STRATEGY WHITE PAPER

Revolutionary e-government Strategies across Asia-Pacific

In order to provide citizens with improved access to government services, governments across Asia Pacific are embracing the concept of e-Government, a strategy of employing the latest technology to streamline public-sector processes As they implement these initiatives, Asian governments are transforming the very structures of their organizations and fundamentally altering the way they interact with those they serve. This paper describes the ways in which individual countries across the region are implementing e-Government programs and examines their goals, challenges and successes. It also draws conclusions about the current situation and makes projections about future developments. e-Government has already become a defining concept for most countries in Asia and will continue to be at the forefront of policy making for years to come.

ALCATEL

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REVOLUTIONARY E-GOVERNMENT STRATEGIES ACROSS ASIA-PACIFIC

Asian governments are exploiting the latest telecommunication and Internet solutions to launch themselves into the vanguard of e-Government.

Introduction

A revolution in government stewardship is underway in Asia. From Hong Kong to Manila, officials are embracing the concept of e-Government, a strategy of employing the latest technology to streamline public sector processes as a means of providing citizens with improved access to government services. As they implement these initiatives, Asian governments are transforming the very structures of their organizations and fundamentally altering the way they interact with those they serve.

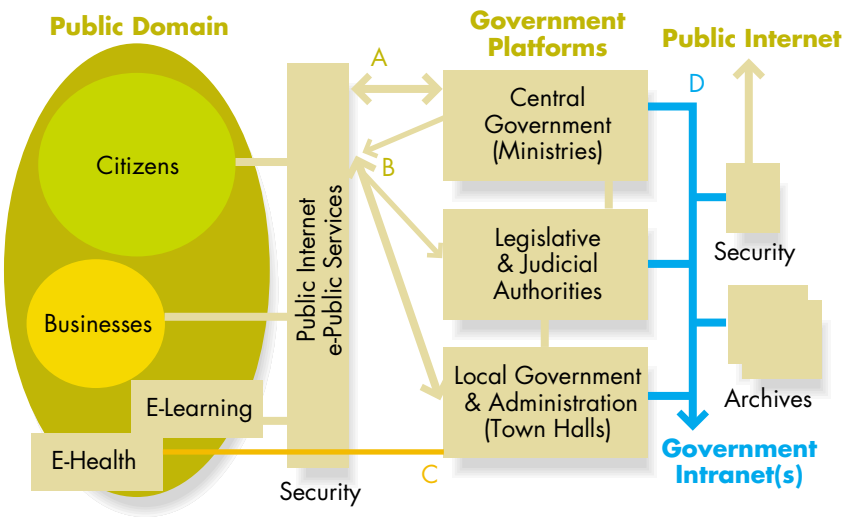
Asian governments and their citizens are some of the most progressive proponents of e-Government in the world. E-Government usage in 75% of the Asian countries analyzed in a recent study by market information firm Taylor Nelson Sofres surpassed the global average of 30%. In Singapore, more than half the population uses e-Government services; the country ranks second, just behind Canada, as the most advanced e-Government in the world. Korea and Hong Kong are not far behind [1]. Certainly, the speed of development is not consistent across Asia. However, virtually all governments in the region have formulated an e-Government strategy and are now turning their words into actions.

The impetus for governments to revolutionize the ways in which they execute their duties to constituents can be ascribed to globalization and the demand for greater transparency, greater speed and a more highly-skilled workforce. Some experts point to the Asian financial crisis in 1997 as the "wake up" call that spurred governments to improve the quality and speed with which they disseminate information [2]. The equation was simple: better access to information results in greater investment, particularly from foreign sources. The advent of an increasingly global trading environment meant that every country in Asia – no matter how large or small – needed to take drastic action to raise the skill level of its workforce to remain competitive in the worldwide commercial arena. Finally, the rise of the Internet and the availability of broadband access in many countries throughout the region changed the expectations and demands of citizens.

e-Government in Asia-Pacific: Regional Perspective

In its most basic form, an e-Government initiative may entail nothing more than setting up an internal network and providing staff with e-mail. Indeed, a number of countries in the region have not progressed much beyond this stage. However, an increasing number have begun to make information accessible to other agencies and to the public through online resources (see *Figure 1*). A very few have begun to move beyond this stage to realize more interactive and complex communication with their constituents. The use of e-Government services in Asia is

Fig. 1 e-Government interactions



highest among Internet users, with the highest level in Singapore at 75%, followed by Australia and New Zealand at 70% [1].

In all this, there are significant opportunities for providers of communication solutions. It is possible to get a sense of where these opportunities lie by considering the cases of a few countries that, taken together, represent a cross-section of government initiatives across the region.

e-Government in Asia-Pacific: Country-level Perspective

Singapore

The Singapore e-Government initiative is the most advanced in Asia-Pacific, and one of the most successful programs worldwide. Singapore's e-Government mission is to better serve the nation in the digital economy using a strategy of providing integrated services oriented towards users' needs rather than delivered in the way a given ministry chooses to define them. The Government is also following a proactive "sense and respond" approach with the goal of anticipating citizens' demands by using information technology.

A key component of the Government's initiative is the Singapore eGovernment Action Plan, a two-phase program launched in 2000 supported by some US$ 1.5 billion in funding for public sector information and communication technology. The initial phase included the large-scale deployment of electronic public services through the development of a government-wide Public eServices Infrastructure (PSi). As the background infrastructure on which public services will be made available via the Internet, the PSi enables agencies to share information, and provides seamless communications between agencies, businesses and citizens while adhering to design considerations such as a multi-tier architecture, high availability, scalability, thin-client support, security, platform-independence and standard technology.

The second phase, which was launched in 2003, encompassed the Broadband Infrastructure for Government (BIG) and Government Access Infrastructure (GATE). The former gives government agencies flexibility in their choice of broadband and mobile roaming mediums. It leverages public telecommunication networks for access to government resources. The complementary GATE provides secure access to the government network via a wide range of channels, including dedicated dial-up, Asymmetric Digital Subscriber Line (ADSL), cable modem and other subscription services provided by Internet Service Providers (ISP).

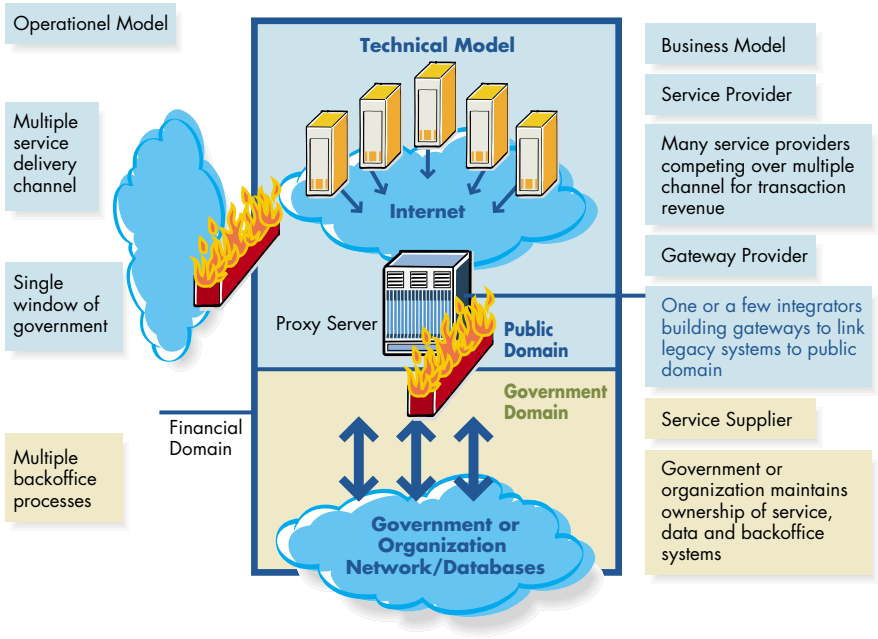
Recognizing the crucial role security plays in ensuring the long-term success of e-Government programs, Singapore has taken concerted steps in this direction, such as enacting the Electronic Transactions Act (ETA) to provide for electronic signatures.

In the near term, Singapore's e-Government plan outlines steps for technology innovation and delivering services over multiple channels – wireless, broadband, etc.

Malaysia

Since the Electronic Government Initiative was introduced under the country's "Vision 2020" policy announced in 1997, Malaysia has been moving an increasing number of services online (see *Figure 2*). Citizens can now apply for drivers' licenses, marriage certificates, etc, online. The government has partnered with world-class companies to develop and implement a number of leading-edge applications. Despite these initiatives, only about 15% of Malaysians have used the Internet to access online government services over the past 12 months, roughly half the global average [3]. The problem, according to Tan Sri Samsudin Osman, Chief Secretary to the Government of Malaysia, is that many public sector websites currently focus largely on providing information, rather than enabling citizens to take

Fig. 2 Malaysia's e-Government model



advantage of the available services. "We want government departments and agencies to promote the services, not promote the departments," he said [4].

In line with the plan's customer focus, the government will set up a portal through which eventually the public will be able to access all online public services, as well as community sites. There are a number of other initiatives in the offing: The e-Services pilot project, for example, offers alternative methods, such as kiosks and interactive TV, for accessing and delivering information and paying bills. Another initiative, the Local Government's Governance Agenda (SLGGA), promotes e-Government among local authorities to improve their efficiency in providing public services [5].

As in other countries, the Malaysian government regards security as a major hurdle to overcome in completing its e-Government transformation. A survey by research firm TNS found that only 32% of Malaysians interviewed considered it safe to use the Internet to provide the government with personal information, compared with 35% the previous year. Moreover, the number who considered it unsafe has risen to 47% from 42% in 2002 [3].

Korea

Even the most cursory review of Korea's e-Government initiatives gives the impression of focused investment of capital and resources. The government has moved quickly and spared no expense in implementing the latest technology. By 2000 almost all the Korean government's agencies were already online and connected to a high-speed backbone, and more than 55% of government documents were handled electronically [6]. The importance of Information and Communications Technology (ICT) to the Korean government is clear from the country's annual budget. ICT spending is among the top ten of the country's expenditures, with the government spending nearly half its ICT budget (some $435 million) on e-Government programs [7]. Given this level of investment and activity, it is little wonder that a United Nations report ranks Korea second in Asia and 13th worldwide in terms of success in employing electronic technology to extend public services. The government is active in advancing technology-related programs and takes a leading role in acting as provider, user and promoter of ICT to encourage development and usage as much by example as by guidance and investment. Another strategy that works to the government's favor is its efforts to foster close ties between the public and private sectors and attract private capital.

The government's vision of an information society expresses itself in a series of plans dating back to 1987. The "e-Government Initiatives" plan released in 2001 provided for the government supported build-out of a national broadband optical fiber backbone. As a result, government ministries, agencies, etc, all have broadband access and have invested over US$ 24 billion. The most recent phase in Korea's e-Government strategy, termed "Global Leader e-Korea", is aimed at upgrading the communication infrastructure. The government plans to spend US$ 53 billion in ICT over the next five years with the goal of getting more than 90% of all Koreans online and encouraging schools to use ICT applications.

China

E-Government in China is following the logic found everywhere that the state recognizes the potential of the Internet and of web-based activities to assist development of the national economy and society. As a result, China has launched a series of online programs to accelerate the government's pace of implementing and using the information economy by improving China's current government information management systems and helping to promote the country's economic development.

Proof of the government's support for Internet development in China can be found in the aptly named Government Online Project (GOP). This project, which was initiated early in 1999, was conceived as a three-stage initiative aimed at encouraging government agencies to utilize information technologies to interconnect and to disseminate information to the populace.

Stage 1 focused on connecting 800 to 1000 government offices and agencies to the Internet; Stage 2 focuses on government offices and agencies moving their information systems into compatible electronic form; and in Stage 3, government offices and agencies will become paperless. The first and second phases were completed in between one and two years. However, the third stage will require continuing efforts over a much longer term.

The main objectives of the GOP are [8]:

- Provide more effective coordination between and across government organizations, both horizontally (between ministries), and vertically (from the center to local offices).
- Build up national and worldwide confidence in the Chinese central and local governments' presence on, and commitment to, the Internet.
- Make government information available to the public, while also reducing government expenses by increasing administrative efficiency.
- Lay a basis for the establishment and growth of China's "electronic government".
- Encourage electronic procurement.

An example of how the program has worked in practice is the Shanghai government's "China Shanghai" site launched in September 2001 (www.shanghai.gov.cn). The website offers information on public government affairs, news events, policy and regulations, Shanghai's daily life, and investment, as well as offering online services and consulting. Full operation started during the APEC Conference in Shanghai at the end of September 2001. By

the end of 2002, all of Shanghai's government bodies had been connected to the site, and all social administration and service departments had offices online.

Opportunities

The e-Government initiatives undertaken by governments in Asia-Pacific are a rich opportunity for telecommunication solutions providers and network service operators. Two applications that would be of benefit to government agencies hold particular promise:

- *Electronic payment application* enhances the interaction between user and government organization.
- *Virtual Private LAN Solution* (VPLS) improves internal communication between government bureaus and increases efficiency.

Electronic payment application

Service profile

The electronic payment application enables a user to make purchases and conclude transactions through a mobile phone using nothing more than a mobile phone number. The service is efficient because it doesn't require credit cards or use an account number to facilitate purchases. The user's cellphone number is registered and recognized by member banking institutions and then approved for executing transactions. When making a purchase, the customer accesses funds that are held in a "cyber" account administered by participating banks.

Solution

This is in essence an e-Commerce solution adapted to government services. Within the context of e-Government initiatives, the solution offers substantial benefits to a couple of specific constituencies – personal and commercial.

Personal application

On a personal level, the solution can complement many of the transactional activities already conceived by government organizations which, in some cases, are today accessible through fixed-line phones and phone connections. Some examples of relevant applications would be to enable citizens to pay taxes or automobile excise duty. This mobile solution is particularly relevant in Asia-Pacific given the prevalence of mobile phones, frequency of usage and frequent absence of fixed-line alternatives.

Commercial application

A more complex application might involve a small enterprise that needs specific market information to increase exports (an initiative that is key to the long-term strategies of nearly all Asian governments). As a first step, the potential exporter might send an electronic message to the relevant government bureau (Ministry of Trade, Commerce, etc) requesting a customized report on a particular market. The exporter could then use this application to pay for the service using the same device. The completed report could then also be forwarded to that device. To facilitate the exchange, the government would use a telecommunication service provider's electronic payment platform and a service provider's communication network. Conceivably, the government would then enter into a "walled garden" relationship with a service provider. Under this "walled garden" arrangement, the Government would essentially serve as a content provider and the service provider would receive part of the revenue from the government as compensation for providing the communication and distribution channel.

Virtual private LAN solution

Service profile

The VPLS is a type of Virtual Private Network (VPN) that provides a multipoint transparent LAN service and gives the user the "look and feel" of being on a private switched Ethernet LAN, regardless of location. The service is protocol transparent, can scale from 64 kbit/s to 1 Gbit/s, and supports any-to-any connectivity between all locations on the network. This feature is particularly valuable for governments whose goal is to find new ways of fostering communication among bureaus and ministries. Moreover, in addition to supporting the multipoint to multipoint communication that is characteristic of a layer 3 VPN, the VPLS guarantees a high level of security by routing information internally as a layer 2 VPN. It thus satisfies another key requirement of e-Government programs. The VPLS has a number of other inherent advantages:

- Service is protocol independent.
- No protocol conversion is required between the LAN and the Wide Area Network (WAN).
- LAN/WAN Ethernet interface on the customer router reduces complexity and total cost of ownership.
- New site can be added without configuring the service provider equipment or customer equipment on site.

Service awareness and management

A key advantage of the VPLS solution is that it is "service-aware" and therefore enables users to control access to any of a range of services, all of which may be available over the same set of Label Switched Path (LSP) tunnels. "Service awareness" is achieved by using signaling [9] to negotiate a set of virtual circuit labels on a per-service basis. The Alcatel 7750 SR uses the Virtual Circuit (VC) labels to demultiplex traffic coming from different VPLS services over the same LSP tunnels.

This is an efficient solution for the network administrator who would otherwise have to dedicate entire ports to restrict access to specific services. The solution

also ensures a high Quality of Service (QoS) by taking advantage of a specially designed network processor array (fast path) that provides queuing and shaping on a per-service basis rather than on a per-port basis.

From an e-Government standpoint, the ability to define QoS on a per-service basis within the VPLS is of particular value because it means that staff in different government agencies can enjoy satisfactory and consistent performance across multiple applications, such as videoconferencing, e-mail and file transfer on the same network.

Security

The VPLS solution addresses another critical e-Government issue: network security. As a layer 2 VPN, the VPLS is inherently secure because the routing information and addresses are maintained internally on the government's network. In contrast, a layer 3 VPN solution would require the government network to share internal IP routing tables with the service provider. This might constitute a security liability from the government's perspective. Another source of security is a high capacity Access Control List (ACL) that can control user access to specific services and network resources, rather than being limited to controlling access to ports. The ACL is valuable to an e-Government initiative because it provides a high level of security without compromising performance.

e-Government Case Study: Shandong Provincial Government

To understand the value of a VPLS solution to an e-Government initiative, it is instructive to consider an Alcatel case study that involved the Provincial Government of Shandong in China.

Historically, the Government of Shandong Province on China's East coast has depended on a highly dispersed and fragmented communications network. In many instances government agencies maintain their own discrete network facilities, often leasing these facilities from different service providers. The networks are invariably incompatible and incapable of communicating with one another in any significant way. Moreover, these networks can only support a very limited range of basic services, such as file sharing and transfer, and Internet access.

Project goal and requirements

The Shandong Government's goal was to make more efficient use of its network resources and improve management of the current network facilities. The government was also intent on deploying advanced services, such as videoconferencing, Voice over IP and Data Center, to serve its constituents more effectively and make its services more relevant. Given the sensitivity and critical nature of the communications over the network, ensuring a high level of security was of paramount importance to the government when developing and deploying these new service capabilities.

Proposed solution and benefits

After a thorough evaluation of the Shandong Government's objectives and requirements, the Alcatel team proposed a VPLS solution that made use of the Alcatel 7750 Service Router and the 5620 Service Router Manager.

Alcatel 7750 Service Router

The Alcatel 7750 Service Router is the industry's first IP/MPLS (Multi Protocol Label Switching) router designed and optimized for the delivery of advanced Internet and VPN services. The 7750 SR supports an expanded range of differentiated private data services, such as multipoint VPLS and IP-VPNs. The service router was designed and optimized to allow flexibility in per-service differentiation, with efficient provisioning, assurance and troubleshooting on a large scale.

The Alcatel 7750 SR's unique service-oriented architecture and fully programmable network processor based fast path make it possible to rapidly customize or add new services and adapt to changing customer requirements without expensive hardware upgrades. The bottom line is that the router enables new services to be rolled out more rapidly to a greater number of customers at a lower operational cost. *Table 1* summarizes the key features and benefits.

Tab. 1 Main features and benefits of the Alcatel 7750 SR

Key features
• Scalable service router with multiple shelf sizes. • Advanced Internet access and VPN services. • Flexible MPLS and IP tunneling. • Robust service management, troubleshooting and billing. • Flexible fast path 10 Gbit/s line-rate packet filtering and access control lists. • Full range of Ethernet and Synchronous Optical NETwork / Synchronous Digital Hierarchy (SONET/SDH) interfaces.
Key benefits
• Efficient delivery of new revenue-generating services. • Reduced operating expenses through rapid service provisioning and advanced operations, administration and maintenance tools. • Reduced capital expenditure through fully programmable fast path, high density and scalable Internet routing.

Alcatel believed that the VPLS solution using the 7750 SR would meet the government's requirements by fostering a greater exchange of information among government bureaus, enhancing network management, and enabling new ways of communication, such as videoconferencing and voice over IP, while at the same time accommodating legacy IP services critical to the government's operation. In addition, the VPLS would be capable of providing the functionality, Quality of Service (QoS), and level of security that the tens of thousands of employees who staff those bureaus depend on.

Emphasizing the capability of the VPLS to support multi-point to multipoint VPNs, Alcatel demonstrated how government agencies would be able to communicate more effectively. The Public Security Bureau, for example, would be able to develop more comprehensive and accurate personal profiles by exchanging data in near real-time with the Health, Human Services and Housing departments.

The VPLS can support useful new services, such as multi-point videoconferencing, that would ultimately make government bureaus more effective. For example, the Shandong Government faced the challenge of reducing the time required to make decisions, the direct result of rapid economic growth and societal change. In addition, many issues for which the Shandong Government was responsible had become increasingly complex, requiring cooperation and consultation across a greater number of Government agencies. The multipoint video service would enable "face-to face" meetings involving representatives from a number of bureaus to be set up "on the fly" without requiring them to expend time and money on traveling.

The VPLS is specifically designed to extend the functionality of LANs, such as the ones used by government agencies, into metropolitan and wide area networks while maintaining a consistent quality of service. The Alcatel 7750 SR's high QoS is attractive, as is the ability to define QoS on a per-service basis within the VPLS, which would mean that government agency staff are able to enjoy satisfactory and consistent performance across multiple applications, such as videoconferencing, e-mail and file transfers, on the same network

Security

The VPLS solution with the 7750 SR can meet the government's rigorous security and performance requirements. First, the solution is a layer 2 VPN which enables the Shandong Government to maintain IP routing information within its own network rather than obliging it to share that information with a service provider. Second, the ACL controls user access to specific services and network resources at a service level, providing a high level of security without compromising performance.

Typically, a network administrator would have to dedicate entire ports to restrict access to specific services, whereas the VPLS solution can control access to any of a range of services, all of which can be available through the same port. For instance, a network administrator can enable a group of low level employees in the Shandong Government's Health Bureau to conduct file transfers with their counterparts in the Housing Bureau. However, the same users may not be authorized to conduct videoconferences in order to prevent inefficient use of network resources. Higher level staff in the same bureaus may be granted unrestricted access to videoconferencing. Although different user communities are granted different levels of access to services, Alcatel's solution enables them to use the same port resources, thereby reducing costs.

Alcatel's VPLS solution uses hardware rather than software ACL filtering to achieve filtering at a line speed of 10 Gbit/s.

Conclusion

Although governments in the Asia-Pacific region are investing considerable time and capital to implement e-Government programs, the resulting benefits are manifold. There is a sense that a higher level of technology translates into greater wealth generation and ensures a place on the right side of what is becoming an increasingly large chasm between digital haves and have-nots. Deployment of technology reduces waste and duplication and a slimmer government frees up resources that can be reallocated to satisfy other pressing needs of state.

A number of applications enabled by telecommunication solutions providers are being introduced that have particular applicability to the e-Government programs of governments in Asia-Pacific. These solutions address some of the fundamental issues that governments face, including security, QoS, relevancy, and fundamental changes in the way people communicate and in their expectations.

It is clear that by taking advantage of the solutions that are now available, Asian governments can take a large step towards meeting the goals of their ambitious initiatives, thereby improving peoples' lives.

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Abbreviations

ADSL A high-speed (broadband) connection that makes use of standard copper wire

ISP Internet Service Provider – provides dedicated access to the Internet

ETA Electronic Signatures Act provides for commercial use of digital signatures

ICT Information and Communications Technology

VPLS Virtual Private LAN Solution - a Virtual Private Network (VPN) solution provided by an operator to a customer that has the "look and feel" of a private, multi-point, transparent LAN

VC Virtual Circuit – used to designate a path for data traversing a Virtual Private LAN

ACL Access Control List – Used to define and manage the access of users to specific services through the VPLS

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