Agenda

- Background of Hong Kong
- Digital 21 Strategy and E-Government Interoperability Framework
- Government’s Support in Technology Innovation
- Case Study: G2B and B2B E-Commerce Infrastructure
- Conclusions
Facts about Hong Kong

- Special administrative region of China
  - Administered by her own government under “one-country-two-systems” policy
- 7M of population within 1,104km² of area
  - 6,459 people per km²
- Core industries:
  - Finance
  - Trade
  - Logistics / Transportation
  - Tourism
- 98% of companies (~300,000) are small medium enterprises (SMEs)
Pinnacles Desert in Australia
HK as Gateway of China, still?

HK economy relies on re-export trade / transportation

Mainland China is opening up trade very aggressively
  - Opened three direct links between China and Taiwan (postal, transportation, trade)
  - Established world-class transportation infrastructure

Critical factors to maintain HK’s role
  - Proven legal, financial, business, transportation systems…
  - HK demands a leading information infrastructure (e-trade)
Digital 21 Strategy

Set out the vision of developing HK to be a leading digital city

2008 edition:
- Facilitating a digital economy
- Promoting advanced technology and innovation
- Developing HK as a hub for technological cooperation and trade
- Enabling the next generation of public services
- Building an inclusive, knowledge-based society
Some Action Items of 2008 Digital 21

- Position HK as a regional test-bed and launching pad of innovative technologies...
- Collaborate with different sectors to develop industry specific data standards...
- The focus of the e-government programme is a citizen-centric mode of service delivery... Increased efforts will be made to integrate services across government bureaux, departments, agencies...
E-Business Interoperability

- Seamless integration of heterogeneous systems across organizations
  - **Technology interoperability**: ability to exchange data across different system platforms
  - **Information interoperability**: compatibility on representations and semantics of information used by different organizations
  - **Process interoperability**: compatibility on business workflows used by different organizations

- **E-government interoperability**
  - Government-to-Government (G2G)
  - Government-to-Business (G2B)
HK E-Government
Interoperability Framework

- Facilitates implementation of client-centric, joined-up, one-stop e-govt services
- Every IT contractor must follow to develop e-govt joined-up services

- Technology interoperability: IF technical specifications
  - Recommendation on use of open standards for different applications
- Information Interoperability:
  - XML Schema Design and Management Guide
  - Govt Registry of Data Standards: [www.xml.gov.hk](http://www.xml.gov.hk)
Simple functional integration in an open environment

Recommended standards

<table>
<thead>
<tr>
<th>Standard 1a</th>
<th>Simple Object Access Protocol (SOAP) v1.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Simple Object Access Protocol (SOAP) provides the definition of an XML document for the exchange of information, based on a one-way message</td>
</tr>
</tbody>
</table>

Reliable document exchange between application systems in an open environment for business document-oriented collaboration

Recommended standards

<table>
<thead>
<tr>
<th>Standard 1</th>
<th>ebXML Message Service (ebMS) v2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>The ebXML Message Service Specification is one of the specifications within the ebXML framework of specifications. This specification defines the ebXML Message Service Protocol which enables the secure and reliable exchange of messages between two parties. It includes descriptions of the message structure used to package payload data for transport and the behaviour of the message service handler responsible for sending and receiving messages.</td>
</tr>
</tbody>
</table>

*Analysis underpinning The HKSARG Interoperability Framework Recommendations*
Methodology to design business processes, information models, and XML schemas for G2G/G2B data exchange
- Customized proven standardization methodologies, e.g. ebXML and UBL
- Policy, guidelines, organizations to manage e-govt data standards
- Used to implement various G2G/G2B services and standards
  - Common schemas on address, person name, business registration,…
  - Weather information standard
  - Works Projects Information Standard, etc.
- Some companies used it to develop enterprise data standards
- Macao govt is adapting this guide to standardize ‘address’
A. Worksheet Information
Worksheet ID: BCWS-ORDERENTRY  Project ID: XMLGL
Technical Contact: Josia Chan / CECID  Administrative Contact: Thomas Lee / CECID

B. Business Collaboration Properties
Name: Order Entry
Description: A buyer and a seller exchange price quotes and create an order.
Scope: The buyer requests the seller to quote the offered prices of the goods for ordering. If the buyer agrees on the prices, it can place an order to the seller.
Pre-conditions: 1. The buyer and the seller have agreed to transact with each other.

C. Roles
<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buyer</td>
<td>The firm that places an order.</td>
</tr>
<tr>
<td>Seller</td>
<td>The firm that fulfills the order.</td>
</tr>
</tbody>
</table>

D. Business Transactions
<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Request Quote</td>
<td>The buyer requests a price quote from the seller.</td>
</tr>
<tr>
<td>Create Order</td>
<td>The buyer places a purchase order to the seller.</td>
</tr>
</tbody>
</table>

E. Business Documents
<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quote Request</td>
<td>Request that the buyer sends to the seller for a price quote.</td>
</tr>
<tr>
<td>Price Quote</td>
<td>Price quote that the seller replies to the buyer on a quote request.</td>
</tr>
<tr>
<td>Purchase Order</td>
<td>Request by the buyer to place an order to the seller.</td>
</tr>
<tr>
<td>Order Confirmation</td>
<td>Indication whether the order request is accepted or rejected.</td>
</tr>
</tbody>
</table>
## Information Modeling

<table>
<thead>
<tr>
<th>UID</th>
<th>Dictionary Entry Name</th>
<th>Ver.</th>
<th>Maturity Level</th>
<th>Business Terms</th>
<th>Item Type</th>
<th>Item Definition</th>
<th>Usage Rules</th>
<th>Object Class Term</th>
<th>Proper Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM000001</td>
<td>HKID Number. Details</td>
<td>1.0</td>
<td>Matured for reuse</td>
<td>ABIE</td>
<td>HKID Number Details</td>
<td>holder of a Hong Kong Identity Card issued by the Immigration Department of BBIEThis is a code that is unique to each individual in Hong Kong.</td>
<td>HKID Number Details</td>
<td>HKID Number Details</td>
<td>HKID Number Details</td>
</tr>
<tr>
<td>COM000002</td>
<td>HKID Number Identifier</td>
<td>1.0</td>
<td>N/A</td>
<td>BBIE</td>
<td>HKID Number Identifier</td>
<td>Hong Kong ID number without check digit</td>
<td>HKID Number Identifier</td>
<td>HKID Number Identifier</td>
<td>HKID Number Identifier</td>
</tr>
<tr>
<td>COM000003</td>
<td>HKID Number Check Digit. Text</td>
<td>1.0</td>
<td>N/A</td>
<td>BBIE</td>
<td>Check Digit of Hong Kong ID number</td>
<td>Check Digit of Hong Kong ID number</td>
<td>Check Digit of Hong Kong ID number</td>
<td>Check Digit of Hong Kong ID number</td>
<td>Check Digit of Hong Kong ID number</td>
</tr>
<tr>
<td>COM000004</td>
<td>HK Business Registration Number. Employee. Rank Code</td>
<td>1.0</td>
<td>Matured for reuse</td>
<td>ABIE</td>
<td>Rank Code</td>
<td>A code representing the rank of a civil servant in the HK SAR</td>
<td>Additional component 'Code List Version' to indicate</td>
<td>HK Business Registration Number Details</td>
<td>HK Business Registration Number Details</td>
</tr>
<tr>
<td>COM000005</td>
<td>HK Business Registration Number. Details</td>
<td>1.0</td>
<td>Matured for reuse</td>
<td>ABIE</td>
<td>Details</td>
<td>A unique reference assigned by the Inland Revenue Department of the HK SAR to a business organization.</td>
<td>HK Business Registration Number Details</td>
<td>HK Business Registration Number Details</td>
<td>HK Business Registration Number Details</td>
</tr>
<tr>
<td>COM000006</td>
<td>HK Business Registration Number. Business Registration Number. Details</td>
<td>1.0</td>
<td>N/A</td>
<td>BBIE</td>
<td>Details</td>
<td>A unique reference assigned by the Inland Revenue Department of the HK SAR to a business organization.</td>
<td>HK Business Registration Number Details</td>
<td>HK Business Registration Number Details</td>
<td>HK Business Registration Number Details</td>
</tr>
<tr>
<td>COM000007</td>
<td>HK Business Registration Number. Branch Number. Details</td>
<td>1.0</td>
<td>N/A</td>
<td>BBIE</td>
<td>Details</td>
<td>Optional Branch Number within the business organization</td>
<td>HK Business Registration Number Details</td>
<td>HK Business Registration Number Details</td>
<td>HK Business Registration Number Details</td>
</tr>
<tr>
<td>COM000008</td>
<td>Person. Gender. Code</td>
<td>1.0</td>
<td>Matured for reuse</td>
<td>BBIE</td>
<td>Gender</td>
<td>A code to indicate the gender of a person (M=male, F=female, U=unknown)</td>
<td>Recommended to let</td>
<td>Person</td>
<td>Gender</td>
</tr>
</tbody>
</table>

**Purchase Order**

- **Document**
- **ABIE**
- **BBIE**
- **ASBIE**
- **CCT**
- **BBIE**
- **AI**
- **BBIE**
- **BBIE**
- **BBIE**
- **BBIE**
- **BBIE**
- **CCT**
- **CCT**
- **Name**
- **Text**
- **Date**
- **Date Time**
- **Physical Address**
- **Signature**
- **Name**
**XML Schema Development**

### Dictionary Index

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<td>Matured for use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COM000002</td>
<td>HKID No Identifier</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COM000003</td>
<td>HKID No Check D</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COM000004</td>
<td>HK SAR Employ Code</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COM000005</td>
<td>HK Bus Regs Number</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COM000006</td>
<td>HK Bus Regs Number</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COM000007</td>
<td>Person Code</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COM000008</td>
<td>Person Code</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Dictionary Information

- **Item Definition**: holder of a Hong Kong Identity Card issued by the Immigration Department of

```xml
<xs:schema targetNamespace="http://www.xml.gov.hk/schemas/example"
    xmlns:x="http://www.w3.org/2001/XMLSchema"
    xmlns:ds="http://www.w3.org/2000/09/xmldsig#"
    version="1.0"
    elementFormDefault="qualified"
    attributeFormDefault="unqualified">

    <xs:import namespace="http://www.w3.org/2000/09/xmldsig#"
                schemaLocation="http://www.w3.org/TR/xmldsig-core/xmldsig-core-schema.xsd"/>

    <xs:complexType name="DocumentHeaderDetails.CT">
        <xs:sequence>
            <xs:element name="FirstSignature" type="ds:SignatureType"/>
            <xs:element ref="ds:Signature"/>
            <xs:any namespace="http://www.w3.org/2000/09/xmldsig#" processContents="lax"/>
        </xs:sequence>
    </xs:complexType>
</xs:schema>
```

### Automatic Conversion

- Making e-commerce everyday commerce
- Center for E-commerce Infrastructure Development
At least 5 B/Ds use the Common Schema
AND
the Common Schema has not been updated for 6 months

The no. of B/Ds voting for level 1 is more than
the no. of B/Ds voting for level 0
Registry of Data Standards
(http://www.xml.gov.hk)

Address Schema
Government Support in Technology Innovation

- R&D projects funded by Innovation and Technology Commission to make HK become a knowledge-based economy
- University and industry collaboration projects
  - 90% govt funding, 10% industry sponsorship
    - IP rights owned by university
  - 50% govt funding, 50% investment from a company
    - IP rights owned by the company
- CECID received 7.7M USD for various projects on B2B, G2B, ebXML / Web Services / UBL standards, data privacy
Paper-Based Trading

- Proven, simple, low-cost
- Repetitive data entry
  - Low productivity
  - Prone to human errors

PO
1/9/2005
ABC Co.
order food
B2B E-Commerce for SMEs (Paperless Trading)

How to make it as proven, simple and affordable as using FAX?

- System-to-system data exchange
  - Repetitive data entry eliminated
  - Accurate and efficient
  - Human fraud avoided
  - Round-the-clock operation
E-Commerce Infrastructure for SMEs

- Open standards
  - Enable software interoperability
  - Eliminate vendor lock-in
  - Promote software development by small businesses / vendors

- Open source software
  - Transparent in source code → security, standards compliance, extensibility, reliability
  - Permits adoption by users and extensions by developers at minimum costs
Hermes B2B Messaging Server

- Multi-protocol-standards B2B data exchange platform
  - ebXML Message Service, AS2, Web Services, ...
- Development funded by ITC of HKSARG
- Standards compliance and interoperability certified
  - ebXML Asia Committee, Drummond group, ...
- Recognized by local and regional awards
  - Asia Pacific ICT Awards, HK IT Excellence Awards, HK Linux Business Awards
Hermes 2 Open-source (H2O)

- Open-sourced at www.freebXML.org
- An international effort to promote adoption and development of ebXML software initiated by CECID
- Downloads from 80+ countries recorded
B2B EDI on the Internet

With Hermes

EDIs

Order Doc (EDI)

Order Doc (XML)

Private Network

Internet

Expensive !!

Cost effective, affordable by SMEs !!
## Cost of Ownership

<table>
<thead>
<tr>
<th></th>
<th>EDI *</th>
<th>Hermes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial cost</strong></td>
<td>US$40,000 – $80,000 (Unix or Windows based)</td>
<td>Free If running on Linux</td>
</tr>
<tr>
<td></td>
<td>US$120,000 (mainframe)</td>
<td></td>
</tr>
<tr>
<td><strong>Programming cost</strong></td>
<td>US$40,000 - $120,000</td>
<td>US$3,000 (app development)</td>
</tr>
<tr>
<td><strong>Operational expenses</strong></td>
<td>US$0.25 - $1 per document</td>
<td>Internet subscription (flat fee for unlimited usage)</td>
</tr>
</tbody>
</table>

* Source: “The Total Economic Impact of EDI” by Forrester Research
Submission of Dangerous Goods Manifests through ebXML Messaging

1. Paper submission
2. Internet submission through web submission
3. ebXML submission over HTTPS or VPN

Shipping Agent -> B2B Connector -> Hermes MSH

Marine Dept

Making e-commerce everyday commerce
Center for E-commerce Infrastructure Development
e-Government Infrastructure Service (EGIS)

Centralized G2G and G2B Gateway

OGCIO

Department A

Department B

EGIS Platform by OGCIO

Web Services

Hermes / ebXML

Recruitment Agents

Issuance Companies

Shipping Agents

Medical Clinics

B2B Connector

Other products

Making e-commerce everyday commerce
Center for E-commerce Infrastructure Development
Another Challenge

- Hermes is open-source and open-standards based. Why isn’t it so widely adopted by SMEs?
- Because of complexity. SMEs don’t have technical expertise to use open-source software.
- They need technology as simple as FAX.
- We developed B2B Connector Internet Appliance based on Hermes to address this problem.
**B2B Connector**

- Plug-and-play, affordable (~1,000 Euro)
- Internet appliance
- Simple, browser administered, no programming required
- Exchanges documents through shared folders via reliable and secure Internet channels
- Support conversion between different e-business standards
- Used by many companies and government departments in HK
- Exported to China, Australia, Spain, Canada, Italy, UK, Taiwan
To streamline vehicle license renewal procedure and curb fraudulent vehicle insurance

6 insurance companies (AXA, Falcon, Mingan, MSIG, QBE, and Zurich) have participated in the pilot

To synchronize vehicle insurance databases between Transport Department and insurance companies

Deploy B2B Connectors for exchange of vehicle insurance information between insurance companies and Transport Department of HKSARG

Potential market size

- 80+ (which cover all vehicle insurance companies in Hong Kong)
- Over 600,000 vehicle license renewals per year

Pilot in Q3 2008, mass rollout in Q2 2009
Vehicle License Renewal
Technical Architecture

Using B2B Connector to send insurance certificate / cover note in XML with digital signature and encryption

e-Government Infrastructure Service (EGIS) adopts Hermes messaging technology for serving Government-to-Citizen (G2C) and Government-to-Business (G2B) transactions

Benefits
- Minimize loss from fraudulent cover note
- Improve customer service
- Increase efficiency
- Enhance reliability and control
- Promote electronic government services

System checks for valid insurance coverage before issuing a vehicle license when citizens come to service counter
Conclusions

- B2B and G2B e-commerce interoperability infrastructure:
  - Open standards
  - Open source software

- Technology innovation for SMEs
  - Simple, plug-and-play
  - Affordable initial and recurrent costs
  - Predictable results (ROI)

- Government leadership in e-commerce adoption is a key success factor