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# Managing Through Metrics

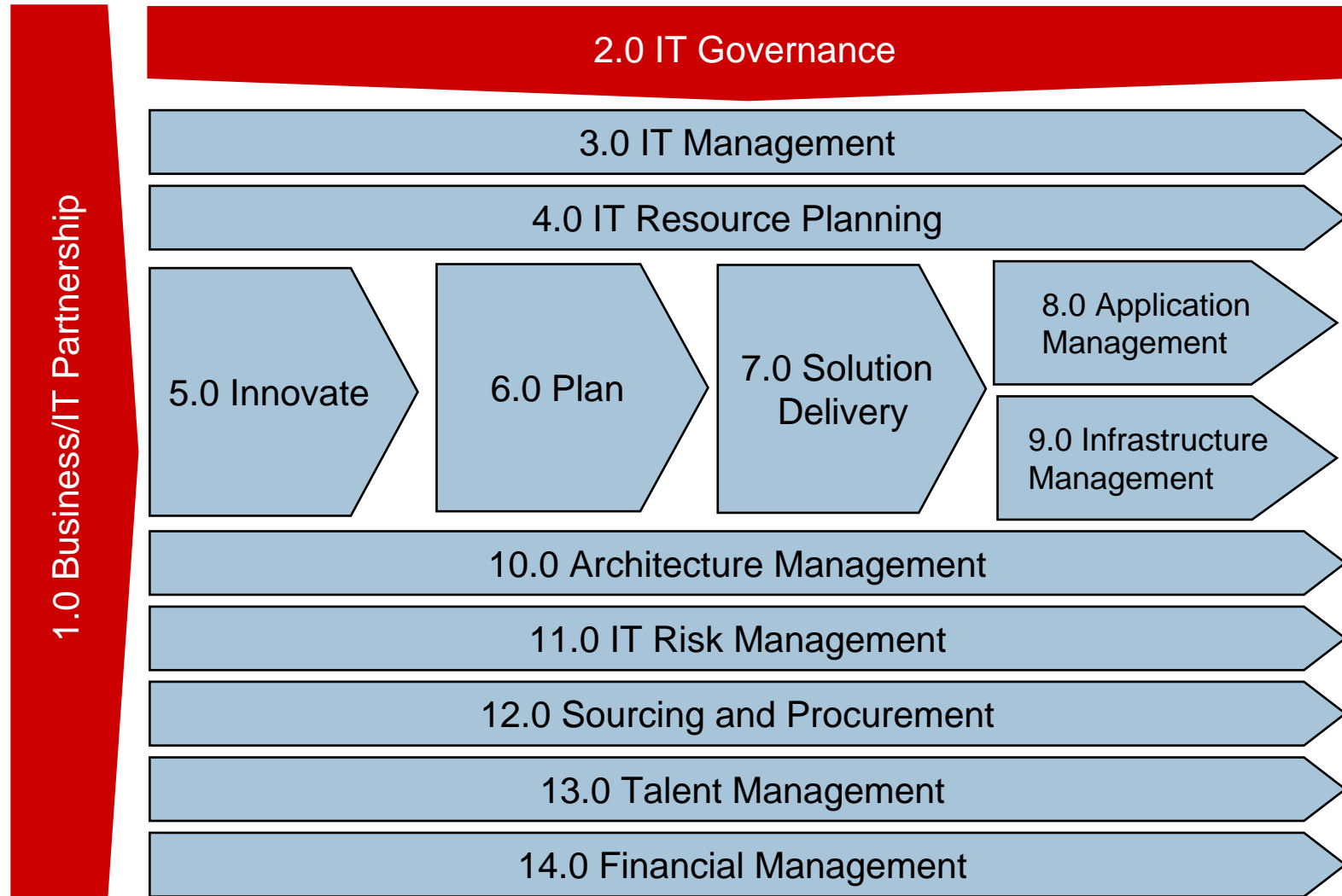
**Muthukrishnan RAMASWAMI**  
**Singapore Exchange**

# IT Delivery Management

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- Establish a Framework for Managing Technology
- To apply this to a specific business establish the following
  - A business roadmap
  - A Technology roadmap
    - Current states – Applications, Infrastructure
    - Future / Desired state
  - Manage process for transformation – through projects
  - Create program / project management disciplines
- Manage services delivery to ensure operational excellence

# An IT Capability Framework

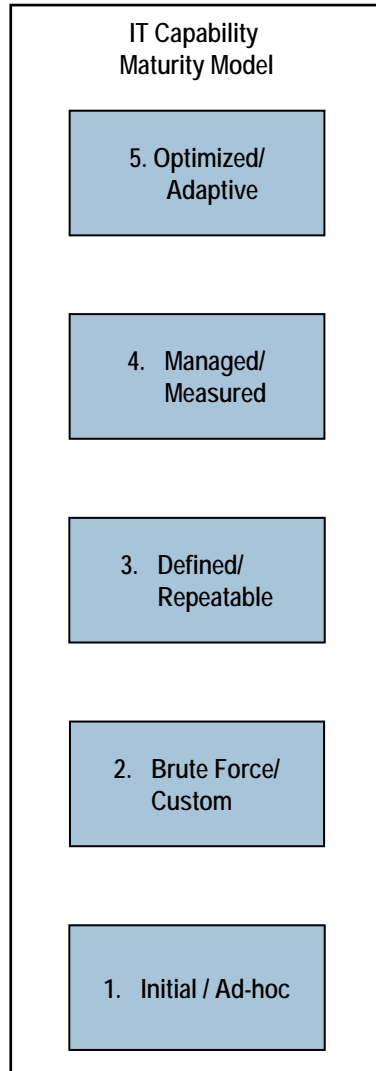


# IT Capability Overviews

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IT Capability Overviews
<b>1.0 Business/IT Partnership:</b> Establish and maintain an effective partnership between the business and IT to better align business and IT goals and objectives through education, communication, and proactive management of the relationship between business and IT
<b>2.0 IT Governance:</b> Specify and manage the structures, policies, guidelines and processes that define IT decision rights and accountability for operating decisions, overall IT spending/funding, investments, standards, IT management, and IT risk management
<b>3.0 IT Management:</b> Provide overall leadership and management of IT including: vision and direction, communications, measurement and reporting, management of IT capabilities, and general administration
<b>4.0 IT Resource Planning:</b> Allocate IT resources (people and capital) against prioritized demand over the planning horizon according to established criteria
<b>5.0 Innovate:</b> Create the conditions for sustainable, balanced IT enabled business innovation
<b>6.0 Plan:</b> Develop multi-year IT strategies and annual operating plans that are aligned with business strategies and maximize the value of IT investments
<b>7.0 Solution Delivery:</b> Define, design, create (build, acquire, enhance, and integrate) and implement information technology based capabilities into the operations of the business
<b>8.0 Application Management:</b> Operate, manage, and support the functionality, quality, efficiency, and use of applications after they have been placed into production. Application Management also includes management and reporting for the overall portfolio of production applications
<b>9.0 Infrastructure Management:</b> Operate and manage the technology infrastructure according to agreed upon service levels
<b>10.0 Architecture Management:</b> Manage the overall IT architecture and technology portfolio to balance innovation, risk, and Total Cost of Ownership
<b>11.0 IT Risk Management:</b> Identify, manage, and mitigate risks, and ensure regulatory compliance in the areas of IT Security, Internal Controls, and Business Continuity
<b>12.0 Sourcing and Procurement:</b> Establish sourcing and procurement strategies, select and manage vendors, establish and manage contracts, and acquire technology products and services
<b>13.0 Talent Management:</b> Attract, develop and retain the required caliber, mix, and quantity of IT professionals
<b>14.0 Financial Management:</b> Plan, report and analyze IT spending and financial performance

# Maturing IT Capabilities



**IT Transformation Benefits**

<b>Time to Market</b>	Ability to meet or exceed business time to market goals
<b>Innovation</b>	Active partnership in technology enabled business innovation
<b>Business Efficiency</b>	Enable better efficiency in the business operations
<b>Interoperability</b>	Provide the infrastructure to allow customers to seamlessly interact with Citigroup
<b>Competitiveness</b>	Provide the ability to create technology enabled differentiation in products and services

**Simplification and Standardization Benefits**

<b>IT Efficiency</b>	Reduced effort, cost and uncertainty through well-designed processes
<b>Effectiveness</b>	Better customer experience and service quality resulting in better performance and better ability to grow incrementally
<b>Integrity</b>	Reduced risk/better compliance with regulatory and trading partner requirements
<b>Agility</b>	Ability to change more quickly with managed cost and risk, including improved ability to innovate and to absorb transformational growth (e.g. M&A) Source: Gartner

Source: Adapted from COBIT, CMM, PMMM

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# BUSINESS LINES

## SECURITIES AND DERIVATIVES MARKETPLACE

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# BUSINESS Landscape

## SECURITIES AND DERIVATIVES MARKETPLACE

Customers' growing product sophistication and their increasing demand for best execution when combined with a proliferation of alternative products and markets no longer allow exchanges to behave as utilities.

The sell-side can encroach on traditional exchanges. Competing on alternative product offerings and use of technology while leveraging its established customer intimacy and suite of value-added services. Meanwhile, regulators are pushing multi-market access to deliver best execution. And, alternative trading systems are pursuing niche, but affluent customer segments under-served by exchanges' traditional utility model. Liquid Net's application to list Singapore stocks on its alternative market for large block traders is illustrative.

Exchanges need not remain utilities, though. Nor need they move away from their core business lines. Exchanges can increase the value of their business lines by growing sophistication and focus in their product and service offerings. They can, moreover, blend these offerings into the increasingly complex value network in which their customers reside.

### Asian Gateway

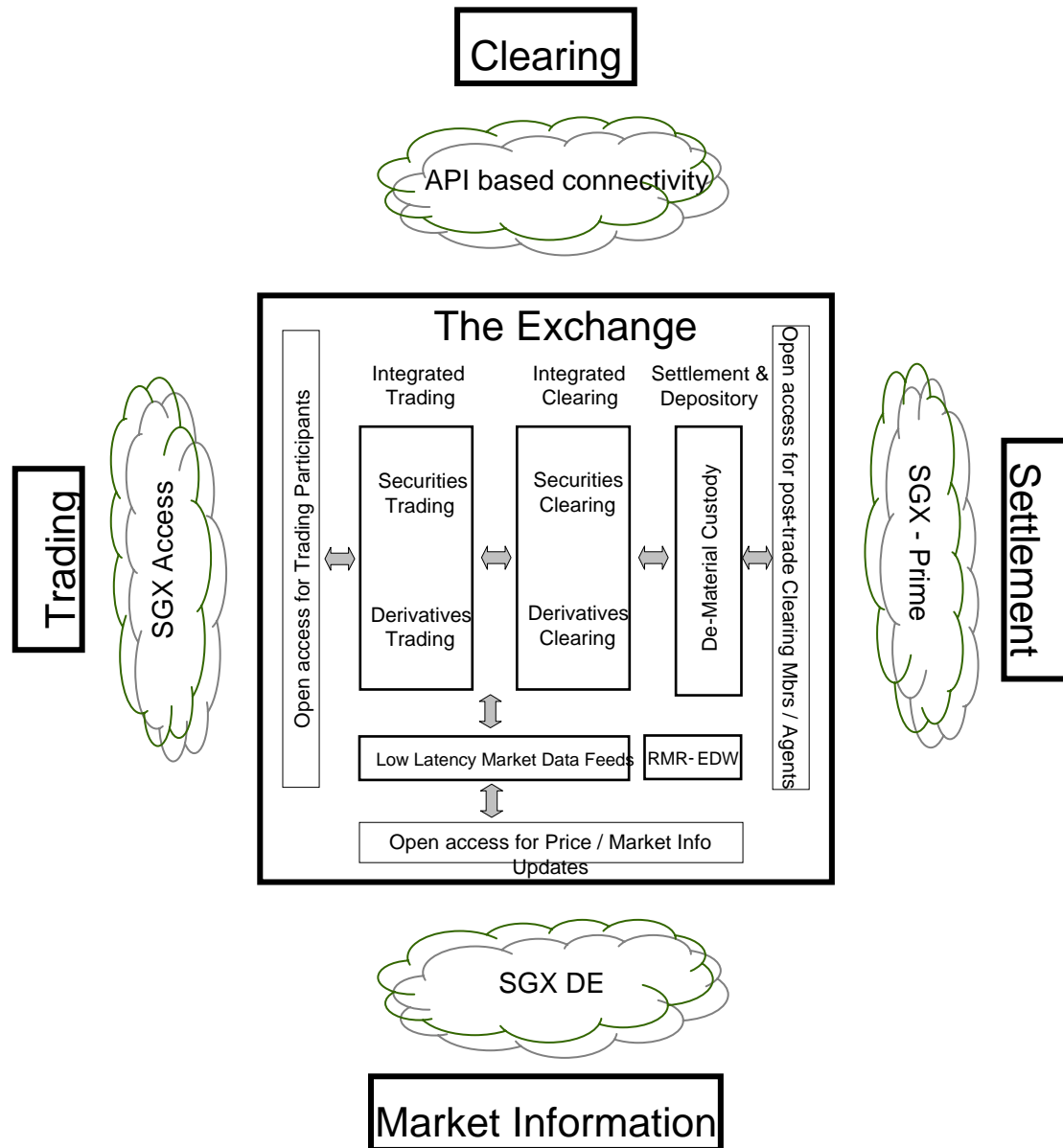
- We are a one-stop solution to tap Asian growth opportunities. We are a hub for raising capital and listing structured products, as well as for trading, clearing and settlement of securities and derivatives
- We are a portal and proxy for Asian products and markets
- Our relevance as a market operator transcends our finite home market

### Delivery excellence

- We are a customer-focused organisation
- Our regulatory policies are market-oriented
- We are operationally and technologically efficient

# BUSINESS LANDSCAPE

## SECURITIES AND DERIVATIVES MARKETPLACE



### Business Services

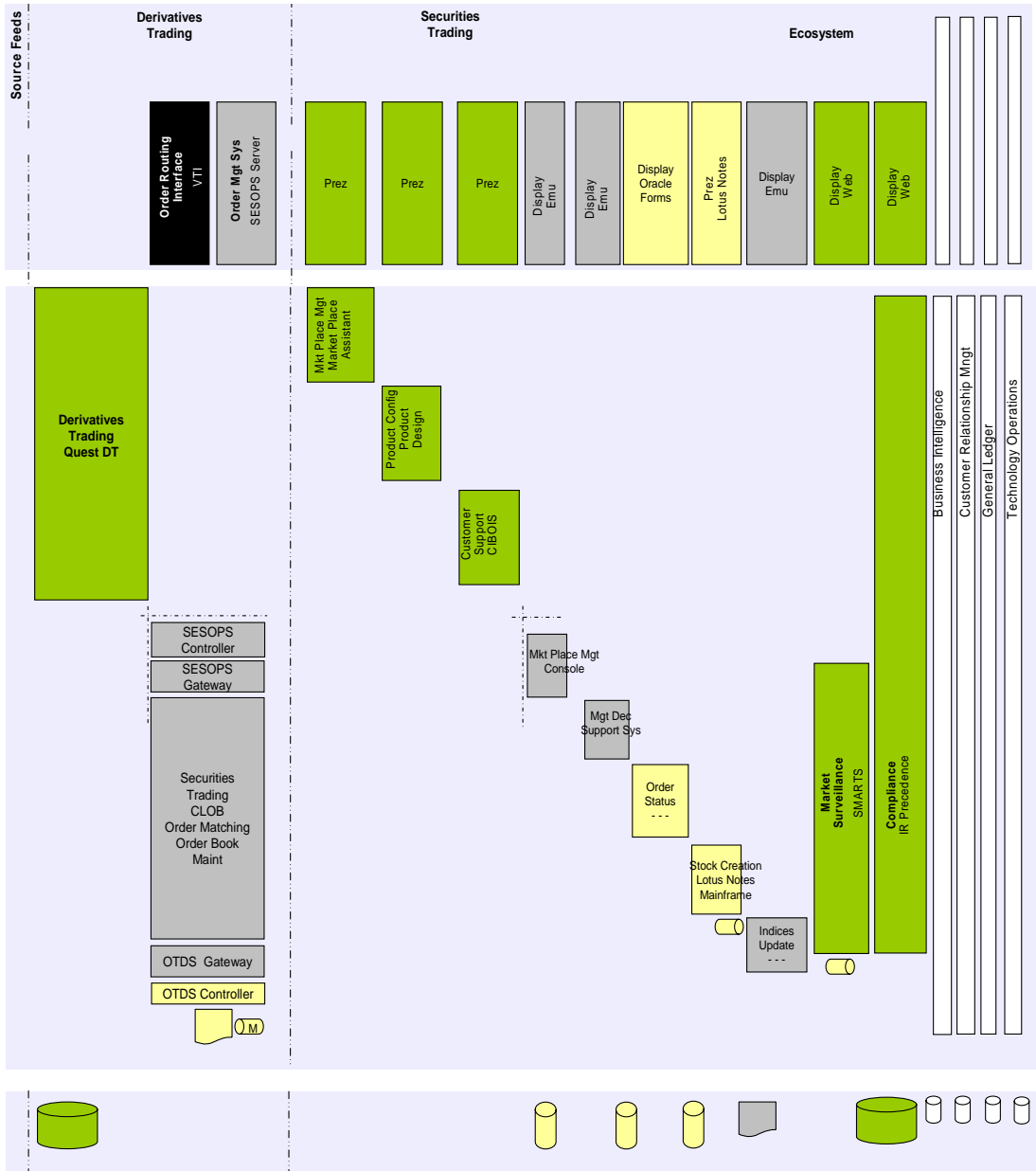
- Listings
  - We operate regulated markets for capital raising and issuing structured products with an Asian-origin or Asian-focus
- Trading
  - We operate markets for buyers and sellers of Asian financial and commodity products to meet and trade
- Market Information
  - We inform buyers and sellers, as well as price sensitive parties about Asian financial and commodity products and market conditions
- Clearing and Settlement
  - We offset counterparty risk, as well as administer the rights and obligations of buyers and sellers of Asian financial and commodity products
- Depository
  - We register owners and their shareholdings, and manage their holdings when adjusted by corporate actions
- Delivery excellence is embodied in our operating model:
  - Timely, reliable, responsive and efficient

### Service Qualities

- Open access to exchange services is pivotal, allowing participants to connect via their preferred solutions
  - Traders use their preferred OMS or automated trading systems
  - Quote vendors and automated trading systems have access to real-time market information
  - Clearing members and custodians use their proprietary or vendor provided back office and custodial solutions
- Seamless access to all exchange services
- High speed trading engines and market data feeds to enable fast, responsive order transactions and information dissemination
- High capacity exchange systems to enable a large number of product listings, as well as large volumes of orders and trades
- High availability exchange systems to ensure exchange services are always up and running

# BUSINESS LINE APPLICATIONS - TRADING JULY 2007

## SEPARATED SECURITIES AND DERIVATIVES MARKETPLACES



### Products

Product	EQUITY										FIXED INCOME										FOREX	CREDIT	COMMODITIES												
	Cash	Warrant	Stock Option	Future	FOption	Warrant	Stock Option	Future	FOption	ETF	REIT	Treasuries	Gov't	Corp Bond	Future	FOption	Index	FOption	Option	STIR			Option	Cash	Index	Future	FOption	Cash	Option	Future	FOption	Agri	Energy	Freight	
• TRADING																																			
• Prdt Definition																																			
• Pr																																			
• User																																			
• Prdt Strategies																																			
• Pr																																			
• User																																			
• Max #	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	

### Business Services

- Securities continuous trading
- Derivatives continuous trading

### Current Status & Key Challenges

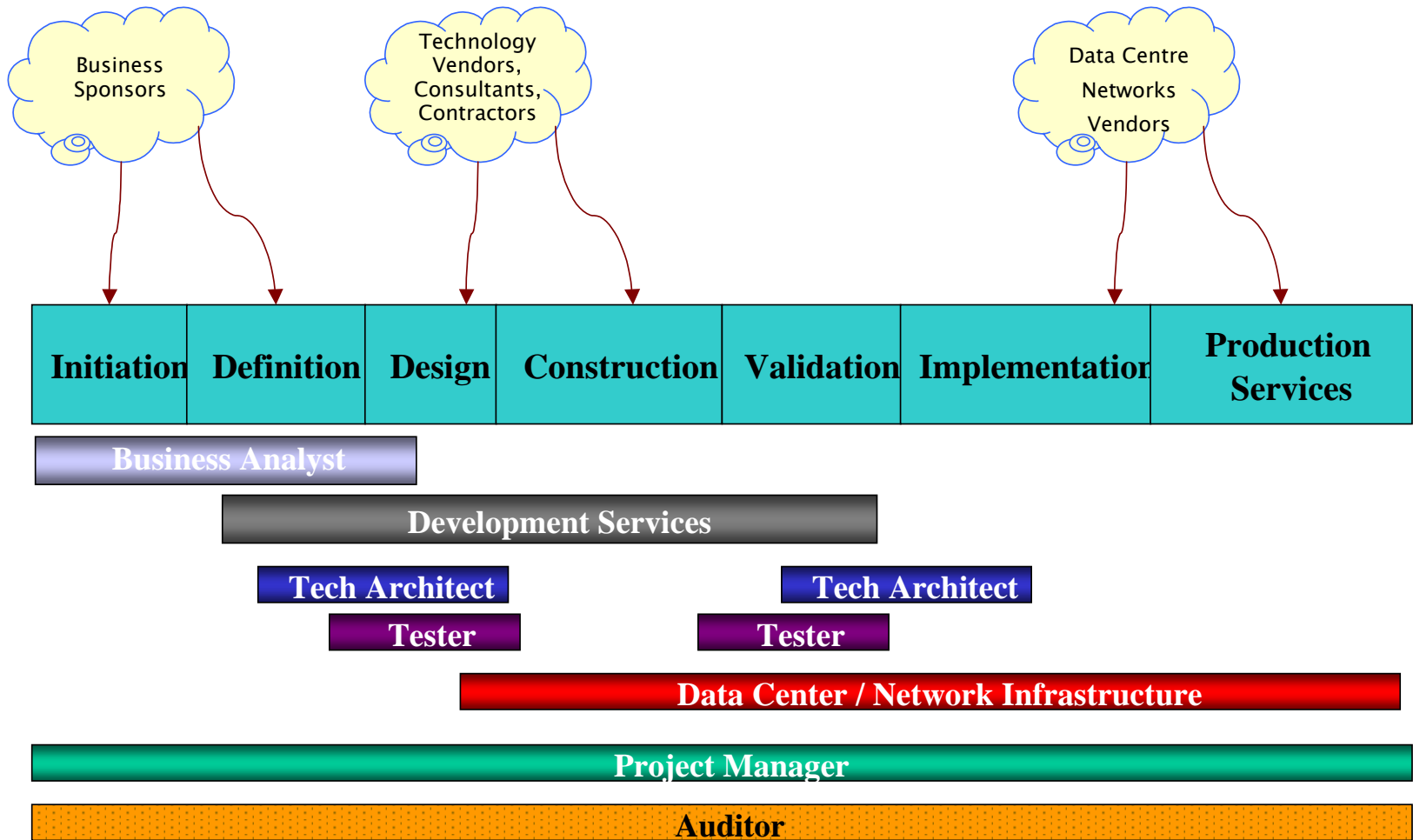
- Product and Services
  - Continuous trading for core securities and derivatives products in place as highlighted above
  - Some products such as single stock futures and options, as well as product and spread definition and # legs can not be supported
  - Several business services can not be run independently
- Access
  - Disparate interfaces used for the securities and derivatives markets
  - Performance and connection efficiencies are sub-optimal
- Applications
  - Trading and front-line support applications are completely separated between the securities and derivatives markets.
  - CLOB is being replaced by QUEST-ST. The separation between venues, however, will remain. Several legacy applications, moreover, are being retained post launch. This has led to significant adaptations being made to the underlying CLICK-XT.
  - Interfaces between applications, especially for the securities market are poorly defined and rely heavily on file transfers.
  - Version upgrades are required for both QUEST-DT and ST. QUEST-DT is also under capacitized.
- Data Storage
  - QUEST-ST and DT have central db configurations which are not compliant with the intended data structures and are incompatible.

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# Managing Change Through Projects



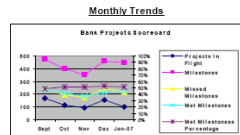
# Management Dashboards

- Progress managed through periodic reviews on all programs and projects

## Project Scorecard – Milestone Trending\*

### Retail Banking

	Sept	Oct	Nov	Dec	Jan-07
Projects in Flight	168	112	95	153	103
Milestones	476	402	354	458	443
Missed Milestones	241	193	174	245	219
Met Milestones	235	209	180	213	224
Met Milestones Percentage	49%	52%	51%	53%	51%



## Project Scorecard – Delivery Trending

### Retail Banking - Implemented On Time Percentage

	Aug	Sept	Oct	Nov	Dec	Jan07
Category C Projects	70%	75%	100%	20%	50%	50%
Category B Projects	55%	69%	87%	17%	75%	100%
Category A Projects	52%	64%	83%	47%	66%	36%
Maintenance Requests	46%	60%	78%	50%	75%	50%
Total Projects	52%	64%	73%	45%	66%	47%



## Projects Implemented & Major Milestones – January 2007

Cont	Asia	Japan
Cat	Guam – Platinum Card launch ✓	Stratus Upgrade implemented on Jan 21 ✓
Cat	Philippines – NAS Multiple File Upload to go live (rescheduled to Feb)	Citigold Platinum Cards ready for UAT ✓
Cat	Taiwan – rewards system migration to RWS ✓	Bankcard English Statement for COOL went live on Jan 15 ✓
Mat	ICCC – MasterCard product launch with Shanghai Airlines ✓	Amazon Co-brand Card Implemented on Jan 17 ✓
Tot	Philippines – Consolidation of Legal Vehicles – complete GAPS discussion ✓	Bankcard & Diners Cashing Gray Zone APR Elimination live on Jan 15 ✓
Con	Australia – COIN – start development ✓	OSCAR – Continue Analysis & Design phase (CEP revision in progress and reviewing alternatives)
Cat	Complete detailed analysis & design for Banking Release 1 2007 for:	Citigold Premium Enhancements (Wealth Management)
Cat	Australia ✓	Portfolio Tracker – Conditional UAT Signoff ✓
Cat	Philippines (rescheduled – pending LV consolidation)	
Mat	Taiwan – OBU (Banking) went live ✓	
Tot	Hong Kong – enhance FX Margin (to Feb)	
	Malaysia – Ladder Deposit (tier 1)	
	Malaysia – Islamic Home Loan (1)	
	Malaysia – Visa Cash Back prog	
	Indonesia – Goal on statement	
	Singapore – SMART Debit Card is	
	Thailand – Bank release 3 2006	
	Total: 10	

## Projects Major Milestones – Due February 2007

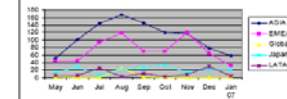
Cont	Asia	Japan
Cat	Philippines – Consolidation of Legal Vehicles – gaps effort estimation	Bankcard ETC development to be completed by Feb 26
Cat	Philippines – Bank release 1 2007 – detailed A&D	JFP Phase II – Continue Analysis/ Design & development phase, to start SIT
Cat	Philippines – NAS Multiple File Upload to go live	Mutual Funds conversion of 'S' to 'A' shares – to complete SIT
Cat	Australia – COIN – complete development	OSCAR – Complete FS Review & Signoff, CEP Revision In Progress, Negotiate with Oracle EOL extension with Oracle
Cat	Australia – Bank release 1 2007 – start development	Citigold Premium Enhancements (Wealth Management)
Cat	Singapore – SMART Debit Card launch	Portfolio Tracker: Implementation on Feb 5
Cat	Singapore – Annual Bonus Refuse Phase 2	Extendable Deposits: Implementation on Feb 5
Cat	Singapore – Mortgage Combined Statement Enhancement	Residential Real estate Loan: Implementation on Feb 5
Cat	Singapore – Triad Pricing	BASEL – UAT In progress
Cat	Indonesia – Goal on statement	Project Unity: Phase 1 on Feb 2, UAT start for Phase 2 and Phase 3
Cat	Malaysia – Ladder Deposit (tiered interest rates)	MEMFIS Brokerage – To complete development
Cat	Malaysia – Cashback Gold (Cash rebate for Gold Product)	MEMFIS Investments – Re-planning, Revise estimate & feasibility study of local vendor's system
Cat	Hong Kong – Enhance FX Margin system to provide 24/7 service	
Cat	Thailand – Project M (Chip card with static info for Loyalty Reward)	
Cat	ICCC – JCBUAL co-brand card public launch	
Cat	ICCC – Released 2006 implementation	

## Project Inventory and Trends

### Implemented Projects

	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 07
ASIA	52	101	145	160	146	121	110	79	58
EMEA	45	45	34	119	70	70	120	65	31
Global	2	0	0	26	1	0	0	0	0
Japan	13	29	7	21	27	34	13	22	21
LATAM	3	6	26	3	11	3	6	30	4
ITO	117	181	272	337	255	226	259	199	114

### Implemented by Region



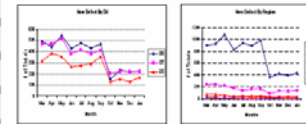
## Software Defects Tracking – January 2007

Cont	ASIA	EMEA	Global	Japan	LATAM	ITO
Cat						
Cat						
Cat						
Mat						
Tot						

Cont	ASIA	EMEA	Global	Japan	LATAM	ITO
Cat						
Cat						
Cat						
Mat						
Tot						

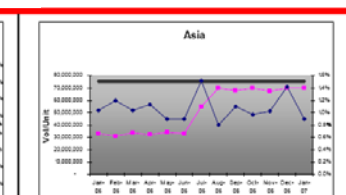
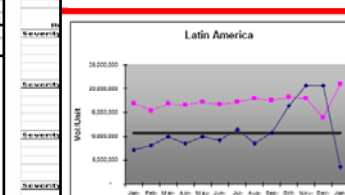
Cont	ASIA	EMEA	Global	Japan	LATAM	ITO
Cat						
Cat						
Cat						
Mat						
Tot						

### Monthly Trends



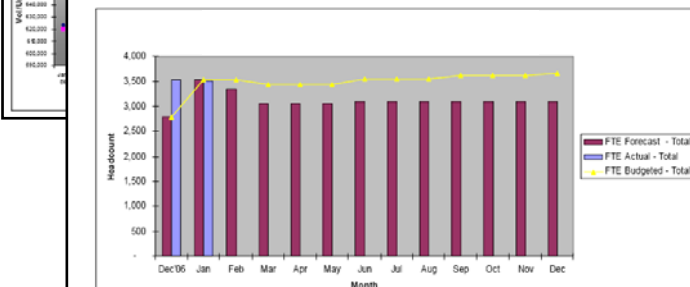
## System Availability

Cont	ASIA	EMEA	Global	Japan	LATAM	ITO
Cat						
Cat						
Cat						
Mat						
Tot						



## Resource Utilization Report

Resources Total	Dec'06	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
FTE Forecast - Total	2,791	3,530	3,350	3,050	3,050	3,100	3,100	3,100	3,100	3,100	3,100	3,100
FTE Budgeted - Total	2,791	3,530	3,350	3,429	3,429	3,550	3,550	3,550	3,622	3,622	3,622	3,622
FTE Actual - Total		3,530	3,500									



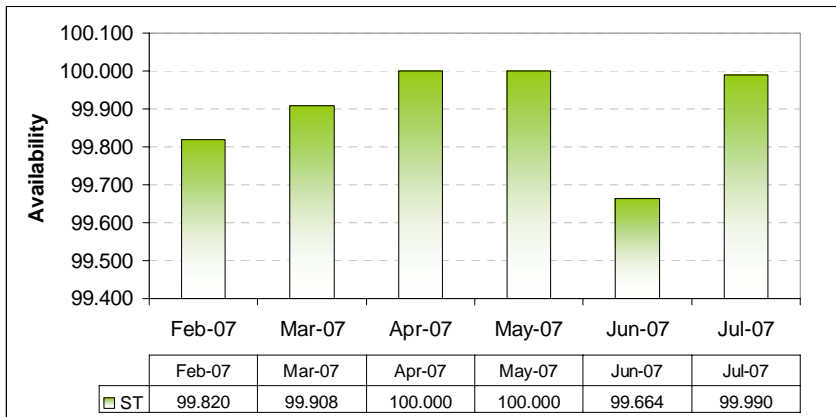
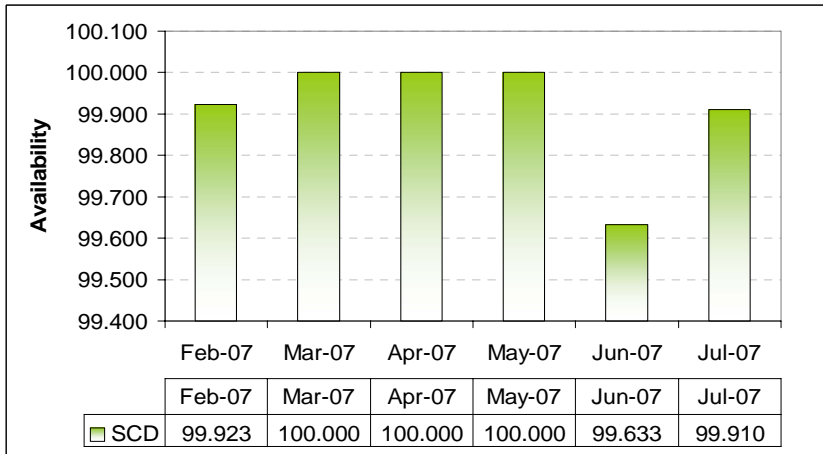
# IT Delivery Management

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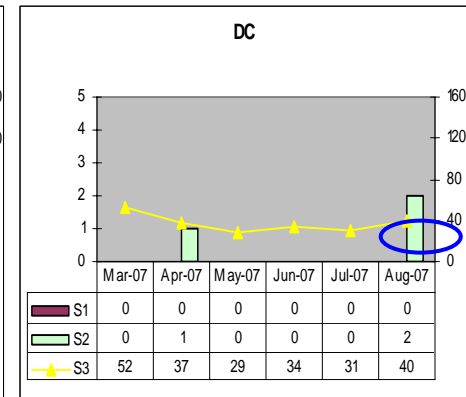
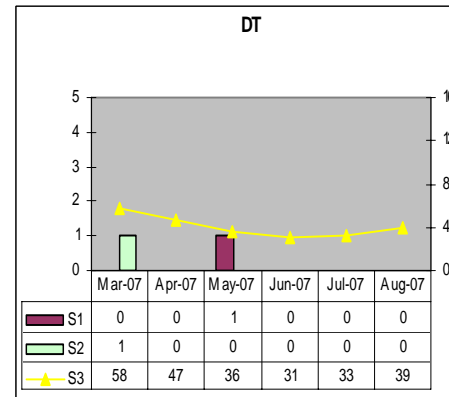
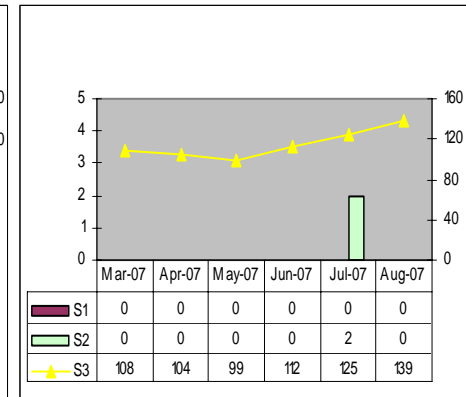
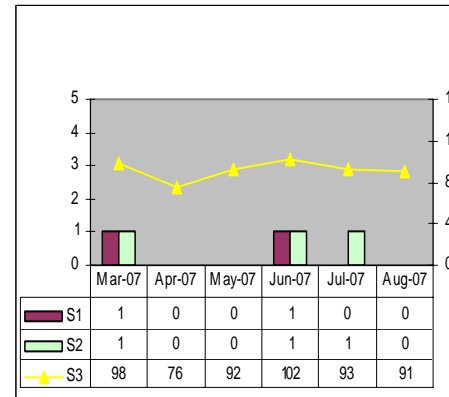
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# Availability & Incidents Statistics – Business Services

## Availability



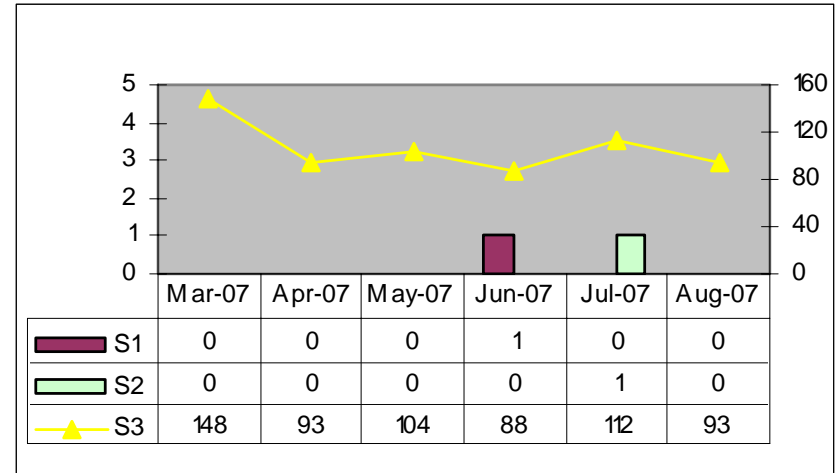
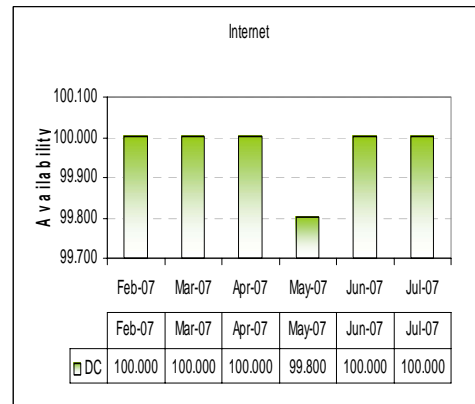
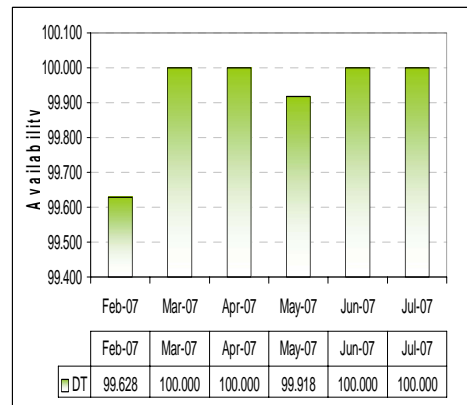
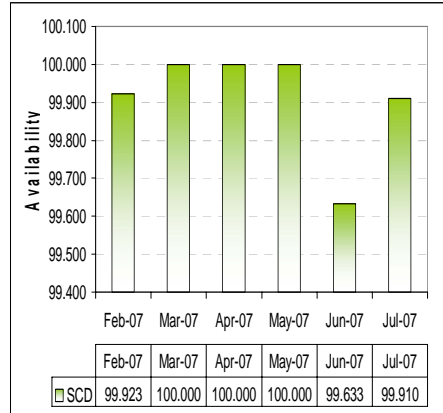
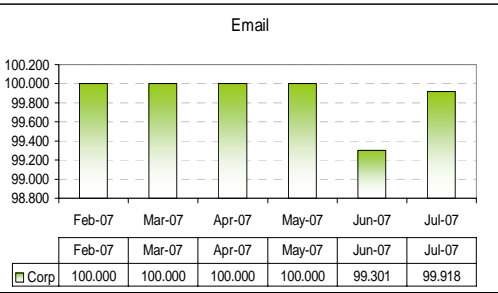
## Incidents



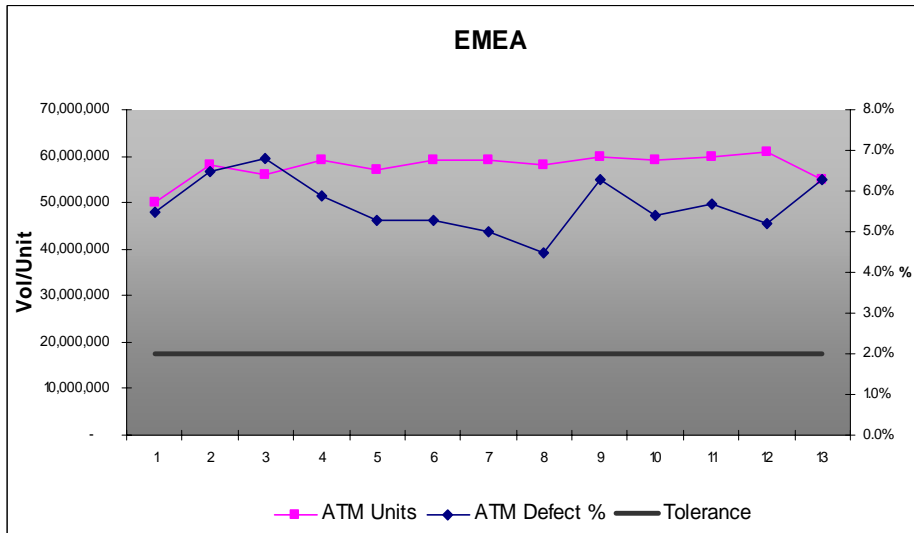
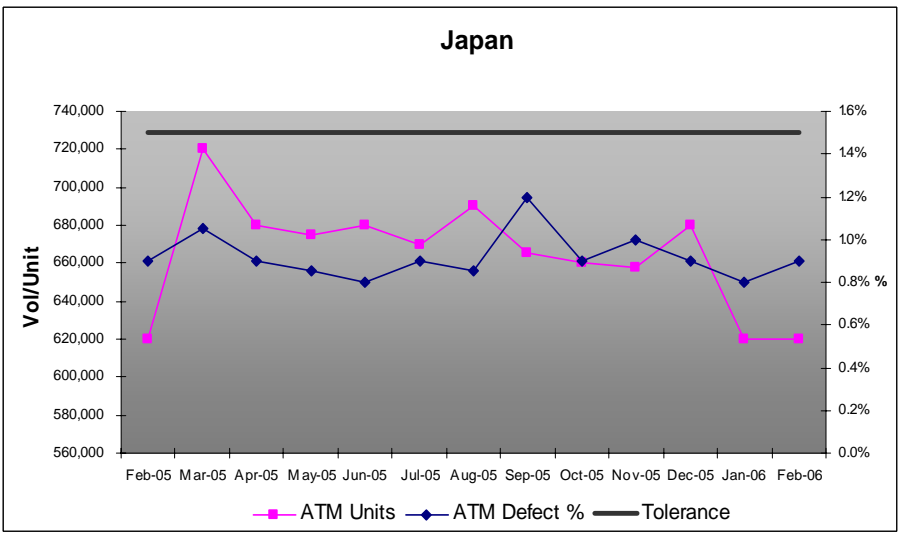
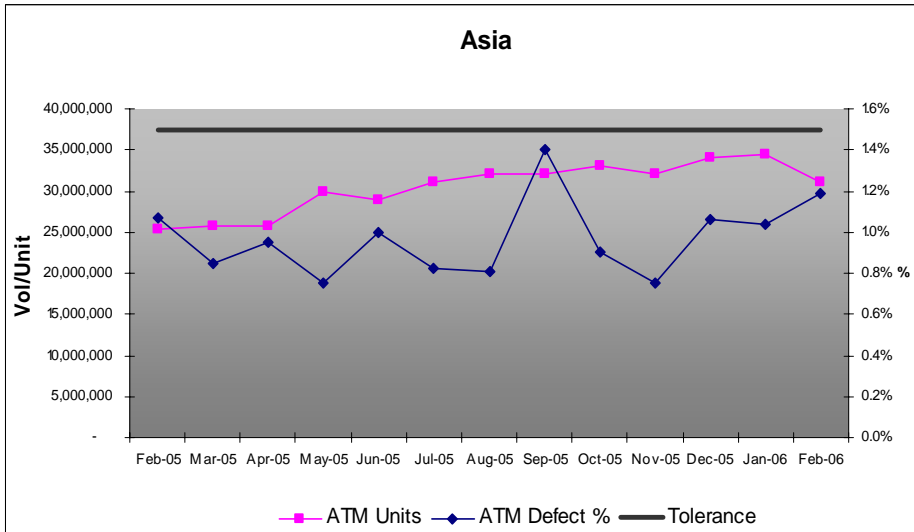
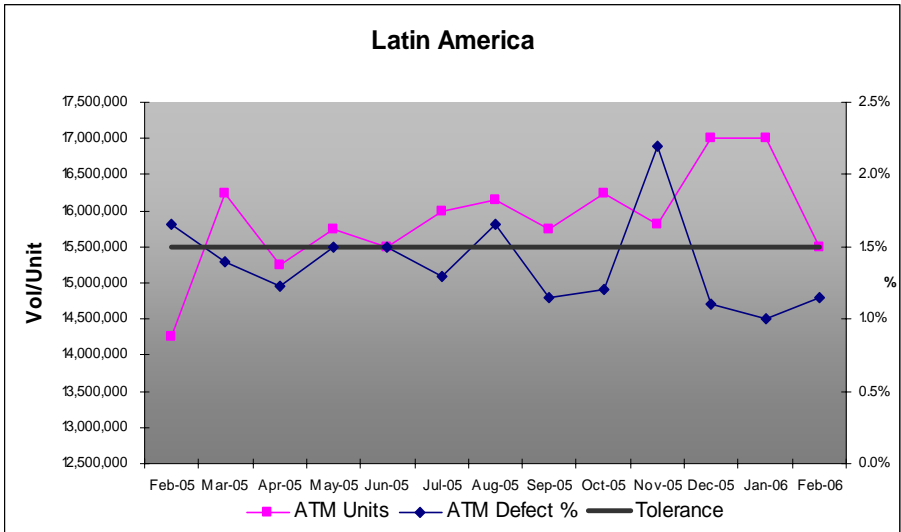
# Availability & Incidents Statistics – Corporate Services

## Availability

## Incidents

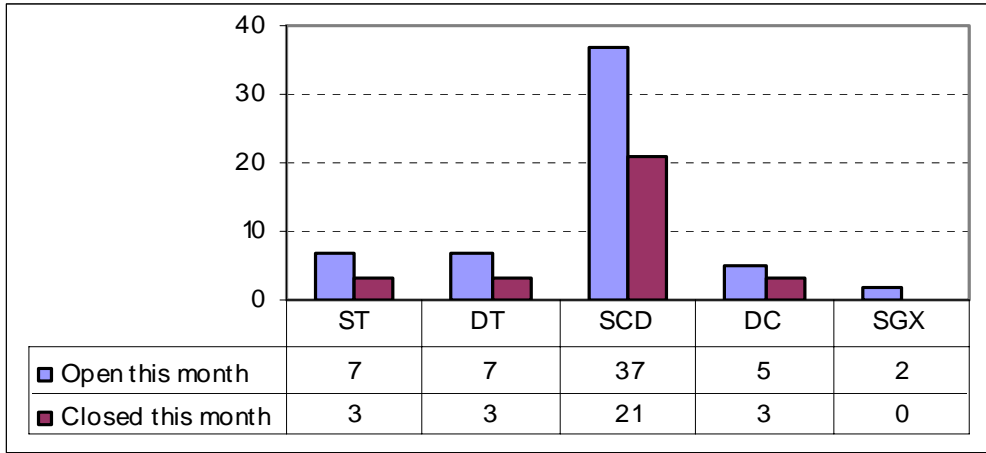


# System Availability

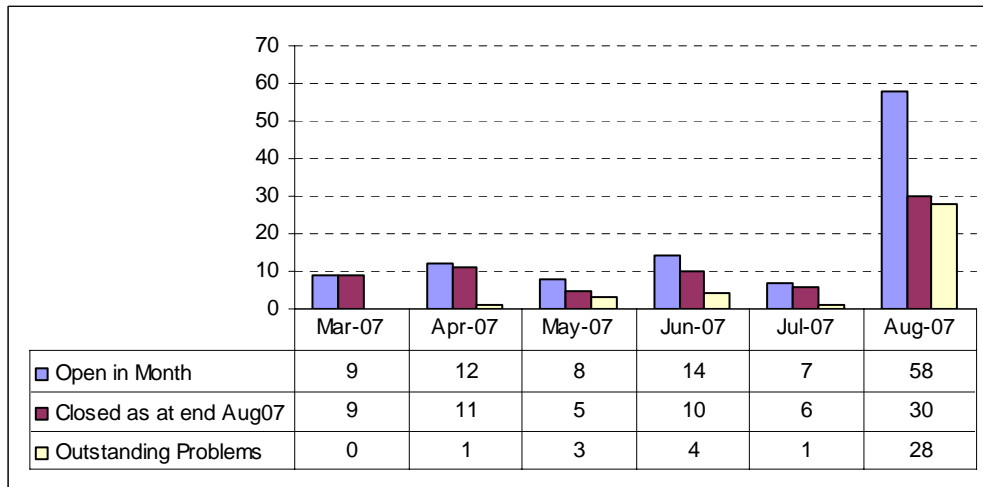


— Regional SLA Tolerance

# Problem Management Statistics



Breakdown of Problem Cases in Aug 2007

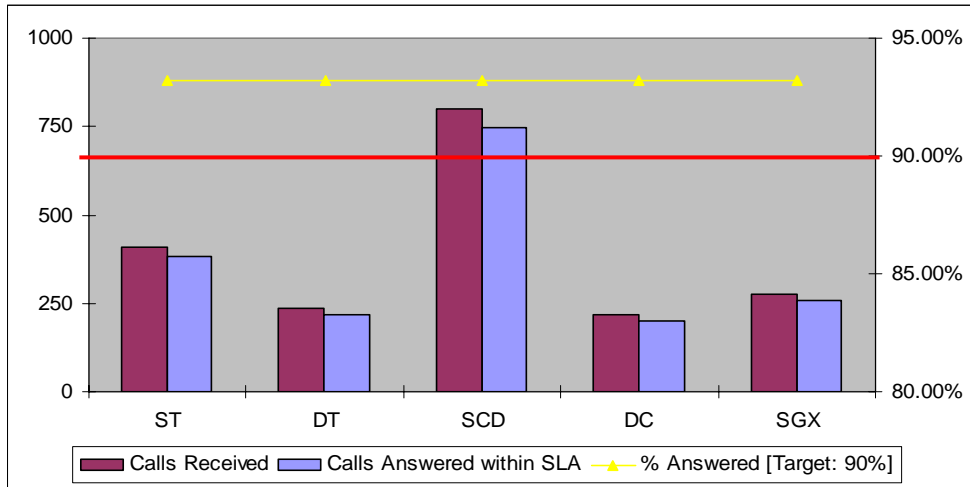


Outstanding Problem Logs (Jan07 – Jul 07)

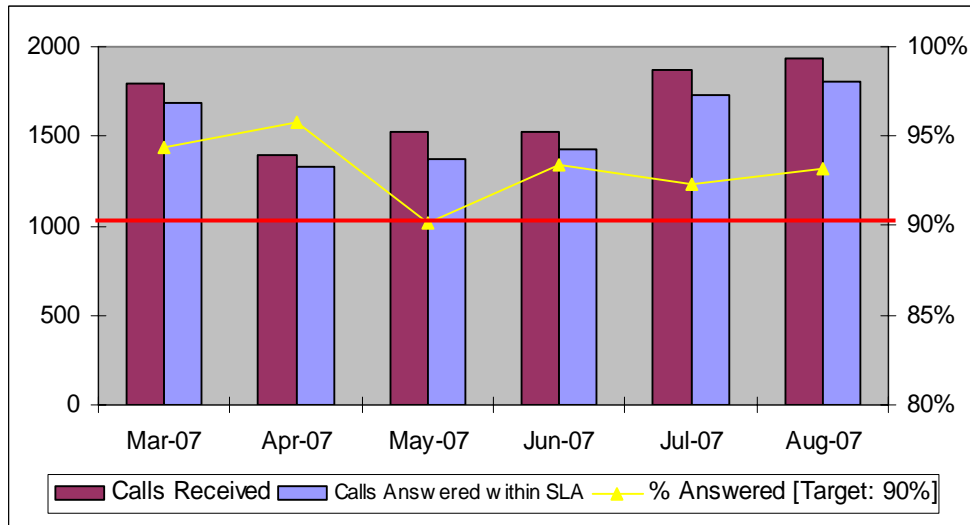
## Remarks:

- There were high number of problem cases logged in Aug 07 due to automated creation of problem cases from Job Abend cases
- Total number of outstanding problem logs based on last 6 months is 37. Majority of the outstanding problems are from Aug 07
- The cases are attributed to: Application (38%), System (30%), Hardware (14%), Usage (8%), Security (3%), Network (3%), and yet to be classified (5%).

# Helpdesk Statistics



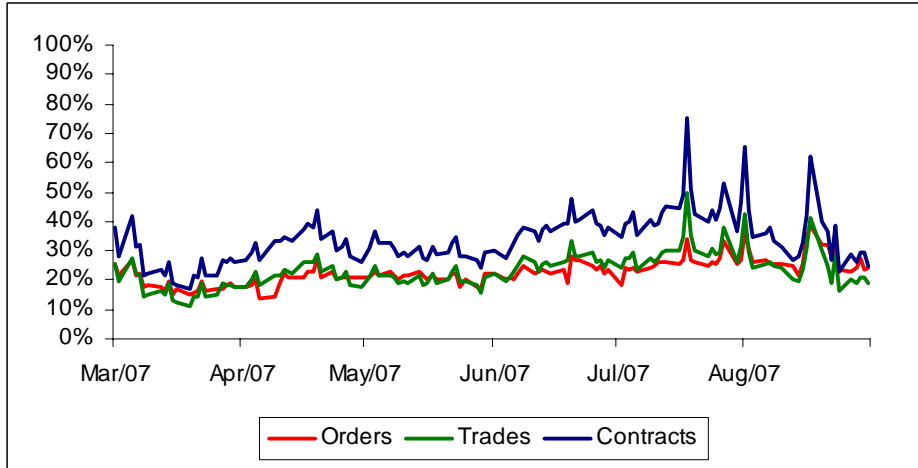
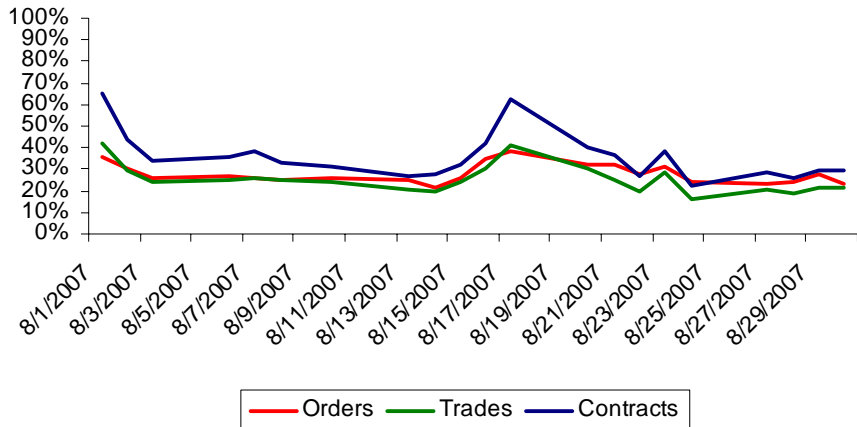
*8400 Call Pick Up for Aug 2007*



*8400 Call Pick Up for last 6 months*

- Pickup rate of 93.19% exceeded the SLA target of 90%
- Number of received calls increased by 70 compared to July 07 and 413 compared to June 07
- However, Helpdesk managed to increase call pick-up rate by 1% compared to July 07

# Capacity Utilization



Description	Max System Capacity	Max Value	Min Value	Average	% of Max system capacity
Orders	2,000,000	772,062 (17 <sup>th</sup> Aug)	435,037 (14 <sup>th</sup> Aug)	555,858	39
Trades	1,000,000	422,169 (1 <sup>st</sup> Aug)	161,974 (24 <sup>th</sup> Aug)	250,480	42
Contracts (Actual)	515,000	335,363 (1 <sup>st</sup> Aug)	116,909 (24 <sup>th</sup> Aug)	181,658	65

- Record high for Orders volume (772,062) since 2000;
- Review capacity for orders, contracts

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# Q & A