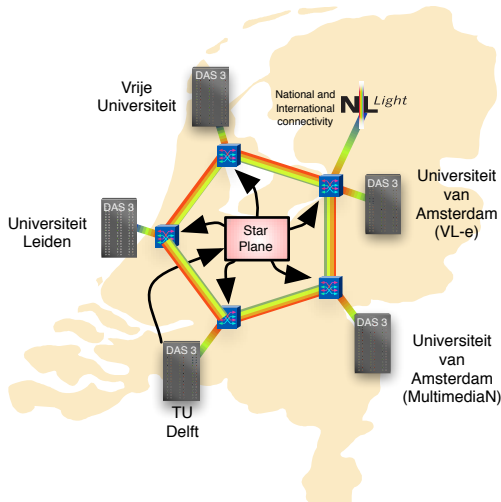


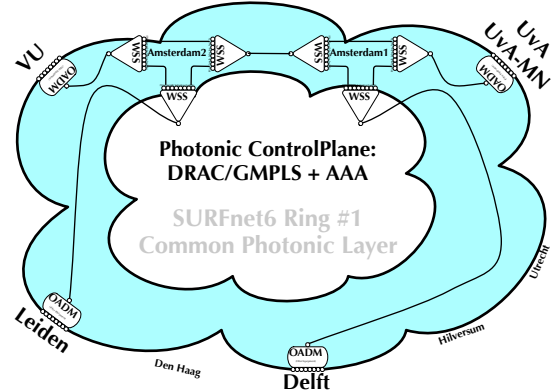
# Application Specific Management of Photonic Networks

## StarPlane Overview



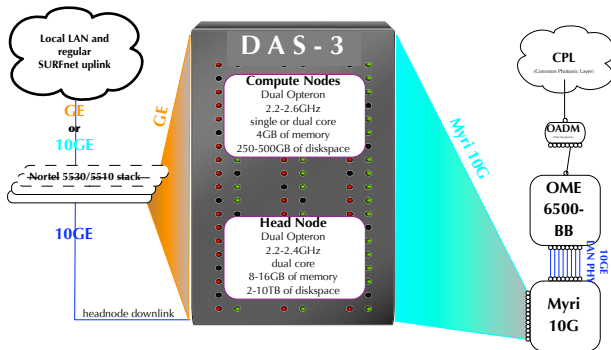
**StarPlane** is a NWO funded project of the University of Amsterdam (UvA) and the Vrije Universiteit (VU). The project uses the photonic network of the Dutch National Research and Education Network - SURFnet - that connects the five compute clusters at the four sites (UvA, VU, TU Delft and Universiteit Leiden). The vision is to allow part of the photonic network infrastructure of SURFnet6 to be manipulated by Grid applications to optimize the performance of specific (e-Science) applications.

## Network Topology



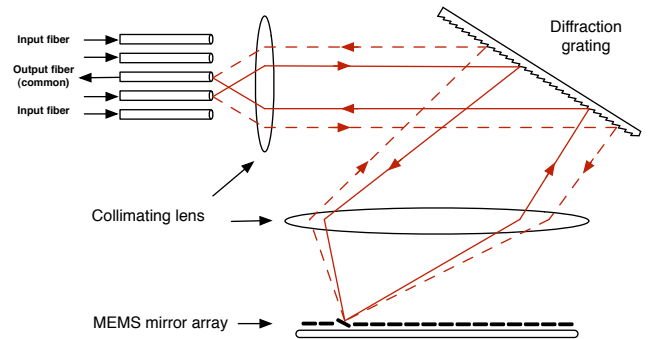
StarPlane is built on top of the photonic SURFnet6; SURFnet's sixth generation network built with Nortel and Avici equipment. StarPlane utilizes a full  $\lambda$ -band within CPL, #8, starting with four and later eight 10Gbps wavelengths at each site. Two sets of Wavelength Selective Switches (WSS) placed in 3-degree branch setups allow for seamless "optical switch-routing" of signals between all five DAS-3 clusters. DWDM filter equipment at all four sites breaks out  $\lambda$ -band #8 using an OME6500-BB for signal conversion before entering the DAS-3/StarPlane WAN equipment. The proposed control plane for the optical/photonic side is a combination of Dynamic Resource Allocation Control (DRAC), GMPLS and Generic AAA.

## DAS-3 / StarPlane Site Design



Four of the five DAS-3 clusters use Myrinet's Myri-10G interfaces, switches and 8-port 10GE LAN PHY bridging switch cards for their WAN interconnect. The DAS-3 cluster in Delft will use a stack of Nortel 5530's to bundle 2Gbps links per node into eight 10GE LAN PHY interfaces for its WAN interconnect. All eight 10GE LAN PHY connections from each cluster will be connected to a SURFnet6 Nortel OME6500-BB. The DAS-3 clusters are AMD Opteron based, per site differences in memory, CPU speed, single or dual core, mass-storage and LAN interconnect are to satisfy local computational, area of expertise and research needs.

## Wavelength Selectable Switch



A Wavelength Selectable Switch (SURFnet uses a Nortel WSS) can select wavelengths and send each different wavelength to a specific output port. The StarPlane project novelly utilizes these switches to realize the redirection of certain wavelengths and establish point-to-point lightpaths between nodes at short time-scales. By manipulating the WSS and other optical devices, StarPlane is also able to change the logical topology of the network in real time (subsecond) and allocate the network resources on demand to multiple applications at different clusters.