Cloud computing, big data and the mobilization of the workforce and business processes are generating growing volumes of traffic in corporate networks. This infrastructure can quickly reach its limits in terms of speed, capacity and security. What's more, today's networks must be increasingly flexible – to meet challenges such as establishing international sites and partner networks, integrating new companies, and taking advantage of the very latest technologies (e.g. OMAN, SDN). Without agile infrastructure, none of this would be possible. In Virtual Private Networks, T-Systems has developed a range of modular connectivity solutions to meet the customer’s every need – from connecting geographically dispersed branch offices, to mobile enablement and extranets. Expansion of bandwidth, sites and services must keep pace with customers’ growing demands. The offering’s key components include a powerful MPLS platform for managed transmission lines, innovative wireless solutions, and a wealth of new features for intelligent, efficient data transfer.
1. CONNECTING SITES

**FIXED CONNECT.** Fixed Connect provides direct connectivity between company sites on a national or international level. Each scalable solution is as unique as the customer’s needs. Dedicated, scalable access to T-Systems’ MPLS platform supports the following technologies for cost-effective IP VPNs:

- Fixed Connect DSL (standard DSL connections via the Internet with IPsec encryption)
- Fixed Connect Premium DSL (DSL connections with CoS)
- Fixed Connect Mobile (connections via 3G/UMTS/LTE)
- Fixed Connect Ethernet (connections via Ethernet technology up to 10 Gbit/s)
- Fixed Connect Link (connections via SDH technology)

The basic component is the router located at the customer site and operated by T-Systems. An IP interface ensures that a variety of routers with application-specific data-prioritization rules can be deployed to meet each customer’s requirements.

**MOBILE ACCESS UMTS.** To improve reliability, it makes sense to deploy Mobile UMTS Access as a second, wireless method of data transfer that is independent of physical cables. UMTS can also be used to provide reduced-bandwidth back-ups. Mobile Access UMTS can be deployed as the primary link for smaller sites (see also Remote Connect).

**Quality of Services**

Data prioritization with Quality of Service (QoS) in eight Classes of Service (CoS) makes it possible to assign service classes to data transfers:

- Voice and voice signaling class
- Real-time class
- Application classes (three profiles with defined minimum bandwidths)
- General purpose class
- Network management class

If capacity assigned to real-time applications (voice, multimedia) is not fully utilized, other data applications (e.g. SAP, email) temporarily use these bandwidths as well. As soon as higher-priority applications need capacity, they are immediately given priority on the bandwidths reserved for them. There are three CoS pricing models to choose from – changes can be made to CoS allocation within packages at any time. In addition to the predefined traffic categories, customers can also opt for service classes configured to meet their specific needs.

**Multi-VPN**

Using a Multi-VPN access point, companies can connect multiple independent sections of the VPN network (e.g. logistics, procurement or production) to ensure secure communications. With advanced Multi-VPN, user groups are segregated logically, but utilize the same physical access...
Connecting satellite offices
Office Connect is a cost-effective, scalable end-to-end solution that allows enterprises to integrate small branch offices with their network via encrypted Internet connections. This version of IP VPN consists entirely of Remote Connect access points (Fixed Connect is not required). Solutions are based on either Deutsche Telekom’s ISDN or DSL connections, or the customer’s own Internet connections. The networks can be accessed with a user ID via an IP router that is shipped to corresponding locations as a plug-and-play device.

Connecting mobile users
Another Remote Connect solution variant integrates mobile users and home offices via software clients and mobile dial up. It also supports smartphones and tablets that run all leading mobile operating systems. In this instance, encrypted data transfer takes place with the help of a software client via an Internet gateway provided by T-Systems. Data is encrypted using IPsec or SSL. For maximum security, customers can choose the One-Time Pass offering, and receive one-time passwords via text message or smart token.

3. ETHERNET VPN
Managed VPN transmission services via standardized Ethernet connections are ideal for enterprises that already own Ethernet-based LAN infrastructure and are looking to implement their own WAN network infrastructure, including IP management. Ethernet VPN offers international availability and diverse bandwidth options from 1 Mbit/s to 1 Gbit/s. To ensure the fast, secure transmission of high volumes of data – from a customer data center to a production facility, for example – defined point-to-point or point-to-multipoint connections can support variable switching and traffic can be prioritized in line with demand. Alternatively, to provide communications across distributed company locations, the LAN service can be set up with any-to-any or hub & spoke topology based on Virtual Private LAN Service (VPLS) technology.

Availability
• Up to 99.9 percent
• Technical SLA types: Platinum (with redundancy), Gold (with redundancy), Silver (with redundancy), Bronze (without redundancy)

4. EXTRANET SOLUTION
Extranets guarantee the efficient, highly secure exchange of confidential or sensitive data across enterprise and government-agency boundaries. As such, they build the foundations for communication throughout the process or value chain, and for secure access to community cloud services.

Suppliers, distributors and partners can be integrated into secure, industry-specific networks, extending enterprise boundaries and optimizing global collaboration through the use of a shared platform. Access lines can be dedicated or shared with other customer VPNs via a Multi-VPN access point. The solution’s quality and security characteristics are the same as those of a private company network.
THE ADVANTAGES AT A GLANCE

BENEFITS

Efficiency
- Companies benefit from less congestion and can use their network more efficiently
- Integrated end-to-end solutions with operations and monitoring provided by T-Systems ensure the highest levels of availability and efficiency
- Use of cutting-edge technology ensures that all possibilities are exploited to the full

Flexibility
- Agile infrastructures support changes to a company’s organizational structure
- Modular offering for customer-specific scope of services
- Connections are scalable in terms of CoS, QoS, SLAs (redundancy, back-up), bandwidths and Multi-VPN

Availability
- Guaranteed service levels are backed by a general SLA
- Round-the-clock monitoring of remote gateways (operability and availability) by network-management centers

Security
- Use of a dedicated MPLS platform with IPsec encryption, separated from the Internet
- Users must register and are authorized via a trust center
- Even greater security with the One-Time Pass offering

ENABLING GROWTH

- The highly-scalable solution supports change within corporations by providing flexible site-to-site connections
- Networks can be easily modified to suit the customer’s changing technological or other requirements
- Businesses do not need to expand their HR resources or develop specialist skills in-house to use the end-to-end IP solutions

SAVINGS

- Companies lower their investment in their telecommunications infrastructure, and benefit from lower capital tie-up
- Protection of investment: existing equipment can continue to be used
- Voice over IP enables you to combine telephony and video in one cost-effective solution

GENERAL SERVICE LEVEL AGREEMENTS

- Apply to all VPN modules and services including network availability and provisioning
- Service level assurance based on corresponding technical configurations
- SLAs both for the entire network and for individual sections or additional solution components
- SLAs include compliance monitoring and documentation
- The quality of the agreed services is documented in monthly reports
- In the event of noncompliance, the customer receives contractually defined discounts (credits)

OPERATING MODELS

- The customer leases existing infrastructures
- IP VPN as a fully managed service
- Ethernet VPN with platform managed by T-Systems. Customer retains responsibility for IP management

PRICING MODELS

- Predictability thanks to fixed costs per site and defined hardware
- National and international cost transparency

INTERNATIONAL AVAILABILITY

Fixed Connect is available in approximately 100 countries throughout the world. Remote Connect is offered in 150 nations, with more than 170 PoPs and 120 contracted providers. T Systems extends the reach of its own infrastructure by collaborating with partners.
In changeable, competitive environments, focusing on the customer can give you the decisive edge over your rivals. Enterprises must become more customer-centric, and evolve their ICT for the age of the customer. Services must be tailored, delivered directly and constantly available – anywhere, any time, on any device. What’s more, there is no real alternative to centralization and cloud solutions. Only high-performance virtual private networks can handle the sheer volume of data efficiently enough to connect businesses, people, information and applications, and keep pace with technological change.

**GERMAN MARKET LEADER FOR VPNS**

T-Systems offers a broad, modular portfolio of services, including both fixed-line and mobile telephony, plus network design, installation, configuration, and management. We are evolving our offering from a series of separate, stovepipe services into a coherent platform, with benefits that go far beyond the technical issues. We now provide network-centric managed services including voice, desktop and unified messaging. Customers benefit from innovative, usage-driven billing models and a provider experienced in large-scale, international roll-outs. T-Systems is the only ICT provider in Europe with comprehensive expertise in IT, telecommunications and mobile communications.

**T-SYSTEMS’ IP MPLS PLATFORM**

T-Systems’ VPN solutions are based on the high-performance IP MPLS platform that has a daily IP data throughput of around 4,047,000,000 megabytes (4.0 petabytes) worldwide. This comprehensive, proven backbone platform delivers unbeatable availability, a large number of PoPs, fail-safe reliability and fast rerouting. The global network currently features more than 250 fully-meshed MPLS PoPs and some 300,000 km of fiber optic cable. T-Systems is working hard to extend the platform’s geographical coverage and develop the network for the future.

**COMPLEMENTARY SOLUTIONS**

**Application Performance Management.** This solution offers end-to-end monitoring of applications, not merely individual sections, and the optimization of data transfer via a WAN. This approach delivers a 20- to 50-fold increase in transfer speed and enhances the efficiency of business processes.

**Cloud Services.** Customers purchase computing power and applications in line with their needs. Infrastructure services such as virtual servers, and end-to-end systems such as databases, web stores and complex IT landscapes are available as preconfigured solutions.

**Unified Communications.** Integrating all communication channels and adding presence information significantly accelerates employee communication. If extended to include collaboration tools, UC enables real-time communication across geographical borders.

**Big Data Solutions.** Solutions that analyze huge volumes of data from diverse sources – including structured data from CRM systems, unstructured information from social media, and bits and bytes recorded by sensors during M2M communication – enable faster, better-quality decision making.

**REFERENCES:**

**TRUMPF**

The world’s largest supplier of machine tools and laser technology wished to create a future-proof network platform for all of its sites around the world. T-Systems delivered an international, high-availability corporate network that integrates all international sites based on MPLS with CoS prioritization. Redundant business-critical components and end-to-end monitoring ensure a high level of reliability. All in all, Trumpf benefits from a comprehensive, one-stop solution that includes a general service-level agreement and around-the-clock service.

**ENX – THE AUTOMOBILE INDUSTRY’S COMMUNICATION NETWORK**

The European Network Exchange (ENX) extranet is accessible around the globe and enables communications between more than 1,000 enterprises from the automobile and other industries, in 34 countries. The managed platform is similar to the Internet but is much better protected and offers much higher performance. Manufacturers can exchange highly sensitive development, production and logistics data with suppliers in other countries in real time. ENX connections fulfill the same quality and security standards as private company networks.
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