Extending the
Reach & Capacity
of Metro Network Spans

FLASHWAVE ®

FUJITSU

increased demands

METRO FIBER CONGESTION

Building Networks
With **INCREASING**
Span Requirements
is the **PROBLEM…**

Fiber availibility and optical transmission distance have long been prime factors driving CAPEX funding levels higher in optical networks.

Increase in Spares & Logistic Complexity

Cost Increase

FLASHWAVE 4500

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Up to 80 km

Limited Fiber Capacity
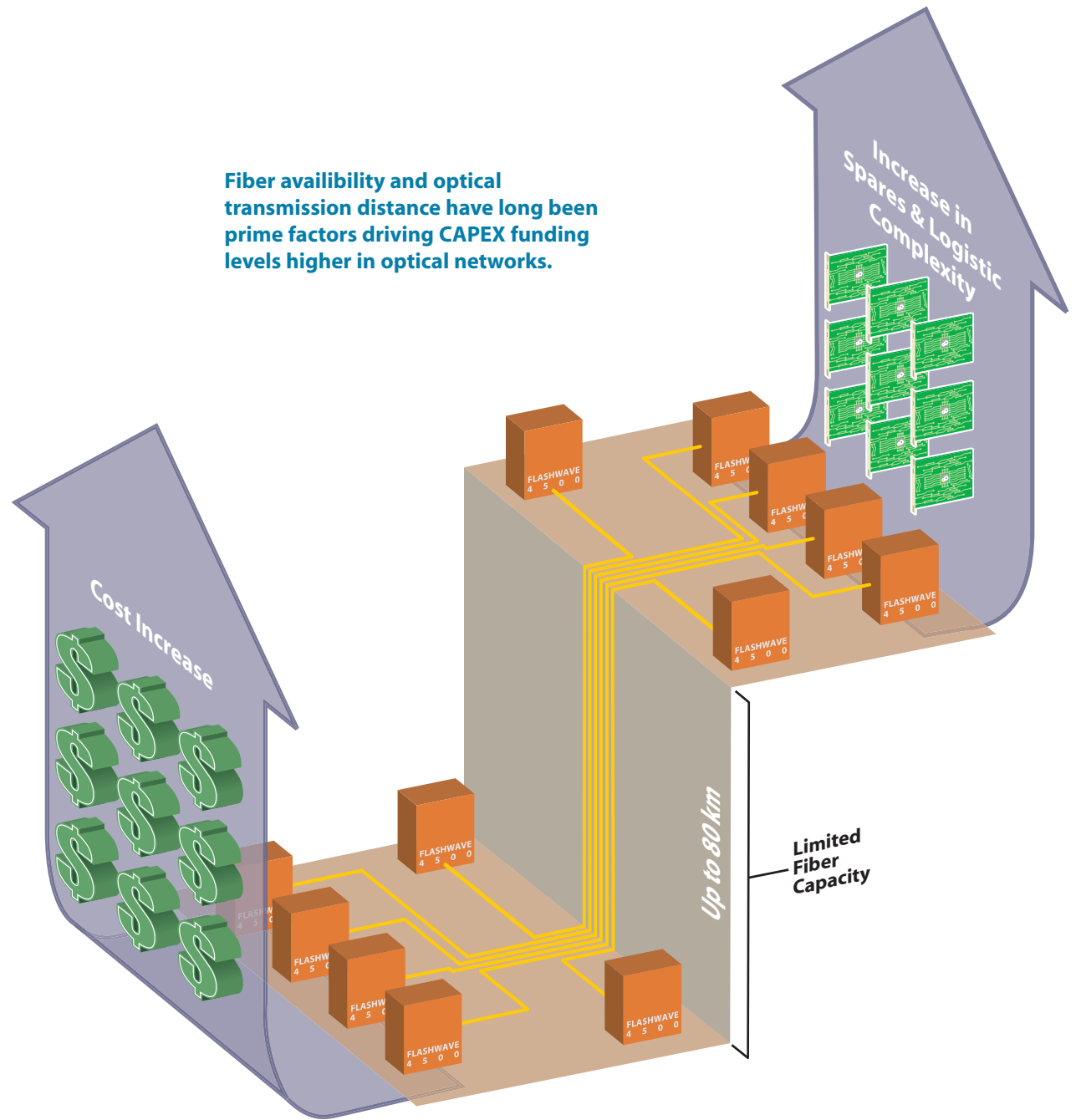
The COST of COMPLEXITY

Your customers are demanding a wide variety of new and innovative services at competitive prices, forcing you to squeeze more out of your network while closely managing your costs. Networks must scale to support these increasing bandwidth needs and also transport advanced services, such as Ethernet and digital video, in addition to your existing services. At the same time, networks are expected to support much larger geographic areas. The challenge for service providers is to accomplish all of these requirements while keeping Capital Expenses (CAPEX) and Operating Expenses (OPEX) in check.

When building optical networks, transmission distance and the availability of fiber are important design considerations. Since metro-regional transport links can reach up to 200 km, implementing cost-effective methods of amplification, performance monitoring and signal conditioning has become mandatory. In addition, congestion within fiber spans is forcing service providers to deploy Wavelength Division Multiplexing (WDM) equipment to conserve fiber in some routes.

Fiber availibility and optical transmission distance have long been prime factors driving CAPEX funding levels higher in optical networks. Network providers need to extend optical services across their existing fiber plants, thereby conserving CAPEX. One popular approach used to attain longer transmission distances is to increase the reach of all available optical units. While helping to achieve the goal, this approach also adds cost to all metro spans, including those that do not require additional reach.

You can also develop a large optical menu that includes short, medium and long reach cards, plus integrated WDM capabilities for each platform. With this model, the deployment cost will directly correlate with the network size while meeting the design criteria. This model, however, also eventually results in higher costs across all spans thanks to more complicated logistics and more expensive sparing requirements.

Ultimately, you need an option that enables you to deploy an optical layer solution that can be added to spans that need extended optical reach or do not have the necessary fiber capacity. To remain competitive and profitable, you need to eliminate cost elements from short spans while satisfying your desire to keep optical menus simple and compact. Plus, you need the most straightforward means to add WDM capabilities to the network. With WDM integrated into the add-on component, you could use existing optic cards and the new component to drive rapid installation time and lower deployment costs.

The FLASHWAVE 7120 system combines multiplexing, amplification, signal conditioning and performance monitoring in a powerful solution that can be easily deployed in metro, regional and long haul networks.
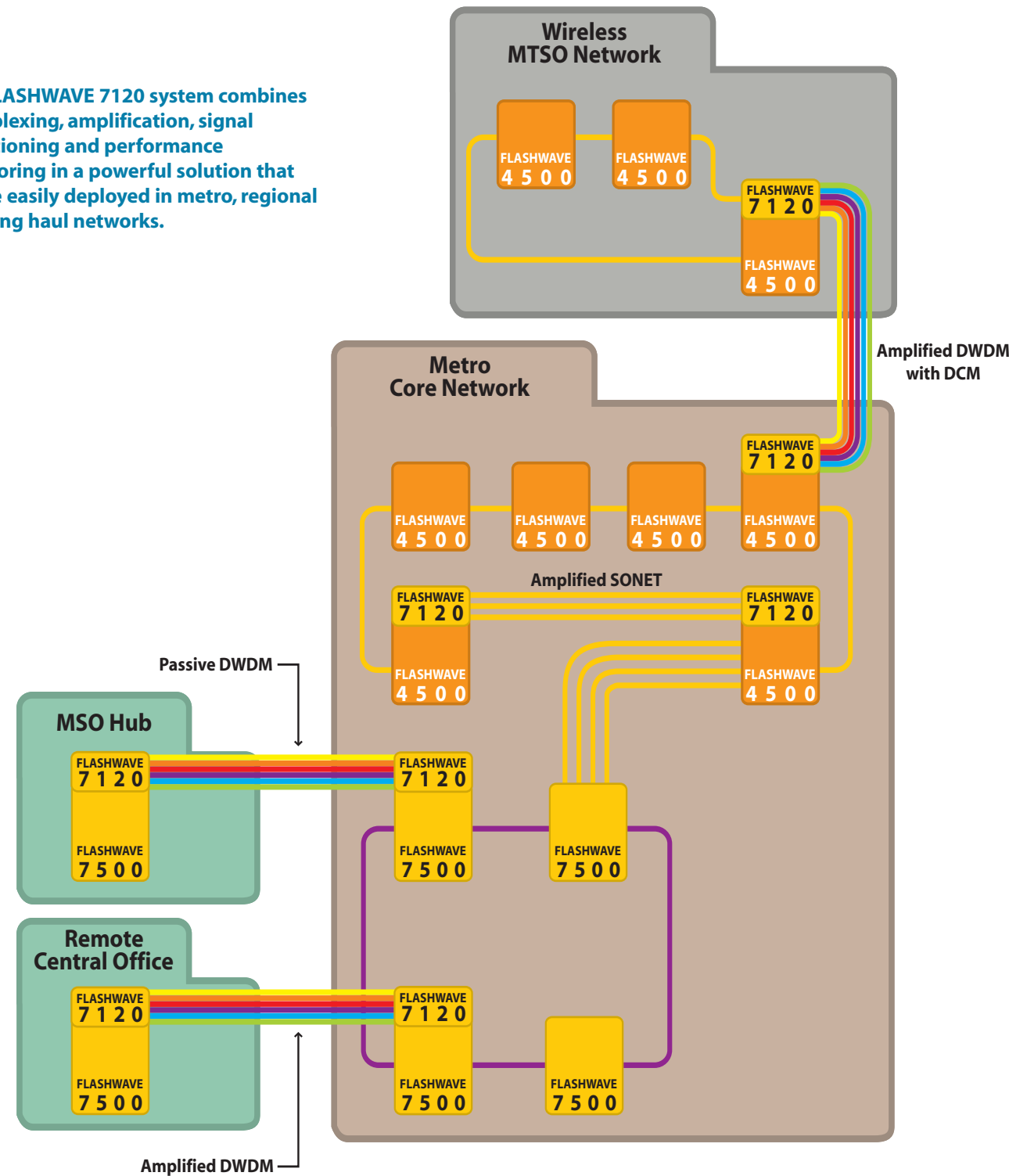
The BENEFITS of SIMPLICITY

For single channel and WDM transport applications that include spans that exceed the typical reach of metro optics or your available fiber capacity, the FLASHWAVE® 7120 system can fully integrate into other Fujitsu FLASHWAVE solutions. The FLASHWAVE 7120 platform combines multiplexing, amplification, signal conditioning and performance monitoring in a powerful solution that can be easily deployed in metro, regional and long haul networks.
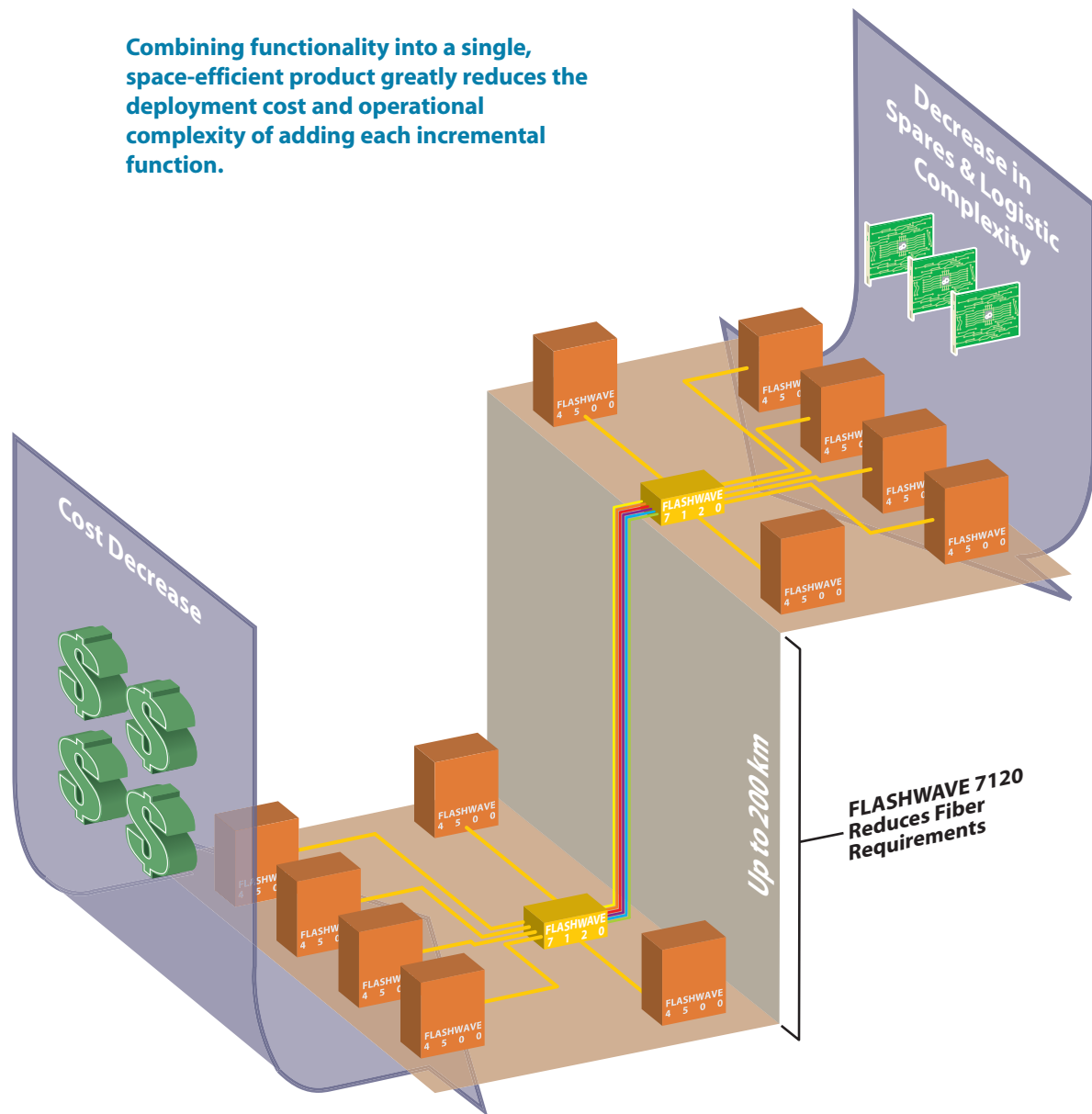
Combining functionality into a single, space-efficient product greatly reduces the deployment cost and operational complexity of adding each incremental function. Optical component sparing requirements are also decreased since the FLASHWAVE 7120 system uses direct connect optics to connect to your existing FLASHWAVE 4000 and FLASHWAVE 7000 service units, resulting in driving the cost and complexity out of your network.

With the FLASHWAVE 7120 solution's unique, modular approach, each slot can be equipped independently with a multiplexer/demultiplexer, optical coupler, Dispersion Compensation Module (DCM) or one of three Erbium Doped Fiber Amplifiers (EDFAs). This solution allows you to tailor the FLASHWAVE 7120 solution to your unique network needs, all within the same compact 2U (3.5") chassis.

Passive optical coupler modules include eight-channel multiplexers/demultiplexers that can be cascaded for 32 channel configurations and one-, two- and four-channel optical add/drop units. When combined with multiple narrowband wavelengths from the FLASHWAVE 4500 Multiservice Provisioning Platform (MSPP) or FLASHWAVE 7500 Extension system, the resulting single DWDM signal reduces the demand on your fiber infrastructure. Optional DCMs are available to provide compensation levels of 40 to 80 km to correct for chromatic dispersion—a common photonic liability that reduces transmission distance. By adding EDFAs, the FLASHWAVE 7120 system can support distances up to 200 km for single-channel applications and up to 110 km for multichannel DWDM networks, with future improvements planned. An Optical Supervisory Channel (OSC) module is also available to support your remote connectivity requirements.

The FLASHWAVE 7120 system scales to support four shelves, allowing all 23-service slots to be managed from a single CPU and Target Identifier (TID). Full integration with the NETSMART® 500 craft user interface and NETSMART 1500 Element Management System (EMS) allows the FLASHWAVE 7120 system to be seamlessly integrated into networks with other Fujitsu optical transport products. The FLASHWAVE 7120 system includes comprehensive Transaction Language 1 (TL1) and Simple Network Management Protocol (SNMP) support, allowing you to incorporate the platform into a wide variety of existing operating procedures and third-party management systems.

Combining functionality into a single, space-efficient product greatly reduces the deployment cost and operational complexity of adding each incremental function.

Decrease in Spares & Logistic Complexity

Cost Decrease

Up to 200 km

FLASHWAVE 7120 Reduces Fiber Requirements

FLASHWAVE 4 5 0 0

FLASHWAVE 7 1 2 0

Deploying Cost-Effective
MODULAR SYSTEMS
is the **SOLUTION**

Partner with an Industry Leader

Telecommunications carriers around the world have trusted Fujitsu with their critical optical networking requirements for over 20 years. With more than 320,000 network elements deployed, Fujitsu equipment sets the standard for performance, reliability and carrier-grade quality. Our experience in building robust and scalable networks of all sizes for major wireline and wireless telecommunications carriers and Multiple System Operators (MSOs) in North America puts Fujitsu in a unique position to help you create networking solutions that are optimized for a wide variety of situations.

Fujitsu is the Leader of the $1.39 Billion SONET Aggregation Equipment Market in North America

FUJITSU
28%
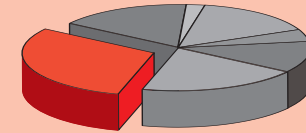
Source: RHK 2005

The **FLASHWAVE 4500** multiservice, optical transport platform optimizes the simultaneous delivery of traditional and next-generation services over a broad range of metropolitan networks. The scalable 300 Gbps switch fabric, integrated test access support, and performance monitoring capabilities allow the platform to support ultra high-capacity grooming applications and Digital Cross-connect System (DCS) pre-grooming or replacement. Next-generation functionality combines multiple NEs into a compact shelf, enabling you to realize immediate CAPEX and OPEX savings, while expanding service offering capabilities.

The **FLASHWAVE 7120** solution is available in two sizes to accommodate a variety of installation and network options. The FLASHWAVE 7120 small shelf offers an ultra compact 1U (1.75") chassis with support for two flexible circuit pack slots for passive applications. The FLASHWAVE 7120 large shelf features increased flexibility, allowing up to six hot-swappable circuit packs, including five service card slots, to be inserted into its modular 2U (3.5") chassis.

The next-generation **FLASHWAVE 7500** platform is optimized for access, metro and regional DWDM networks. Available in several configurations to satisfy a wide variety of applications, the FLASHWAVE 7500 system supports convergence of traditional SONET services with new data, video, storage and wavelength services. By aggregating all of your services and carrying them transparently over a single network, you can cost-effectively satisfy current and anticipated traffic demands and keep your network flexible and easy to manage.

The **NETSMART 500** craft user interface and the **NETSMART 1500 EMS** software simplify the management, provisioning and surveillance of Fujitsu FLASHWAVE and FLM optical transport products, as well as third party transmission products. Both software platforms include a full suite of on-site and remote network and element management features that empower service providers with indispensable tools to quickly and efficiently monitor and provision Ethernet, WDM, SONET, SDH and ATM services.

FLASHWAVE7120/SB/2.0/08.05/PDF