



Fraunhofer Institute for Computer Graphics (IGD)

The Company and Its Network

The Fraunhofer Institute for Computer Graphics (IGD) in Darmstadt is primarily dedicated to the development and adaptation of hardware and software products, more specifically to the design and implementation of computer graphic concepts and their adaptation to specific application requirements. Basic research and pilot projects round off the institute's work. The leader of the Institution is Prof. Dr. José L. Encarnação, a prominent researcher in this area for over 25 years. The multitude of research topics and their different demands on the network require a flexible and fast network design. In addition, the network team must be able to respond very quickly to customers needs.

The network operations center in Darmstadt provides network access for the INI-GraphicsNet (International Network of Institutions for Advanced Education, Training and R&D in Computer Graphics Technology, Systems and Applications), which consists of approximately 350 full-time employees and 800 part time employees (www.inigraphics.net). The network consists of approximately 20 Cisco Catalyst® switches from the Cisco Catalyst 6500, 5500, 2900, and 3500 Series and 10 routers from the Cisco Catalyst 4000, 7500, 7100, and 3600 Series, serving approximately 1300 computers. The IGD uses a single network management server loaded with the CiscoWorks LAN Management Solution (LMS) 2.0 and CiscoWorks Routed WAN (RWAN) Management Solution 1.1.

The Products in Action

Mathias Gaertner, the lead for the network management team at IGD, finds that the most important product features within the CiscoWorks LMS 2.0 bundle are the User Tracking database and Topology Services found in the CiscoWorks Campus Manager application. User Tracking automatically discovers all end stations connected to managed Layer 2 devices by reading the content-addressable memory (CAM) tables. Gaertner and his team use this information to easily map Media Access Control (MAC) addresses to IP addresses and switch ports. Prior to installing and using User Tracking, network operators would search for MAC addresses in their network by taking a best guess at which switch a user was connected to and then manually searching the CAM tables until the MAC address was located. Now, using the table created by User Tracking functionality saves the network administrators a considerable amount of time.

" By using Topology Services to determine the spanning-tree state for a VLAN, Fraunhofer IGD can locate information five times faster! "

—Mathias Gaertner
Network Management Team Leader
Fraunhofer Institute for
Computer Graphics



Gaertner and his team also use the network topology features within CiscoWorks Campus Manager. Prior to using Campus Manager, Gaertner was one of the only operators familiar with the network topology. Now, with the automatic network discovery and layout process provided by Campus Manager, the entire team shares the knowledge. He says, “The graphical depiction of the network design has significantly decreased the number of calls I receive late at night regarding the physical network layout.”

Gaertner also says that the company finds great value in the per-virtual LAN (VLAN) spanning-tree view available in Topology Services. IGD has 35 VLANs on its Cisco Catalyst switches, and the company is able to find root bridges, blocking ports, and forwarding ports for each VLAN with this application. In fact, by using Topology Services to determine the spanning-tree state for a VLAN, IGD can locate information five times faster than with its previous manual procedure. This has significantly decreased troubleshooting time, resulting in a more reliable network. Gaertner summarizes, “We used to find out the spanning-tree parameters by logging into the switch and issuing some commands, but that is not intuitive and takes at least five times longer.”

The CiscoWorks RWAN component most often used by IGD is the CiscoWorks Internetwork Performance Monitor (IPM). IPM walks the user through a graphical user interface (GUI) to configure and gather metrics from the Service Assurance Agent imbedded in Cisco IOS® Software. CiscoWorks IPM can baseline network performance statistics for Domain Name System (DNS) queries, Internet Control Message Protocol (ICMP) responses, and voice over IP (VoIP) traffic, just to name a few. According to Gaertner, “I have 13 different tests running using IPM, including Web server response times and DNS lookup times. I use this information to find network response time problems before any of my customers do.”

Gaertner can recall two major instances when CiscoWorks IPM provided insight to network problems for IGD.

- As indicated by IPM, the Dynamic Host Configuration Protocol (DHCP) server (and the DNS in conjunction) started to become slower and slower. After reaching a threshold, an automated warning was sent out to Gaertner, allowing his team to quickly fix the problem before the degradation led to DHCP timeouts on behalf of the clients.
- A customer claimed that the network was slow, failing, and otherwise unusable. He informed the Service Center that he could not reach his Web server. With IPM, Gaertner’s team was very fast in identifying the root of the problem to be the server page load time, rather than the network. This early identification of the source of the problem saved the team from having to investigate further into the network and waste valuable manpower.

In addition, IGD regularly uses CiscoWorks Resource Manager Essentials (RME), found in both CiscoWorks LMS and RWAN. Specifically, they rely on the 24-hour reports to review all configuration, software, and inventory changes in their network, as well as the GUI-based Software Image Manager for the frequent software upgrades on both Cisco routers and switches. In Gaertner’s words, “CiscoWorks RME has definitely saved me time. I have only three full-time employees and considering our limited resources, we have found RME to be a great help in making and tracking network changes.”

Overall, the Fraunhofer IGD network management team was looking for a very specific feature set when shopping for network management software. Gaertner states, “My idea of proper network management is to have a Web-based GUI tool that can be used easily by my entire team to make changes to network devices—and can also give me the ability to track these changes. The CiscoWorks LMS and RWAN bundles in the CiscoWorks product family fit this very nicely.”



Corporate Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

European Headquarters
Cisco Systems Europe
11 Rue Camille Desmoulins
92782 Issy-les-Moulineaux
Cedex 9
France
www-europe.cisco.com
Tel: 33 1 58 04 60 00
Fax: 33 1 58 04 61 00

Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-7660
Fax: 408 527-0883

Asia Pacific Headquarters
Cisco Systems, Inc.
Capital Tower
168 Robinson Road
#22-01 to #29-01
Singapore 068912
www.cisco.com
Tel: +65 317 7777
Fax: +65 317 7799

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