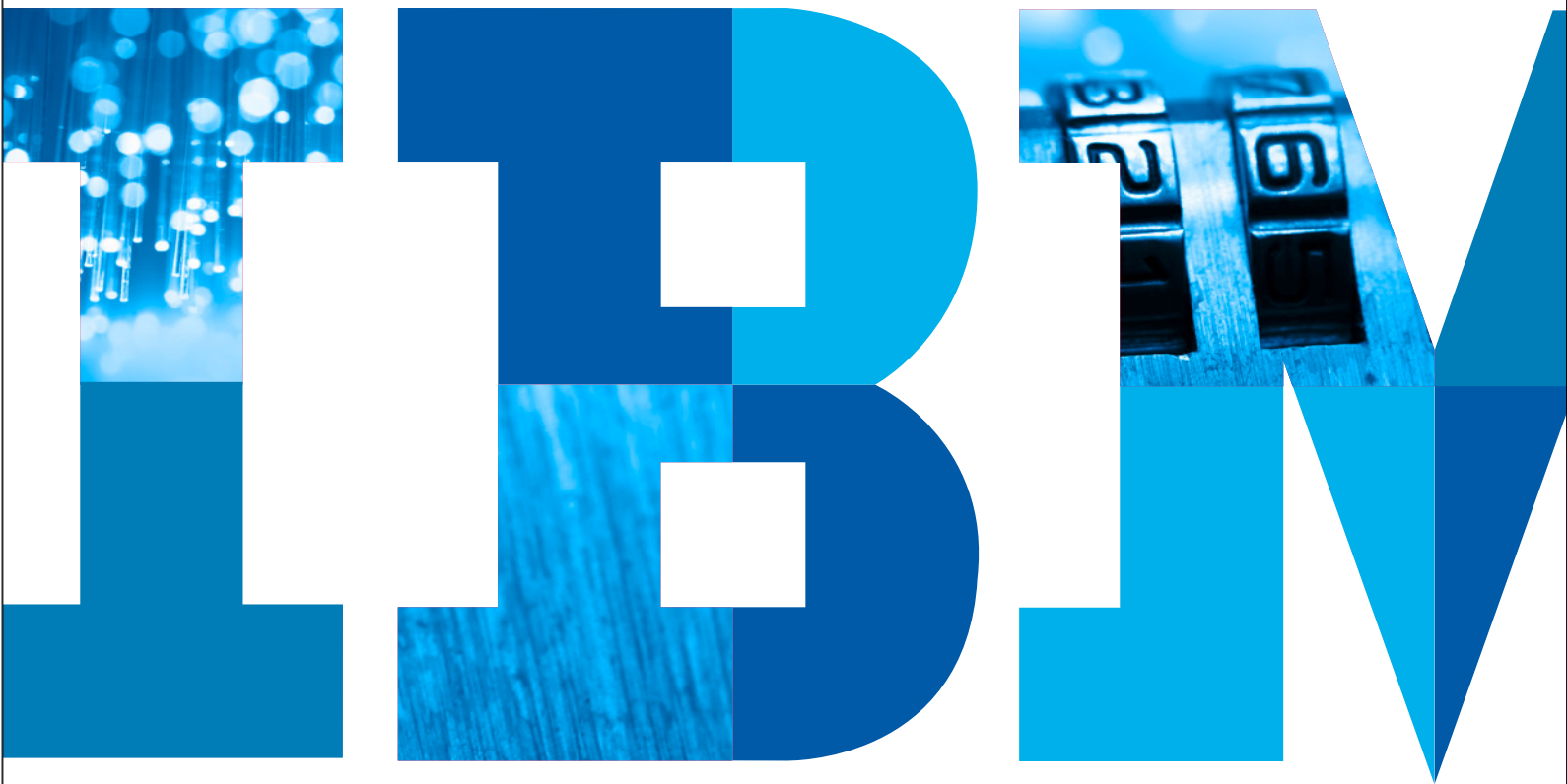


Enhanced Security in Data Center Connectivity

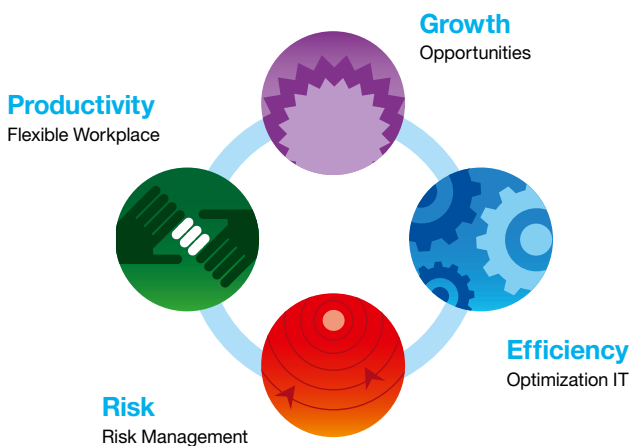
*Innovation from ADVA Optical Networking
and IBM Network Integration Services*



Your Optical Network Becomes a Strategic Asset

The Time is Right for New Connectivity

Cloud computing, virtualization, business continuity and disaster recovery – all demand access to increasing amounts of bandwidth with the lowest possible latency. Financial and regulatory demands have forced IT managers to reassess their data center storage strategy. Enterprises, including financial institutions and utilities, have deployed geographically dispersed server clusters and Storage Area Networks (SAN). Disaster recovery solutions that help provide for the availability and survival of essential data, even in case of a catastrophic failure, have become a mandatory design requirement. Due to the large bandwidth demands involved, private optical transport networks are a critical strategic asset for driving success in data center connectivity. Built-in redundancy and security capabilities are essential to achieve high standards regarding data safety and integrity.



A Unique Economical Network

Private optical networks based on Wavelength Division Multiplexing (WDM) technology offer great relief to address these challenges by providing significantly higher bandwidth and scalability. WDM technology is also forward-looking when it comes to the security demands of your IT infrastructure. Since backup and security strategies for high availability require a geographically dispersed implementation, it's not only high capacity that is needed. Distance, reliability, high performance in terms of high

throughput and low latency and security by encryption are also critical. WDM technology enables secure transport of massive amounts of data between your data centers. It helps you to cost-effectively interconnect the most demanding low-latency, business-continuity and disaster-recovery applications. And it supports a wide range of interface protocol and bit rate up to 100Gbit/s at native speed, including Fiber Channel, FICON, InfiniBand, and Ethernet. Whether connecting to an information feed, interconnecting virtualized servers or accessing storage networks – WDM optical transport technology provides you with a competitive advantage for your core applications.

A Complete Ecosystem for Optical Networking

Setting up a private optical network can be a challenging project that requires a great deal of planning, design and coordination. This process begins with a thorough analysis of all requirements, a definition of objectives, through to project planning and the acquisition of fiber capacity and hardware. And it extends beyond the successful implementation of the solution into the actual operation and maintenance phase. For enterprises whose business viability depends on high availability of critical applications and data, IBM provides Network Integration Services for data center networks — and expertise in private optical networking technologies, such as WDM, that provide high bandwidth, low latency connectivity between data centers. IBM combines a structured delivery methodology, broad and deep technology expertise, and related project management.

IBM services include planning, design and implementation services for ADVA Optical Networking's WDM (Wavelength Division Multiplexing) solutions and provide connectivity for geographically dispersed data centers supporting Business Continuity, Disaster Recovery and Cloud Computing. As a market-leading supplier of optical transmission technology for data center applications, ADVA Optical Networking is in a global alliance with IBM. Furthermore, the ADVA Optical Networking WDM solution is fully qualified for GDPS by IBM and other vendors providing storage solutions for the data center environment.

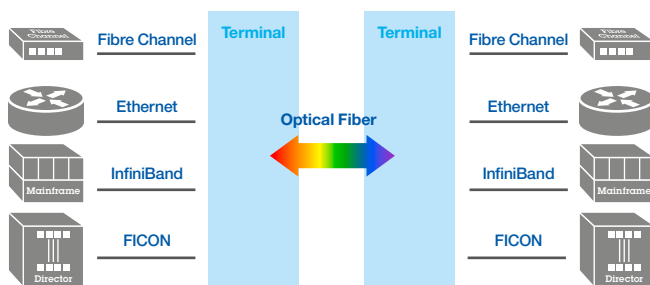
Achieving Very High Efficiency for Key Applications

- A flexible and dynamic private optical network adapting to the changing compute and storage requirements in cloud computing applications
- High capacity data transmission up to 10Tbit/s with ultra-low latency enabling short storage intervals in distributed Storage Area Networks (SAN)
- Secure exchange of large data volumes in real time when interconnecting data centers and Geographically Dispersed Parallel Sysplex (GDPS) clusters

More Than Private Optical Connectivity

Alliance Relationship

Working with IBM Global Technology Services means that you benefit not only from the complete service portfolio of IBM, but also from the expertise of IBM's strategic technology cooperation. IBM selected ADVA Optical Networking for an alliance for its private optical networking services. ADVA Optical Networking is a leading company in fiber-optical networking with global presence. ADVA Optical Networking's core competencies, developed over many years of experience in enterprise networking, are in the field of optical technologies and data center applications. The result is a tailored private optical networking solution for your data center interconnection applications as well as for deployment of extensive fiber-based network infrastructure.



WDM technology

The unique transmission and multiplexing technology utilized by the ADVA FSP 3000 enables you to support a wide range of data protocols – including 16G FC, InfiniBand and 100GbE – over one and the same fiber – integrated delivery of connectivity services ranging from a few Mbit/s up to 100Gbit/s. Complemented by extensive service monitoring and assurance capabilities, the ADVA FSP 3000 guarantees that your data center and network resources are interconnected with ultra-high network availability.

The ADVA FSP 3000 can be tailored to your specific requirements with regard to application, capacity, reach, protocol and network types. Its versatility and flexibility assure the most efficient optical networking solution depending on the characteristics of your network and the objectives of your project.

ADVA FSP 3000 – A Market-Leading Optical Networking Solution

The ADVA FSP 3000 is a scalable optical transport solution based on WDM technology that enables you to provision data, storage, voice and video applications rapidly and cost-effectively on a single platform. It is the connecting element between your geographically dispersed network resources including servers, routers, switches, directors, and many more. The ADVA FSP 3000 can handle distances ranging from a few hundred meters up to several thousands of kilometers. And it provides ultra-low latency transmission for your time-critical applications.

The important distinctions

- Ultimate flexibility and scalability through service interfaces ranging from 10Mbit/s to 100Gbit/s for all current and future data center applications
- Easy-to-install system architecture, combined with power- and space-efficient system design for low operational cost
- Transparent wavelength conversion and ultra-low latency amplification for data transfer at very low latency
- Integrated encryption, optical fiber monitoring and secure software to help address potential regulatory compliance requirements and concerns about fiber plant integrity, security and availability of applications

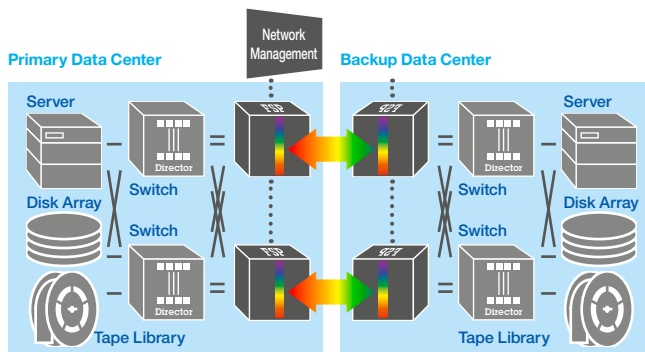
ADVA Optical Networking: Focus on Innovation Asset

Ideas that make a difference

ADVA Optical Networking was founded in 1994 with the focus on developing the potential of fiber optic technology for applications in the metropolitan area. From the beginning, ADVA Optical Networking has been using cutting-edge technologies to develop efficient, cost-effective, and – above all – practical solutions. With a solid financial performance and more than 1,000 employees worldwide, ADVA Optical Networking is a reliable global company with a strong focus on innovation.

Specialists for Enterprise Networks

Through a long-term commitment to WDM technology for enterprise networks, ADVA Optical Networking has become a leading European supplier in that market segment in less than ten years. Since its foundation ADVA Optical Networking has launched five product generations, which have been installed and used in over 40 countries across five continents. Thanks to this focused product strategy and a commitment to space- and power-efficiency ADVA Optical Networking has become a trusted partner of over 250 network operators and more than 10,000 enterprises worldwide.



Data center connectivity scenario

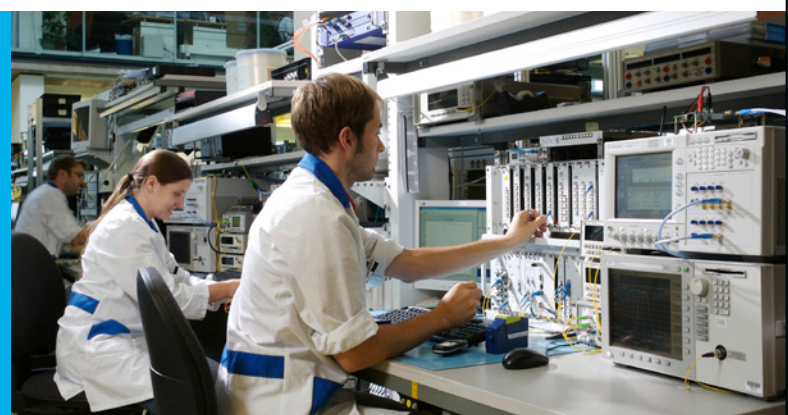
Alliance Synergies

ADVA Optical Networking is a focused company that concentrates on the development and production of technological innovations. The technology alliance with IBM for private optical networking offers customers a strong cooperation of experienced and dedicated professionals: IBM handles solution design and implementation as well as the subsequent operation of the FSP products used. Clients receive superior system solutions, especially with regard to storage and server coupling as well as the IBM patented Geographically Dispersed Parallel Sysplex (GDPS) solution. ADVA Optical Networking products have been certified for IBM GDPS since 2003 and were the first to be qualified for InfiniBand transport – the start of a promising co-evolution of new approaches to broadband connectivity in urban areas.

IBM Managed Maintenance Services

Multivendor Network Maintenance and Network Services offer cost-effectiveness and flexibility to support your whole business, whatever your requirements and geographic locations:

- Full suite of services to support your IT department from installation to maintenance
- Support options up to 24 hours a day, seven days a week
- Worldwide technical support agreement with ADVA Optical Networking
- Manufacturer-accredited service engineers for ADVA Optical Networking technology
- IBM service quality and methodologies for products covered by an IBM Network Maintenance agreement



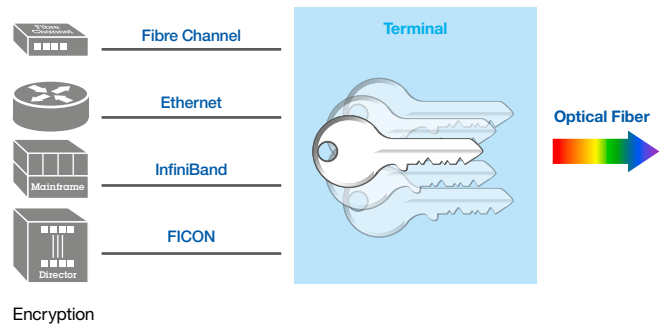
IBM Network Integration Services

An Experienced Team

IBM Network Integration Services portfolio is based on decades of experience in system integration, operation, maintenance, and management of Wide Area Networks, Local Area Networks and Data Center Networks. Since network infrastructure is playing an increasingly important role in the development of high-end data backup and storage solutions, IBM's innovation services place a great deal of emphasis on this field. IBM is an inventor and patent owner of business continuity solutions, including GDPS and protocols such as FICON and InfiniBand. When implementing a high-standard solution, what could be better than working with the inventor of the solution? IBM has the expertise when it comes to consulting, planning, designing, installing, and implementing enterprise networks.

High Security for Your Data

IBM Network Integration Services for Private Optical Networking with ADVA Optical Networking's optical solutions make the coupling of data centers within the context of availability strategies such as GDPS substantially more efficient compared to alternative WDM solutions that consume more power and require additional equipment to provide features such as encryption. The ADVA FSP 3000 enables synchronous mirroring with transmission speeds of up to several terabits per second at lowest latency – a necessary prerequisite for enabling the backup data center to take over all operations in case of an outage. Another factor contributing to the security of your data is the integrated encryption and optical line monitoring function, addressing concerns about fiber plant integrity and security. Data can now be exchanged securely between your data centers while achieving highest throughput and latency performance.



Cost-Effective Expansion of Capacity

As the amount of data traffic continues to grow rapidly, also the cost pressure increases for enterprises. Most IT decision makers are faced with the challenge of expanding capacity while saving on costs. The optical transport solution from ADVA Optical Networking is a way out. It allows using the existing fiber optic infrastructure much more efficiently. Startup costs are low and a single pair of fibers is enough to handle significant increase of data volume in the future. The ADVA FSP 3000 is inexpensive to operate and maintain, allowing for return on investment usually within a short period of time.

People who understand Optical Networking

Setting up a private fiber optical network requires expertise from specialists. If you expect dependable project execution that allows you to be involved in everything without having to handle it all yourself, then your project is in good hands with IBM. At IBM, solution development and implementation all come from one source. As a worldwide IT service provider with many years of experience and a broad range of competencies we mobilize resources for you as nobody else can. The cooperation between IBM and ADVA Optical Networking provides you benefit from complementary resources and expertise. We work together to build a network that removes barriers to your success.

Three good reasons to work with us

- IBM services to help you plan, design, implement, manage and maintain the private optical network to meet current and future business needs.
- ADVA Optical Networking is the trusted partner of over 250 network operators and more than 10,000 enterprises worldwide.
- The global alliance of IBM and ADVA Optical Networking provides a tailored private optical networking solution for your data center interconnection applications that utilizes the latest WDM technology and innovations like ultra-low latency and encryption.

For more information

International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
ibm.com/Services/us



ADVA Optical Networking
Campus Martinsried
Fraunhoferstrasse 9a
82152 Martinsried/Munich
Germany
e-mail: ibm@advaoptical.com
www.advaoptical.com



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