-point to multi-point broadband connectivity and fast re-configuration by a Customer-Network-Management (CNM). Furthermore, MANs have to be carrier class networks and very cost efficient, to meet the network requirements. At the UNI-side the Ethernet networks have POS interfaces supporting the mapping of Gigabit-Ethernet (GbE) streams into SDH concatenation formats. The UNI interconnection allows a seamless connection bandwidth adaptation in the ASTN backbone.

The IP network is based on backbone routers, providing the IP functionalities in the GSN Demonstrator. At the UNI-side the routers have POS, VC-4 channelized interfaces, enabling the most efficient data transport over SDH networks. The channelized interfaces support flexible connection bandwidth adjustments in VC-4 steps accordingly to the actual IP traffic demand.

For end-to-end monitoring, integrating for the first time the view on the ASTN backbone and Ethernet-MAN configuration, a network management solution called Upper Monitoring System (UMS) is being developed.

Last but not least, to complete the whole picture and to visualize the network functionalities, broadband applications (e.g. video, HDTV) using Ethernet formats demonstrate the end-to-end connectivity via the entire GSN demonstrator. Additionally, E4 applications are connected directly to the ASTN backbone network. In this way the impact of network functions, e.g. restoration, can be evaluated and real end-to-end functionality is demonstrated.