

**The Second International Workshop for Asian Public Key
Infrastructures (IWAP 2002)**

Taiwan's Experience in PKI-enabled e-Government

**Keynote Speech
By**

**Chia-Cheng Lin, Ph.D.
Chairman of Research, Development and Evaluation
Commission, Executive Yuan**

30 October 2002

Taiwan's Experience in PKI-enabled e-Government

Chia-Cheng Lin, Ph.D.

Chairman, Research, Development and Evaluation Commission,
Executive Yuan
30 October 2002

Mr. Chairman, Honorable Speakers, Distinguished Guests, Ladies and gentlemen:

First, I would like to extend a cordial welcome to you who have come from all parts of the world to visit Taiwan and attend this workshop.

It is indeed a great honor for me to be given this opportunity to address you on the occasion of the Second International Workshop for Asian Public Key Infrastructures. On behalf of Research, Development and Evaluation Commission (RDEC), I would like to thank everyone for participating today's Government Root Certification Authority (GRCA) launching.

Since the early 1990's, Taiwan has been applying information and communication technologies to its business processes to achieve more accessible, responsive, and cost-effective government services. To realize the vision of e-services in public and private sector requires high-security infrastructures for information distribution and transaction. Public key cryptography can play an important role in providing needed security services including confidentiality, authentication, digital signatures, and integrity. Building Public Key Infrastructures (PKIs) is one of the essentials in achieving this goal. In 1997, RDEC initiated the Government Public Key Infrastructure (GPKI) project to meet the security requirements of e-Government service delivery, promote the domestic information technology industry. The aims of GPKI are to provide government agencies an efficient, effective, interoperable, and common basis for the secure electronic delivery of government services and programs. The ultimate goal of Taiwan's GPKI is the establishment of a secure electronic service delivery system based largely on a centrally managed PKI cross-certified with other PKIs. In February 1998, RDEC established the first certification authority-Government Certification Authority (GCA) and began to provide various certificate services, which speeded up the emergence of creative online services in public sector. On November 14, 2001, Electronic Signature Law drafted by RDEC was promulgated by the President. Since the law was enacted, GRCA is the first licensed CA in public sector.

Based on the understanding that the full benefits of public key cryptography will be achieved through the widespread cross-certification of public key infrastructure components, RDEC gave priority to establishing a root CA. Today, with your witness, I hereby announce the formal operating of GRCA. In a hierarchical trust domain in GPKI, GRCA will initiate all trust paths. With GRCA-enabled certificate services, government agencies in Taiwan will have greater opportunities to:

- Form the basis for cross-certification and create trust paths between government agencies that will provide for reliable and broad propagation of trust to perform essential and mission-critical functions in public services.
- Launch and provide broader government-wide PKI services to support and facilitate more aggregated, clustered, and value added e-services across government agencies.
- Further interoperability among heterogeneous public key certificates management systems in public sector, thus enabling larger citizens to take advantage of PKI-enabled online services.
- Ensure the sound management of the Government Public Key Infrastructure and related initiatives; to develop PKI communications, awareness and training.
- Accelerate PKI implementing and interoperability through liaison with other governments, standards bodies and international organizations.
- Provide oversight and guidance on the establishment of PKIs in public sector.
- Strengthen Taiwan's trusted e-services infrastructure in e-Government and e-business, which will provide larger opportunities to realize the vision of e-services and gain competitive advantage.
- Increase Taiwan's readiness to meet APEC's deadline for paperless trading by 2005.

Taiwan's commitment to electronic services delivery was highlighted in the 2001 *Electronic Government Program*, which is an ambitious plan to make all government services and programs available online by 2004. Today, I would like to share Taiwan's experiences in building e-services in public sector. Firstly, I would like to talk about driving force for e-Government. Secondly, I will introduce road map for e-Government. Thirdly, I will introduce e-service initiatives in e-Taiwan. Fourthly, I will address how to transform public service delivery with latest ICT. Then lastly, I will introduce *e-Taiwan project* which is the outlook of our

e-Government initiative and one of the ten key points of *Challenge 2008: National Development Plan* (see the appendix for more details).

1. Driving Force for e-Government in Taiwan

- Taiwan is a leader in Networked Readiness in Asia, as reflected by its fifteenth overall ranking in Readiness for the Networked World. (source: The Global Informational Technology Report 2001-2002, conducted by Center for International Development at Harvard University and World Economy Forum) The number of Internet users has reached 8 millions with the online penetration rate of 36% as of July 2002. More than 27% of the households in Taiwan are connecting to the Internet as of the end of 2001. Among these online households, 40% of them have broadband Internet connections.
- Taiwan was successful to shift industry policy to focus on high-technology products-a policy that successfully transformed Taiwan into one of the largest hardware-exporting nations in the world. This strategy has had a major impact on national strategy in harnessing information and communication technologies for economic development and global competitiveness.
- To accelerate the transformation of traditional industries to a knowledge-based economy, the Cabinet is pushing for an e-Taiwan project (2002-2008) which is composed of e-industry, e-Government, e-society, and e-infrastructure. Among the flagship projects, e-Government is the major driving force. We followed a top-down model to plan the flagship projects. During the planning process, we tried our best to bring in wide participation from experts and professional from information technology industries, academies and the relevant agencies.

2. Road Map for e-Government in Taiwan

• Phase 1 - Infrastructure Development and Penetration

With the spread and application of the Internet in the 1990's, the government made the decision to use the open, high-speed online environment to provide the public convenient information and services. In November 1997, the government accordingly assigned RDEC the task of drafting the *Mid-term e-Government Implementation Plan* (1997~2000). This plan called for the full-scale deployment of a government backbone network, the development of convenient online public services and administrative applications, the acceleration of government information interchange, and the

establishment of electronic certification and network security mechanisms.

• **Phase II - On-line Services Development and System Integration**

To further broaden the scope of e-Government applications, RDEC issued the *Electronic Government Program* (2001-2004) in April 2001. This program aims to link all government agencies through networking and to provide versatile Internet-based services. It is expected that “e-Government” will improve government operational procedures, promote service efficiency and quality, cut-down service cost, and provides private sectors and individual citizens with many innovative and convenient services.

• **Phase III - the Future - Mobile Government**

Taiwan’s teledensity and mobile phone penetration are among the highest in the world. Taiwan's mobile phone subscribers reached 21.63 million in 2001, for a penetration rate of 96.6%. This was second in the world, after Luxembourg with 96.7%. By the end of April this year the number of users had risen to 22.6 million, giving a penetration rate of 100.7%--the highest in the world.

As wireless technology becomes more fully development, as bandwidth increased with the availability of “always on” connectivity, and as the price of mobile components continue to fall, it can no longer be assumed that a citizen is using a traditional computer to access data and application from a government website. To meet the anticipated demand, RDEC is urging government agencies to deliver data and applications efficiently across the network regardless of citizen’s devices or connectivity configurations. That will be realized in the e-Taiwan project mentioned earlier.

3. E-service initiatives in Taiwan

3.1 e-Government Landscape

Currently, Taiwan is implementing the “*Electronic Government Program* (2001~2004)”. Here are more details about the program.

3.1.1 Vision and Goal

- **Vision**

1. Using latest ICT to make government services more useful, convenient, value-added;
2. Fundamentally reshape the way government serves the people and recast the connection between people and government;
3. Streamlining Internal Operation; Creating new channels for citizen participation;
4. Using ICT to promote equal opportunity and a healthy and just society.

- **Goal**

1. To provide Government Service Network's Internet services to all agencies and civil servants. The tasks include providing enough network facilities, establishing a secure Internet environment, enriching government information and services on Internet, etc.
2. To push the government workforce in all level of organizations to take advantage of Internet to process administration affairs and provide services for citizens more efficiently.
3. To implements electronic official document exchange and gateway system to promote the intercommunication and processing efficiency between each level of organizations.
4. To provide 1500 Internet based application services and "one-stop processing service" to improve the convenience and efficiency of government services and to extend government service time and points.

3.1.2 Strategy

The *Electronic Government Program* has formulated the following implementation strategies to insure the effective execution of relevant tasks:

- Provision of Government Service Network (GSN) Internet services to all agencies.
- Acceleration of information infrastructure development.
- Enhancement of information applications, development of GIS applications.
- Development of flagship projects.
- Enrichment of government online services, implementation of integrated single-portal government service.
- Elimination of the digital divide by providing enhanced attention to remote areas and information underprivileged groups.

- Making good use of private resources and expanding outsourcing.
- Respecting human rights and promoting humane values; strengthening e-learning for civil servants; enshrining correct information behavior and values; and encouraging innovation and vigor.

3.2 Future Prospective

Responding to the rapid development in this modern times, the government will keep up promotion and improvement of the e-Government Infrastructure and services in the dimensions as indicated below :

- To connect all government agencies to the Internet
- To enrich the contents of the Internet-based government information and resources
- To expand government information service channels
- To promote the Internet-based government application services
- To consolidate the government information security management
- To review the government information related legislation and regulations
- To enhance the Internet application competency of the government workforce
- To enhance electronic government promotion and IT human resources allocation
- To expand the IT budget of the government

3.3 Few Lessons Learned

- **Leadership**

Creative committed leaders at all level and all branched of government are essential to make the vision of e-Government a reality. From top to the President, and extending to the Cabinet, the Congress, Mayors-public sector leaders must embrace e-Government as a driving force and strategic tool to transform and improve government and connect it to the people.

- **Strategy**

It is much easier and cheaper to be a “fast, first or smart follower” than a first inventor, and government agencies should learn if appropriate, innovation and best practices occurring in the private and public sectors.

- **Financial and Human Resource**

The “ inability to recruit qualified and well experienced IT personnel “ and “ lack of financial resources “ is mostly recognized as the major obstacles to achieve e-Government. Effective e-Government requires a very different type of investment than that currently being directed to IT projects. It needs capital for projects to address common issues of service delivery or program management across agencies as a whole, or provides technological solutions to critical problems, such as security and privacy, and interoperability. Such investment cannot be adequately founded by one agency. IT has to be supported by adequate fund. To accelerate the implementation of e-g, we are planning to create a strategic investment fund (public construction) to fully support the flagship programs.

To attract and retain more people, who know best how to apply e-Government techniques, the government should offer flexible, entrepreneurial workplaces.

- **Collaboration and Outreach**

The Government cannot make e-Government into reality alone. Government and industry have to work together on making more government services available on the Internet. Designing, implementing and managing e-Government needs unprecedented and non-traditional collaboration between the public, private, and research sectors and within and across every level of government.

- **Privacy and Security**

Citizens are concerned about hackers breaking into government computers and networks. To help restore public confidence, it is all the imperative that public concerns with respect to privacy and security are thoroughly examined and addressed in the move to e-Government.

4. Transforming Public Service Delivery

The *Electronic Government Program* is expected to transform public service delivery by followings:

- It will promote government data sharing, enable online application services, effectively lessen the need for document transcripts, improve administrative efficiency, cut the wasted time and effort of citizens traveling to and from government offices, and dramatically conserve

government agencies' human resources and social costs.

- A variety of channels will be used to provide the public speedy, real-time, integrated services. The government's online service network will be accessible at all times and in almost all places. Online information and application services will reflect innovative government operating methods and improved administrative procedures.
- Government information and services will be accessible at times and places most convenient for citizens. It will be possible to use a computer at work or at home, or in an information kiosk, to obtain government services. This will achieve the goals of openness and transparency, while allowing government to quickly learn about and respond to public opinion.

It is anticipated that the implementation of e-Government will have the following impacts:

- Government agencies will become more flexible and responsive.
- Government will be able to act faster.
- Government service times will be extended.
- Government service points will become ubiquitous.
- An even broader range of government services will be available.
- The cost of government services will reduce.

5. E-Taiwan Project

5.1 Challenge 2008: National Development Plan

"*Challenge 2008 - National Development Plan*" will cost a total of NT\$2,650 billion, and is referred to by Premier Yu as "a key task that will lead Taiwan's transition and upgrading" and lay down the foundation for the upgrading of national competitiveness over the next 20 years. The plan encompasses 10 key projects, with funding coming from central and local governments as well as special funds and private investment.

- Cultivation of E-Generation Manpower
- Development of Culturally Creative Industries
- Establishment of a Base for Innovation and R&D
- Heightening of Industrial Value
- Construction of e-Taiwan
- Development of Operations Headquarters
- Island-Wide Trunk Transportation Construction
- Doubling of Tourist Arrivals
- Water and Green Construction
- New-Home Community Development

One of the 10 projects is the “*e-Taiwan*” project which was launched at the end of 2001 and is now incorporated into this master plan, aiming at promoting national information infrastructure and knowledge-based economic development. Based on this project, we will continue to strive for developing applications for next-generation broadband networks, such as IPv6 and wireless LAN. Besides, efforts will also be made to deploy broadband networks ubiquitously and to promote broadband Internet usage in order to realize the goals of e-Government, e-industry, e-society, and e-infrastructure.

5.2 New Initiative to Develop an e-Taiwan

As I mentioned earlier, *e-Taiwan project* (2002-2008) is composed of e-Government, e-industry, e-society, and e-infrastructure. Among the projects, e-Government will be the major driving force.

In the area of e-Government, the ministries and commissions are currently formulating three to five core plans with the goal of putting all government agencies and government employees online, placing 1,500 government application services online, and eliminating all household and land registration certificates. In regard to e-industry, companies will be assisted in setting up global logistics systems, an industrial automation and e-industry application environment will be molded, and a high-efficiency supply chain management network will be built up.

In the area of e-society, the target is to create a digital learning environment that will make online learning easy, and to provide individualized health and medical care information services through national IC cards. The goal of the e-infrastructure is to boost the ratio of Taiwan’s online population from the present 35% to 50% within five years, with broadband users accounting for 70% of the total online population; to establish a network security mechanism; and to popularize national information education.

In the area of e-industry, in line with the government’s policy of upgrading Taiwan’s strength in the area of global logistics, Ministry of Economic Affairs has announced the investment of NT\$1.6 billion within two years in a model-type “*E-Industry CDE Plan*.” The government investment is expected to stimulate private investment in the amount of at least NT\$1 billion in the same endeavor. The aim of this plan is to bring about an overall reinforcement of Taiwan’s international logistics competitiveness by integrating important factors that figure in global

logistics operations, including Cash Flow, Delivery, and Engineering Collaboration (CDE).

6. Conclusions

As the Internet-using population rises above eight million and the first results of e-Government are reaped, the expectations of the people of Taiwan with regard to their government are also rising. The implementation of e-Government goes far beyond the mere acquisition of new technology; rather, it signifies the transformation of government agencies into a digital nervous system capable of instantly transmitting information, communicating views, and sharing experience and knowledge. It is leading to the transformation and re-engineering of government organizations, making them leaner, more accountable, more flexible, more responsive, more efficient, and transparent. When the government provides services to businesses and individuals via the Internet, it will meet their needs with lightning swiftness, efficiently handle fast-changing new matters, and offer strengthened emergency response capabilities. Simply put, government service must be citizen-centric with trust. Even more importantly, e-Government represents a break with conventional thinking: responding to the emergence of a civil society, Taiwan is rethinking the role and functions of government from all-new points of view, transforming and improving the two-way relationship between government and the public, taking the public's needs as a compass, striving to build a fair and equitable society, enriching the content of social life, and enhancing the public's welfare.

It is truly a great honor for us here to be able to convene this workshop of internationally recognized authorities in PKI. For those of us who have cooperated in convening this workshop, it will be our greater joy to profit by listening to the opinions of others, sharing experiences, and changing ideas, and so make this workshop a worthwhile experience for all concerned. Finally, I would like to thank the organizer: Chinese Cryptography and Information Security Association (CCISA). We also would like to express our great esteem for all who, over so many years, have labored so hard in the work of this field.

I would like to end these words with an earnest prayer for the great success of this workshop through the coming 3 days. Wish everyone good health and good fortune! Thank you very much for your kind attention.

Appendix Challenge 2008: National Development Plan

On May 9 the Executive Yuan (commonly known as the Cabinet) formally approved the National Development Plan, which calls for a total investment of NT\$2.6 trillion over six years in the overall upgrading of Taiwan's living as well as investment and operating environments. This blueprint for socioeconomic development, with an equal emphasis on knowledge and innovation, economy and culture contains 10 key projects, the goals and strategies of which are described below:

• Cultivation of E-Generation Manpower

- 1.Goals: cultivation of outstanding internationalized and information-centered e-generation manpower with innovation capability.
- 2.Strategies: (1) use of English as a quasi-official language, with increased publicity aimed at achieving a general consensus, (2) development of an internationalized living environment and enhancement of the people's English capability, (3) promotion of national Internet education, (4) enlivening of youth education, and (4) establishment of a social environment for lifetime leaning by the e-generation.

• Development of Culturally Creative Industries

- 1.Goals: Development of creative territory and combining of culture and economics in the development of cultural industries.
- 2.Strategies: (1) Establishment of a promotion organization for culturally creative industries, (2) cultivation of creative manpower for art and design, (3) preparation of an environment for the development of creative industries, and (4) development of creative design and creative culture industries.

• Establishment of a Base for Innovation and R&D

- 1.Goals: Encouragement of private investment in R&D, heightening of the ratio of R&D spending in the GDP to the 3%, the same level of the advanced countries within six years, and building of Taiwan into a special territory that is the best base for innovation and R&D in Asia.
- 2.Strategies: (1) Attraction of international R&D personnel and introduction of R&D resources from around the world, (2) provision of NT\$50 billion in R&D loans so as to enliven innovation and R&D

activity, (3) establishment of key industrial colleges such as those for IC design and digital content, and encouragement of cooperation among industry, academe, and research institutions in the cultivation of industry personnel, (4) establishment of innovation and R&D centers for the creation of special R&D advantage, and (5) promotion of key industrial technology research and establishment of core industrial technology.

- **Heightening of Industrial Value**

- 1.Goals: Heightening of industrial value-added and forming of Taiwan into a global production and supply center for high-value-added products.
- 2.Strategies: (1) Raising of NT\$100 billion in venture capital funds from the government and private sectors to enlarge funding channels for emerging industries, (2) provision of assistance for the development of core industrial technologies including electronics and information, optoelectronics, communications, machinery, textiles, and biotechnology, (3) promotion of key industries, including the adding of value for traditional industries, semiconductors and three other core industries, information application services and three other new service industries, and green industries, (4) incentives for investment in international channels and brands, (5) labor upgrading, and (6) construction of industrial parks as bases for industrial development.

- **Construction of e-Taiwan**

- 1.Goals: Six million broadband households by 2008 and development of Taiwan into Asia's most digitized country.
- 2.Strategies: (1) development of infrastructure for taking broadband to the home, (2) support for emerging digital industries with high potential, including digital entertainment, digital collecting, and digital learning, and (3) promotion of digital applications including e-Government, intelligent communication systems, corporate and industry digitization, Internet society, etc.

- **Development of Operations Headquarters**

- 1.Goal: Building of Taiwan into an ideal location for the establishment of regional operations headquarters by domestic and multinational enterprises.
- 2.Strategies: (1) Planning of free port zones, (2) establishment of a

complete set of tax measures to help companies establish operations headquarters, (3) building of three major joint sea/air ports in northern, central, and southern Taiwan to integrate sea and air shipping, (4) simplification of customs-clearance documents and procedures by 2005 so as to remove customs obstacles, and (5) digitization of global logistics so as to facilitate e-operations in supply chain management.

- **Island-Wide Trunk Transportation Construction**

1.Goals: Investment in and integration of public transportation services, construction of a complete island-wide trunk transportation system so as to form Taiwan's western transportation corridor into a one-day living circle with one-hour transportation between cities along the west coast.

2.Strategies: (1) Construction of a high-speed rail transportation system to provide fast, on-time, and safe mass transportation including a high-speed railway and access roads, investment in mass rapid transit systems in metropolitan areas, and high-speed conversion of the east-coast railway, (2) assistance for the rejuvenation of the Taiwan Railway Administration and its re-engineering into a regional metropolitan mass rapid transit system, and (3) strengthening of highway network construction, including subsidies for local public transportation systems to facilitate the formation of road systems for living circles and the extension of the freeway and expressway systems.

- **Doubling of Tourist Arrivals**

1.Goals: To stimulate the development of related industries through the doubling of the number of foreign travelers who visit Taiwan for tourism purposes from about one million annually today to two million in 2008.

2.Strategies: (1) Reordering of existing tour itineraries, (2) development of new tour packages and new destinations, (3) establishment of a tourist service network, (4) international tourism advertising and promotion, and (5) development of the MICE industry (meetings, incentives, conventions, and exhibitions).

- **Water and Green Construction**

1.Goal: Gradual restoration of Taiwan's natural ecology.

2.Strategies: (1) Rational planning and utilization of water resources,

(2) land surface re-engineering and restoration, (3) development of renewable energy sources, (4) construction of sewerage systems, and (5) promotion of green construction.

- **New-Home Community Development**

1.Goals: Integration of local resources and development of industries with local characteristics.

2.Strategies: (1) Enlivening of community development organizations, (2) the "new village movement" for aboriginal peoples, (3) integration of community development resources, (4) the "new Hakka" movement, and (5) promotion of community services development.