

Tata Communications

Ethernet News



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T.E.N: Tata Ethernet News

Analyst Brief

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About Tata Communications

Tata Communications, a member of the \$62.5 billion Tata Group, is a leading global communications provider. As an emerging market leader, Tata Communications leverages advanced solutions capabilities and domain expertise across a global and pan-Indian network to deliver managed solutions to multinational and Indian enterprises, service providers, and Indian consumers.

Tata Communications' services include transmission, IP, converged voice, mobility, managed network connectivity, hosting and storage, managed security, managed collaboration, and business transformation for global enterprises and service providers. The company also provides Internet, retail broadband, and content services for Indian consumers. The Tata Global Network encompasses one of the most advanced and largest submarine cable networks, a Tier-1 IP network, with connectivity to more than 200 countries across 300 points-of presence (PoPs), and more than 1 million square feet of data center and co-location facilities.

The company's market depth and breadth of reach include a national fiber backbone, network and access network in over 60 cities and 125 PoPs in India, strategic investments in South African converged services operator—Neotel, Sri Lanka, Nepal and, subject to regulatory approvals, 50 percent ownership in China Enterprise Communications (CEC) for full country VPN coverage in China.

Servicing customers from offices in over 80 cities in 40 countries, Tata Communications is the number one global, wholesale voice operator and provider of international long distance, enterprise data, and Internet services in India. The company was named "Best Wholesale Carrier" at the 2006 World Communications Awards, "Best Pan-Asian Wholesale Provider" at the 2006 and 2007 Capacity Magazine Global Wholesale Telecommunications Awards, and "Best Progress in Emerging Markets" at the 2008 Mobile Communications Awards.

Tata Communications Limited (with global subsidiary Tata Communications), is listed on the Bombay Stock Exchange and the National Stock Exchange of India and its ADRs are listed on the New York Stock Exchange (NYSE: TCL).

Ethernet Portfolio - The Power of Choice

Tata Communications offers enterprise and carrier organizations unparalleled freedom of choice to select from an extensive Ethernet services portfolio, with varying configurations and features to accommodate every business application.

As a high quality, cost-effective alternative to Layer 1 services, Ethernet allows organizations to purchase the exact bandwidth required. Customers can choose from two global platforms that span business centers in Asia, North America, Europe, Africa, and soon the Middle East (using either Ethernet over MPLS or Ethernet over SONET/SDH) and provide a variety of features and benefits. Equally important, a comprehensive footprint throughout India connects over 120 cities via Ethernet. The India offering seamlessly connects with Tata Communications' global service to provide Ethernet connectivity between all major global business centers and any location within India.

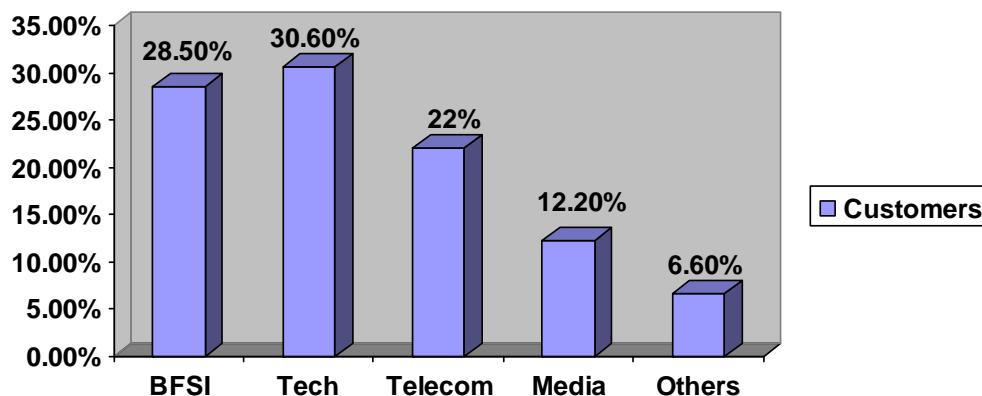
Quick Facts

- **Two Ethernet networks connecting India, North America, Africa, Asia, and Europe to provide seamless, secure Ethernet services**
 - o Tata is the only provider to deliver global Ethernet services designed for enterprise customers on two platforms
- **Current ownership of 200,000 km of submarine cable globally with investments in TGN-Intra Asia, TGN Eurasia, I-ME-WE, and SEACOM**
 - o Tata is the only provider to offer an extensive offering of Ethernet services over self-owned global cables with a wide range of bandwidths (64 Bytes to 10 Gig-E)
 - o Expansion plans for submarine cable networks ensure adequate bandwidth and cost-effective Ethernet services for years to come
- **Extensive coverage across India with Ethernet services available in over 120 cities**
 - o National and metro coverage
 - o The first Indian provider to offer MEF-certified Ethernet services
 - o Seamless interconnection between global and Indian networks
- **Services to over 40 major business centers today with plans to add 10 new sites across the globe by the end of 2008**
 - o **Asia:** Tokyo, Japan; Hong Kong (X2); Singapore (X2); Sydney, Australia; Manila Philippines; Kuala Lumpur, Malaysia
 - o **North America:** Seattle, Washington; Palo Alto, San Jose, Santa Clara and Los Angeles, California; Dallas, Texas; Chicago, Illinois; Atlanta, Georgia; Miami, Florida; New York City, New York (X2); Newark and Wall, New Jersey; Toronto and Montreal, Canada
 - o **Europe:** London (X2), Highbridge, Peterborough, England; Amsterdam, Netherlands; Paris, France (X2); Frankfurt, Germany; Madrid, Spain; Brussels, Belgium; Warsaw, Poland; Stockholm, Sweden; Zurich, Switzerland
 - o **Africa:** Johannesburg and Cape Town, South Africa
 - o **Middle East:** Dubai, UAE
 - o **India:** Mumbai, Chennai, New Delhi, Hyderabad, Bangalore, Pune, Cochin, Calcutta plus 120 cities nationwide.
- **Ownership in Neotel (South Africa) and soon ownership in CEC (China), pending regulatory approval**

Customer Quick Facts

- **The most popular Ethernet feature:** non-service affecting upgrades is the most commonly used feature by customers, upgrading the bandwidth on their Ethernet circuits without service interruption. For customers' flexibility, Tata Communications does not require a contract extension for upgrades.
- **Very low churn:** 98 percent of Tata Communications' customers who have taken circuits over the last three years are still customers today. Over 75% of those customers have increased their bandwidth at least once, and some have required several upgrades.
- **Total bandwidth** sold as of August 2008 is over 14,000 Meg (excluding 10 Gig-E circuits)
- **The average circuit size** is 232 Meg (top and bottom five circuit sizes were removed and 10 Gig-E circuits were excluded from the calculation)

The following shows a breakdown of Tata Communications' customer groups showing the variety of industries accepting Ethernet as a transport for data—from mission critical to non-critical. These firms have turned to Tata to deliver this emerging service.



MEF Certifications – A Global First

Tata Communications was the first global service provider to earn MEF 9 and MEF 14 certifications for Global Dedicated Ethernet Service and the first Indian service provider to earn MEF 9 certification for National Dedicated Ethernet Service. This certification is awarded after passing over 400 tests performed by an independent testing firm over a period of five weeks. The Metro Ethernet Forum (MEF), a global industry alliance of more than 150 organizations, develops technical specifications and implementation agreements to promote interoperability and deployment of carrier-grade Ethernet worldwide.





Tata Communications' Ethernet Services

All services described below are currently available.

Point to Point Ethernet Services

Priority Ethernet (Global and National)

Designed for enterprise organizations, this service features global reach and mesh protection with geographic diversity for service continuity in case of a regional disaster. Priority Ethernet offers four classes of service, allowing customers to prioritize traffic. The service also features interclass bursting within the overall CIR (Committed Information Rate).

Global Dedicated Ethernet

Designed for enterprise customers or carriers, this service features global reach, ring protection, and a single priority service with frames forwarded in the order received plus a choice of protected or unprotected circuits. This service supports standard and jumbo frames.

National Dedicated Ethernet

Designed for enterprise customers or carriers within India, this service is available throughout India and offers ring protection and a single priority service with frames forwarded in the order received. This service supports standard and jumbo frames.

Point to Multipoint Ethernet Services

Priority Point to Multipoint Ethernet (Global and National)

Designed for enterprise organizations, this service features mesh protection, a choice of four classes of service with interclass bursting, and a hub and spoke architecture. VLAN tagging directs frames to intended destinations.

Dedicated Point to Multipoint Ethernet (Global and National)

Designed for enterprise or carrier organizations, this service features a private network utilizing a hub and spoke architecture, choice of ring protected or unprotected circuits, a customer premise to customer premise SLA, and a single priority service with frames forwarded via their MAC address in the order received.

Multipoint Ethernet Services - Introducing a Revolutionary Ethernet Service

Dedicated Multipoint Ethernet (Global and National)

Designed for enterprise organizations, this service features a private network on a multipoint (any-to-any) configuration, choice of ring protected or unprotected circuits, a customer premise to customer premise SLA, and a single priority service with frames forwarded via their MAC address in the order received. This service is a true LAN service and does not use Layer 3 to achieve multipoint.

Enterprise SLA Option

As a completely managed solution available globally, the Enterprise SLA Option offers an enhanced SLA that extends from the customer premise to the customer premise, covering the entire circuit, on-net and off-net. Tata Communications monitors the entire circuit using Tata's equipment installed at each customer premise. This option provides a strong Layer 2 SLA that covers service uptime, packet delivery ratio, frame delay (latency) and frame delay variation (jitter), on-demand reporting, and all verified using inline monitoring.

Key Differentiators - Flexible Solutions Promote Customer Growth

Tata Communications Ethernet services provide the flexibility organizations need to design a telecommunications solution that exactly meets their changing requirements. This focus on flexibility is represented throughout the company's offerings, as described in the features below:

Range of Services

A range of services is provided via two global platforms:

- Ethernet over SONET/SDH (Dedicated Ethernet)
- Ethernet over MPLS (Priority Ethernet)

Multiple Configurations

- Point to Point (EPL and EVPL)
- Point to Multipoint (EVPL and E-TREE)
- Multipoint (E-LAN)

Varying Bandwidths

- 64, 128, and 512 byte service
- 1 to 100 Meg in 1 Meg increments
- 100 to 150 Meg in 5 Meg increments
- 150 to 1,000 Meg in 50 Meg increments
- 9,500 Meg for 10 Gig-E

Additional Features

- Four classes of service on Tata Communications' Priority Ethernet services or a completely transparent service on Tata Communications' Dedicated Ethernet services.
- Levels of protection—ring, mesh, or unprotected
- Competitive, industry-leading SLAs from PoP to PoP or customer premise to customer premise
- SLAs that cover parameters such as availability, service uptime, frame delay (latency), frame delay variation (jitter), and packet delivery ratio

Tata Communications' Ethernet Portfolio At a Glance

| <u>Network & Coverage</u> | |
|--------------------------------------|--|
| <u>Metric</u> | <u>Value</u> |
| Architecture | Dedicated Ethernet: Ethernet-over-SONET/SDH. Priority Ethernet: Ethernet-over-MPLS. |
| Topology | Dedicated Ethernet: Point to Point, Point to Multipoint, and Multipoint. Priority Ethernet: Point to Point and Point to Multipoint. |
| Equipment vendors | Cisco, Turin, Tejas, Advia, and Accedian. |
| Local access options | Metro and national Ethernet services are available within India. |
| Port speeds | Dedicated Ethernet: 100/1000Mbps – 10 Gig-E. Priority Ethernet: 100/1000Mbps. |
| Bandwidth increments | Dedicated Ethernet: 2 – 100Mbps in 2Mbps increments/50 – 1Gbps in 50 Mbps increments. 9,500 Mbps (10 Gig-E) Priority Ethernet: 64kbps/128kbps/512kbps/1 – 100Mbps in 1Mbps increments/105-145 in 5Mbps increments. |
| Off-net coverage | Partnerships are being developed in the Philippines, Thailand, Malaysia, China, Qatar, UAE, and this trend will continue. In addition, Tata Communications has long-standing and extensive relationships and can arrange for off-net local loops globally when required. |
| Ethernet MANs | Metro networks in 9 cities in India. |
| <u>Services and Features</u> | |
| <u>Metric</u> | <u>Value</u> |
| Applications | Tata Communications' Ethernet services have the capabilities to meet the strictest application standards, such as live video or VoIP and can provide a cost-effective solution for data applications such as email. |
| EPL services | Dedicated Ethernet |
| EVPL supported | Priority Ethernet |
| E-LAN services | Dedicated Ethernet |
| V-LAN supported | Priority Ethernet |
| VPLS/VPWS supported | No. |
| DWDM wave length | 10 Gig-E (WAN and LAN PHY) available globally. |
| Managed option | Tata offers an Enterprise SLA Option, available globally that provides customer premise to customer premise monitoring and SLA. |
| CoS | Yes, for Priority Ethernet – four classes of service. |
| MEF certification | MEF 9 and 14 for Global Dedicated Ethernet, MEF 9 for National Dedicated Ethernet (in India) |
| Pricing | MRC and NRC based on routes and endpoints. |

| <u>Service Level Agreements</u> | |
|---|--|
| Metric | Value |
| Network availability | Dedicated Ethernet: Uptime: 99.9% protected circuit and 99.5% unprotected circuit. Priority Ethernet: 100% for key international sites; 99.9% for other international sites. For India: 99.995% (Tier 1), 99.9% (Tier 2), and 99.5% (Tier 3 PoPs). |
| PoP to PoP or premise to premise | Dedicated Ethernet: PoP to PoP. Enterprise SLA Option: Premise to premise. Priority Ethernet: PoP to PoP. |
| Packet loss ratio/packet delivery ratio | Dedicated Ethernet: 0.03% / 99.97% Priority Ethernet: 0.05% for CoS1; 0.5% for CoS2; 1% for CoS3 and best effort for CoS4. |
| Frame delay (latency) | Dedicated Ethernet: Individually calculated based on actual path provided. Priority Ethernet: Based on geographic region and CoS. |
| Frame delay variation (jitter) | Dedicated Ethernet: Not to exceed 5ms. Priority Ethernet: India Tier 1 PoPs: 5ms; Tier 2 PoPs: 10ms; Tier 3 PoPs 15ms. Key international sites: 5ms; other international sites: 15ms. |

For More Information

For more details about all Tata Communications' global Ethernet services, visit <http://www.tatacommunications.com/enterprise/network/ethernet.asp>

Tata Communications — www.tatacommunications.com