



CHINA TELECOM USA
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Access China with CN2: The Internet for Business

White Paper



China Telecom is one of only a handful of elite carriers who have built entirely new IP networks in order to satisfy the complexities of globally distributed, Internet-based, mission-critical applications. China Telecom's next generation network initiative, China Telecom Next Generation Carrying Network, or CN2, began its acclaimed commercial roll-out in mid-2005. Corporate entities, public sector organizations, carriers and managed service providers now have access to a broad range of highly reliable, high-performance network services through the region's best-connected and entrenched information provider – **China Telecom**.



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The Century's Greatest Innovation

It's been suggested by some pundits that the Internet is the greatest innovation of the last 100 years, having already shaped the global political landscape, fundamentally shifted the way economies develop and changed how people live, work, learn and play. The world is getting comfortable in a digital skin. Most of us would agree that the Internet has had a profound effect on our lives. In April, 2006, the Pew Internet and American Life Project released its findings that 45% of Internet users, or about 60 million Americans, say that the Internet helped them make big decisions or negotiate their way through major episodes in their lives in the previous two years. Global e-commerce is booming, e-mail and instant messaging communications have become ubiquitous and vital industries such as financial services rely on the Internet for mission-critical applications.

There's a common global theme. Driven by consumer and business demand, Europe and Asia are now becoming Internet transit centers, a role that had once been dominated by North America. The Probe Group predicted that by 2008, Europe will have the busiest routes for IP communications and North America will rank third, after Asia.

Data published by China Internet Network Information Center (CINIC) in January 2006 show that Internet adoption and use in China continues to be strong. China's 111 million Internet subscribers (second only to the U.S. in 2005) spent nearly sixteen hours per week online to obtain news, exchange e-mails and instant messages, shop, download media and play online games. According to ACNielsen, 63% Chinese

Partnering for Success

Penetration of Internet subscribers, like the distribution of China's nearly 700,000 websites, is concentrated in more developed regions of China. It parallels the investments that have been made in all sorts of infrastructure such as the thousands of industrial parks that have been created to nurture upstart Chinese business, attract multi-nationals doing business in the region and retain them. What foreign companies

have discovered over the years, as have eBay (which recently completed a \$150 million investment in Chinese online company EachNet), Yahoo and Google, is that in order to have long-term success in China, finding a strong local partner is crucial. China Telecom USA with its parent, China Telecom, helps multi-national companies and carriers develop and execute their market penetration strategies in China.

Internet surfers shop online and are active users of search engines such as Baidu.com (in which Google holds a minority position), Google.com and Alibaba.com. (Yahoo agreed in August 2005 to pay \$1 billion and transfer all of its businesses into Alibaba.com Corp. for a 40% stake in the company). Such huge investments in the Chinese Internet economy are indicative of the further potential that Internet players believe China offers. Consider this testament to China's potential: The number of Internet users grew by 18% in 2005 to 111 million, yet still accounts for less than nine percent of China's population, compared to nearly 69% penetration of Internet services in the US population.

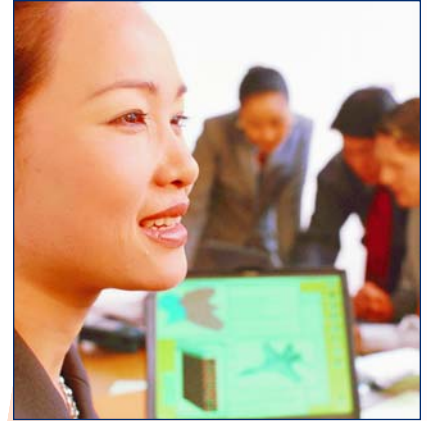
So What's Wrong with the Internet?

If so many people are using the Internet with positive results, what could be wrong?

The Internet on which we depend today is wrought with weaknesses stemming from the fact that it was originally developed as a means for research universities to share information among their computers. As it evolved to be used by consumers, government, businesses, educators and researchers, it remained fundamentally a one-size-fits-all infrastructure.

The Internet's founders could not have foreseen the level of dependency the global business community now has on the Internet as the foundation for the Information Technology (IT) stack, becoming the network of choice for all kinds of applications and communication methods – from voice to video. Who could have anticipated the many changes to the business environment that now affect all areas of IT, especially the network? Today's IT executives must now make network architecture and operations decisions in consideration of these trends, which make up the new IT paradigm:

- **Globalization.** Whether the company's increasingly global view is driven by a global client base and/or global sourcing of services or materials, IT – from the network layer up to the business application layer - is supplying the enabling infrastructure to sustain the expansion.
- **A growing reliance on distributed, composite applications.** The nature of distributed, composite applications is that resources are spread out among many physical and logical locations and they are comprised of IT assets that were not originally built and rolled out together. These applications are ever-changing and leverage both old and new technologies. They are dependent upon underlying network performance to keep application resources on-line, performing at required service levels and synchronized worldwide.



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China Telecom has the majority market share of Internet users in China and 53% of the country's Internet backbone. The company controls 70% of China's local access and has led the country's telecommunications evolution with service offerings like China VNet (Internet portal) and ChinaNet (IP and broadband network) and was the first Chinese carrier to establish a US operation to serve global clients, China Telecom USA.

- **A move from batch to real-time transaction processing.** Industries like manufacturing, financial services and even retail that used to wait 24 hours to analyze the day's operations data or complete clients' transactions are now processing transactions in real time and expect to view performance data in real time through their Business Activity Monitoring (BAM) applications and Executive Dashboards. Real-time transaction processing smoothes network loads, yet also means that unless the network supports classes of service, mission critical financial trading transactions or important updates to the ERP system may experience performance bottlenecks due to a burst of e-mail traffic. Customer Service Level Agreements (SLAs) and IT's operations performance targets are now higher than ever, and rely on real-time transactions, which in turn require network reliability, accessibility and performance.
- **Intense competition and consolidation in many vital industries.** There is extreme pressure in almost every industry to reduce the cost of operations. IT – from the business layer down to the network layer – has delivered cost savings by rolling out systems and processes that automate and control business operations. As new network protocols and services are commercialized by industry-leading communications companies, the cost of IT operations has been further reduced and the new IT paradigm has been enabled.
- **Government regulations.** Although many regulations are process-oriented, others dictate stringent IT performance, new reporting capabilities and auditable levels of security in the IT infrastructure.
- **Greater availability and acceptability of digital content and web applications.** Integrated Software Vendors (ISVs) and content owners have made billions of dollars of investments in web-enabling applications and creating digital content. The growth of the market for digital content is spurred by the commercialization of services that enable it to be consumed in a variety of ways; through a television, computer or mobile device. The convergence between mobile and fixed line services; between voice, data and video; and between devices all requires supporting network infrastructure to meet consumer demand.

Most consumers and business users of Internet services are not cognizant of the new paradigm, but IT executives and network communications providers certainly are. The fact is that the Internet we use today (the majority of it running IPv4 technology) has had millions of patches applied to it in order to help it address this new IT paradigm. And in spite of its shortcomings, the Internet continues to be a strategic part of our lives and the global economy.

China Telecom's CN2: The Business Class Internet

While many global users may be satisfied with the current Internet, some IT executives, industry analysts and innovators like publicly-traded China Telecom Corporation (NYSE: CHA) have seen both cause for concern and untapped opportunity. China Telecom has the majority market share of Internet users in China and 53% of the country's Internet backbone. The company controls 70% of China's local access and has led the country's telecommunications evolution with service offerings like China VNet (Internet portal) and ChinaNet (IP and broadband network) and was the first Chinese carrier to establish a US operation to serve global clients, China Telecom USA.

Forward-thinking and resourceful, China Telecom in the early 2000's evaluated a constellation of emerging technologies, market conditions and trends and concluded that ChinaNet would meet much of the market's needs for a long time, yet the company understood that there would remain an underserved market segment. The growing importance of IT to global competitiveness, the increasing dependence on networked applications, the booming economy and the influx of Multi-National Corporations (MNCs) investing in China would require an entirely new global Next Generation Network to meet both the staggering volume of demand for Internet services and the new IT paradigm – one that rests on the power of global, distributed, real-time and regulated networked operations. China Telecom laid plans for China Telecom Next Generation Carrying Network, or "CN2." CN2 provides the global coverage, network technology infrastructure and management capabilities required for MNCs to successfully leverage China in their growth strategy. It's an advanced communication and information network for the future.



Telecom Magazine reported in June 2005 that CN2 will make China Telecom one of the most proactive NGN carriers in the world. CN2 moves China Telecom from a traditional network carrier to a comprehensive integrated information service provider and reinforces its position as an ally to multinational businesses doing business throughout Asia.



In this example, ChinaTelecom USA's client is a global manufacturer and distributor of consumer products that are sold through thousands of independent, direct representatives worldwide. The company's regional office employees use IPVPNs to securely access data from regional CRM and

Inventory and Distribution systems in real-time. Independent representatives may securely utilize the corporate systems through a variety of access types including wireless, ADSL and ethernet to update customer orders, check inventory, access training videos, etc.



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Technology for the Next Generation

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A multi-billion dollar investment, CN2 was built from the ground up. It is a completely new IPv6-capable backbone network leveraging new softswitches (the control layer) and protocols like DiffServ and MPLS, which boosts performance of its bearer layer. With five classes of service and QoS, CN2 guarantees reliability and performance of mission-critical and high-priority applications. The MPLS-optimized architecture also enables Frame Relay and ATM traffic to be transported over a Layer 2 VPN, ensuring support for both legacy traffic and new IP services over a single IP/MPLS network. This promotes network efficiency and scalability in order to satisfy the growing demand for IP services.

CN2 enables China Telecom and its subsidiaries to continue to support its legacy services while moving forward with cost effective new offering such as:

- high-performing global VPNs such as IP/VPNs or Ethernet VPN;
- converged services offering communications from anywhere to any device (combined voice, data and video services);
- high-quality IP voice;
- video streaming and other advanced broadband applications;
- 3G mobile applications.

Pervasive Network Coverage

After nearly three years of tests and trials, the network began its commercial roll-out in mid 2005, beginning in China with core nodes in seven cities, aggregate nodes in 22 cities, edge nodes in 165 cities with direct coverage to 194 cities with the ability to extend further through ChinaNet. CN2's Global Points of Presence (POPs) will be located in New York, Los Angeles, San Jose and Washington, DC (North American POPs will be rolled out through China Telecom USA in Q2'06), Frankfurt, Hong Kong, London, Seoul and Tokyo. CN2 will be linked to ChinaNet's more than 35 million registered customers and will provide direct connections to all major global ISPs for direct traffic routing. Because it is an ultra long-haul Dense Wavelength Division Multiplexing (DWDM) network, CN2 provides better transit and minimizes signal delays.

Smart Operations Support System

Many global carriers struggle with the fact that their Network Operations Centers (NOCs) were built before the entire IT paradigm shifted – before real-time, distributed, mission-critical applications were running over the Internet and certainly before classes of service needed to be managed like applications. How can a company offer industry leading Service Level Agreements for multiple services without the tools to assure that they can be met?

China Telecom's network investment has been matched by an equally powerful Operations Support Systems (OSS) infrastructure called China Telecom Global Support Center. New NOCs in Shanghai and Beijing equipped with service-aware management tools provide automated provisioning, proactive problem identification and resolution, network and application performance management, service level management and real-time reporting. These OSS tools provide China Telecom's global clients and carrier partners visibility into CN2's performance. When distributed, composite applications experience performance problems, quickly identifying and isolating the root cause of the problem to the network, ERP system, middleware, database, J2EE application or even the mainframe becomes essential. CN2's management tools empower Operations Support experts to rapidly rule out whether or not the problem is being caused by the network.

CN2's Benefits to Clients and Affiliates

While it leverages the assets that already exist on ChinaNet, CN2 offers a business class alternative that enables applications and communication services in Asia and beyond to perform at unprecedented levels. CN2 takes into account:

- The need for immense scalability (of users, network capacity, thousands of interconnections, domains and IP addresses, etc.);
- The need for application-specific SLAs;
- The growing global dependence on Internet-based distributed, composite, mission critical applications;



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About China Telecom USA

China Telecom USA, a wholly owned subsidiary of China Telecom, is headquartered in Herndon, Virginia. It provides customers between North American and China a full range of China-domestic, China-North America and international voice and data products. China Telecom USA's comprehensive product portfolio meets all aspects of a business' telecommunications needs, from local loops to international circuits. China Telecom USA is also a strategic partner to North American telecommunications companies requiring access to China and Asia.

About China Telecom Corporation

With over 231 million customers and more than \$61 billion in assets, China Telecom Corporation is one of the world's largest telecommunications companies. As the largest fixed-line provider in the world, China Telecom owns and operates an extensive system of domestic and international telecommunications networks and facilities, including local wireless loops, voice, data, image, multimedia and other telecommunications services in China. China Telecom has international offices in the United States, Hong Kong and the United Kingdom.

For further information, contact us at:
1-866-692-8872 or on the web at
www.chinatelecomusa.com



- Security as required by government regulations and today's security best practices;
- Support for alternate devices and converged media such as voice, data and video;
- The need to find and fix performance bottlenecks quickly.

Corporate and Public Sector Organizations

Corporations and Public Sector Organizations will realize many benefits from CN2, including:

- Improved performance of all networked applications;
- Broader range of services available;
- Greater flexibility in service choices;
- Cost effectiveness - more services available through one investment;
- Ability to store information centrally on the network, which means that they can obtain it from many points, rather than have to transfer data among devices;
- Reliable management capabilities.

Communications Providers and Managed Services Providers

Communication and Managed Service Providers which have had a long history of collaboration with China Telecom are offered the following with CN2:

- Best of breed services to offer to their clients either under the China Telecom brand or privately labeled;
- Ability to generate new revenue streams from innovative, customizable service offerings;
- Opportunity for easier and cheaper entry into the Asian market by working with China Telecom and its subsidiaries;
- Availability of carrier-class multiservice IP networks and service driven switching;
- Superior customer support by leveraging CT's investment in OSS, making service fulfillment and service support available in real-time.

Summary

China Telecom's CN2 initiative set out to leapfrog current technology and Internet service offerings in order to enable the growth of the Chinese economy and to remain the Internet service provider of choice serving China and the rest of the world. CN2 is not merely an enhancement or network upgrade. It represents a network and corporate transformation and one that will benefit the region, MNCs and carriers doing business in China for years to come.