Financial Services Infrastructure Architectures in China
(One Country, Two Systems)
Putting China’s Capital Markets into Perspective

1848 – Chicago Board of Trade Futures Exchange

1911- 92 Years Ago – Dynastic Rule Overthrown

1911-1949 - 39 Years of Turmoil & Civil War

1949-1976 – 27 Years Consolidation of Revolution, Ideological Struggles, Bureaucratic In-fighting

1976-1990 14 Years Consolidation of Reforms & Opening Up Economy/Society to World

1990 13 Years Ago – First Capital Market Open in China since 1949 (41 years hiatus)
Since 1990

40 Exchanges to 5 (2 Equities, 3 Commodity)

Futures Contracts Forbidden to Trade:
Oil, Bonds, Sugar, Steel, Coal, Gasoline, Diesel, Cotton, FX, Index-linked, Coffee, Rice, Plywood.

Poor Regulatory, Enforcement, Transparency, Price Discovery, Liquidity

Crude Risk Controls, Fragmentation of Clearing, Counter-Party Risk, New Product Introduction, Concentration of Players
An IT organization that produces fundamental positive changes within DCE. Changes that catapult DCE forward in its market.

Enable the business to change quickly

Competitive advantage from IT

Access to new technology

Use resources efficiently

Deliver on commitments

IT Council

Contract Mgt capability

Program Office PMO

Deliver to SLAs

Central Procurement

Preferred Supplier

Outsource Development

TOGAF

TA Program Office

Unified Business & IT Strategies

Common Systems

Best Business Practice

Business Practice Council

Common architecture

Solution Centre

Manage Services not resources

Open Exchange Interface

Common Hardware

Resource Portfolio Approach

Right People, Right Place, Right Time

Best IT for Exchange in China

New Trading Products

New Member Services

New Industry Services

IT Innovation

Enhanced eLearning

Expand Trading Community

Internal Marketing

External PR
Bearing with the Burden...of Architecting
Illustrating and Explaining the Development Cycle
Bearing with the Burden...of Architecting
IT Governance and Organization MOST DIFFICULT Concept

1. Policy formation

2. Policy review

3. Strategic direction & Policy adoption

DCE Technical Architecture TEAM

- DCE Operating Committee
- Technical Architecture PMO
- DCE IT Steering Committee
- DCE Technical Architecture Document
- IT Council
- DCE Technical Partners
- DCE Business Units
- DCE

DFG

DFG Technical Architecture Document

DCE Technical Architecture Document
Bearing with the Burden...of Architecting
Technology Architects Organisation

IT Governance and Organization MOST DIFFICULT Concept

Chief Technology Officer
- Executive Management
- Directions Oversight

Chief Solution Architect
- Recommendations
- Program Management

Senior Solution Architect
- Delivery Oversight
- Communication Outreach

Solution Architect
- PRESENTATION
  - Forms, Scripting
  - DHTML, FIX, XML
  - JSP, ASP
  - HTML, JavaScript
- PLATFORMS & DB
  - J2EE, .NET
  - SQL, Databases
  - TRM Services
  - Architecture
- BUSINESS LOGIC
  - EJB, COM, COM+
  - UML, Use Cases
- SECURITY
  - SSL, e-Authentication
  - Encryption
  - Security
- MESSAGING
  - SOAP, XML, FIX
  - ebXML / UDDI
  - Web Services

Financial Industry Associations
- Technology Industry Working Groups (i.e., W3C, OMG, XML, TOG)

Regulatory Agencies

IT Industry Vendors
Bearing with the Burden...of Architecting
Defining the Business Process Domains and
Current Baseline Report of DCE

Trading
Clearing and Settlement
Member Services
Web Portal
Risk Management
Market Surveillance
Margining
Delivery

# Bearing with the Burden...of Architecting

## Measuring the Maturity of TA in the DCE

<table>
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<th>STAGE</th>
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| **Stage 5**
Leveraging the TA for Managing Change. 
[Includes all elements of Stage 4] | • Written/approved policy exists for TA maintenance  
• Either IT Steering Committee or IT Council has approved TA  
• Matrices exist for measuring TA benefits |           |
| **Stage 4**
Completing Architecture Products  
[Includes all elements of Stage 3] | • Written/approved policy exists for IT investment compliance to TA  
• TA products describe enterprise’s business – data, applications, and technology that supports it  
• TA products describe “as is” environment, “to be” environment, and sequencing plan  
• CIO has approved the TA plan |           |
| **Stage 3**
Developing Architecture Products  
[Includes all elements of Stage 2] | • Written/approved policy exists for TA development  
• TA products are under configuration management  
• TA products describe or will describe enterprise’s business – data, applications, and technology that supports it  
• TA products describe or will describe “as is” environment, “to be” environment, and sequencing plan  
• TA scope is enterprise focused |           |
| **Stage 2**
Building the TA Management Foundation | • Committee or group representing the enterprise is responsible for directing, overseeing, and/or approving TA.  
• Program office responsible for TA development exists.  
• Chief architect exists.  
• TA being developed using a framework and automated tool.  
• TA plans call for describing enterprise in terms of business, data, applications, or technology.  
• TA plans call for describing “as is” environment, “to be” environment, or sequencing plan. |           |
| **Stage 1**
Creating TA Awareness | • The Exchange is aware of TA |           |
The End Game for DCE

Managing highly-developed electronic systems to support the services and functions of DCE

Constantly enhancing the technological infrastructure to ensure DCE leads in innovation and open systems in China and be ready to plug-in to the global arena

Creating an open Application Program Interface (API) to trading & clearing platforms to facilitate Straight Through Processing (STP)

Balancing IT resources with business needs with a customer driven focus

Blending in-house development and strategic outsourcing to yield cost-effective and efficient solutions
eFinancial Services Infrastructure Architecture for Hong Kong
Objective:
Enhance the competitiveness of Hong Kong as an international financial centre in terms of
Risk Management
Increased Efficiency
Cost Reduction
Objective:

Legend:
- Current assessment
- Strategic direction based on announced plans
- Potential direction for Hong Kong in two years

Cross Market

Disparate Entity

Market Integration

Within Region

Market Reach

Complete Integration

Globally

Local

Legend:
- Hong Kong
- UK
- US
- Japan
- Singapore
- Germany
- Switzerland

Strategic direction based on announced plans
Potential direction for Hong Kong in two years

Disparate Entity Vertical Silo Complete Integration
Strategy:

- Setting up of a single clearing arrangement for securities, stock options, futures and other exchange-traded transactions
- Enhancing the financial technology infrastructure to facilitate straight-through processing of transactions across financial markets; and
- Moving towards a secure, scripless securities market
Principles:

- Achieving Risk Management Excellence
- Maximising the possibility of STP
- Ensuring instantaneous finality and legal certainty of transactions
- Complying with international standards and suitable best practices
- Seeking strategic partnerships with leading financial centres, and
- Embracing open and web-enabled technology for universal connectivity and continuous innovation
Aspirations:

- To be one of the leading clearing and settlement centres in the Asian time zone
- To be a centre of excellence for risk management and a liquidity centre in Asia
- To be Asia’s portal for strategic links with global markets, and
- To be a centre of excellence for financial infrastructure
Aspirations:

- Hong Kong should embrace an infrastructure that will allow local and global market participants to access the full spectrum of financial products and services, on an open, robust, secure, scalable and high performance network.
The eFrastructure: Single Clearing Arrangement

HKEC Clearing

Consolidated Clearing Account

Cross-market Risk Management

Securities Clearing
Risk Collateralization
Derivatives Clearing

Securities Settlement
Securities Depository

Unified Money Settlement
The eFrastructure: Enabling Straight-Through Processing - STP

- Lack of connectivity & compatibility among market participants
- Inadequate deployment of best practice procedures - different timing & procedures for trade confirmation and amendments
- Lack of standards for determining what data should be communicated
- Lack of timeliness & completeness of settlement instructions to custodians
The eFrastructure:
Enabling Straight-Through Processing - STP

- Varying standards from country to country (tolerance limits)
- Inaccessibility or unavailability of standing settlement instructions
- Manual pre-matching processes, and
- Lack of support for efficient use of consistent static data - (standing delivery instructions)
The eFrastructure: Target STP Infrastructure

- Banks
- Issuers
- Market Regulator
- Custodians
- Fund Managers
- Brokers
- Local Investors
- Global Users & Investors
- Internet, ESD, Mobile, etc.
- Global Network

**FinNet - Securities & Derivatives Community Network**

**HKEC Trading**
- Transaction Routing System
- Transaction Flow Manager
- Electronic Transaction Interface
- Common Banking Interface

**HKEC Clearing**
- Consolidated Clearing Account
- Cross-market Risk Management
- Securities Clearing
- Risk Collateralization
- Derivatives Clearing
- Securities Settlement
- Securities Depository

**Unified Money Settlement**

**FinNet - Securities & Derivatives Community Network**

**Overseas**

- Exchanges
- Clearing Houses
- Depositories
- Exchange Alliances
- Cross-collateralization
- CSD-to-CSD Bridges
- Share Registration
- HKEC Information Services

- HKEC Trading
- HKEC Clearing
- Securities Settlement
- Unified Money Settlement
- Securities Depository
- Risk Collateralization
- Derivatives Clearing
- Cross-market Risk Management
- Consolidated Clearing Account

- FinNet - Securities & Derivatives Community Network

- Banks
- RTGS
- Payment Systems
- Foreign Currency Settlement

- Internet, ESD, Mobile, etc.
- Global Network
Building a Robust Technology Structure

- Anchored on technologies and architectures that are open, robust, secure, current, scalable and supportive of continuous innovation
- Support unified and open access for trading and clearing of securities and derivatives
- Provide an integrated for risk management and STP for all markets and products
Building a Robust Technology Structure

- Enable connectivity and interoperability with standard interactive and message-based interfaces
- Adopt best-of-breed approach or use proven solutions provided by leading players, and
- Provide a unified, secure, high performance and high resilient network, enabling both local and remote open access
Technology Structure Building Blocks

- **Access**: entry point to the financial infrastructure via local or remote connections and which must be simple, open, secure and affordable.

- **Network**: standards based TCP/IP connecting market participants and service providers.

- **Gateway**: provides interactive and message-based connections between market participants and service providers.

- **Services**: COTS application solutions used by or provided by global leaders.
Topological Structure of Hong Kong’s eFrastructure

Access

Network

Gateway

Services

HKMA
RTGS/CMU
Repo Facilities

Banks
Money Settlement
Credit Facilities

HKEC
Order Routing
Transaction Routing
Txn Flow Manager
Trading
Clearing
CSD
Information Mgmt & Dissemination
Integrated Risk Mgmt & Collateral Mgmt
Unified Money Settlement

Registars
ROM
eIPO
Corporate Action
Corporate Comm

SFC
Supervision
Market Regulation
Licensing
Enforcement

Service Providers
Information Providers
Other Online Services
Overseas Exchanges
Overseas Srv Providers

http://www.aboutfinnet-hk.net
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The Heterogeneous Community of Hong Kong FinNET

Exemplary Scenario for Active Loss Prevention
Closing Thoughts

"You can't create experience. You must undergo it".

Albert Camus

"If you got them by the architecture, their hearts and mind will follow".

John Wayne
Thank You!

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