

Deutsche Telekom

T-Systems in Asia

Peering Across the Asia Pacific



Erasmus Ng

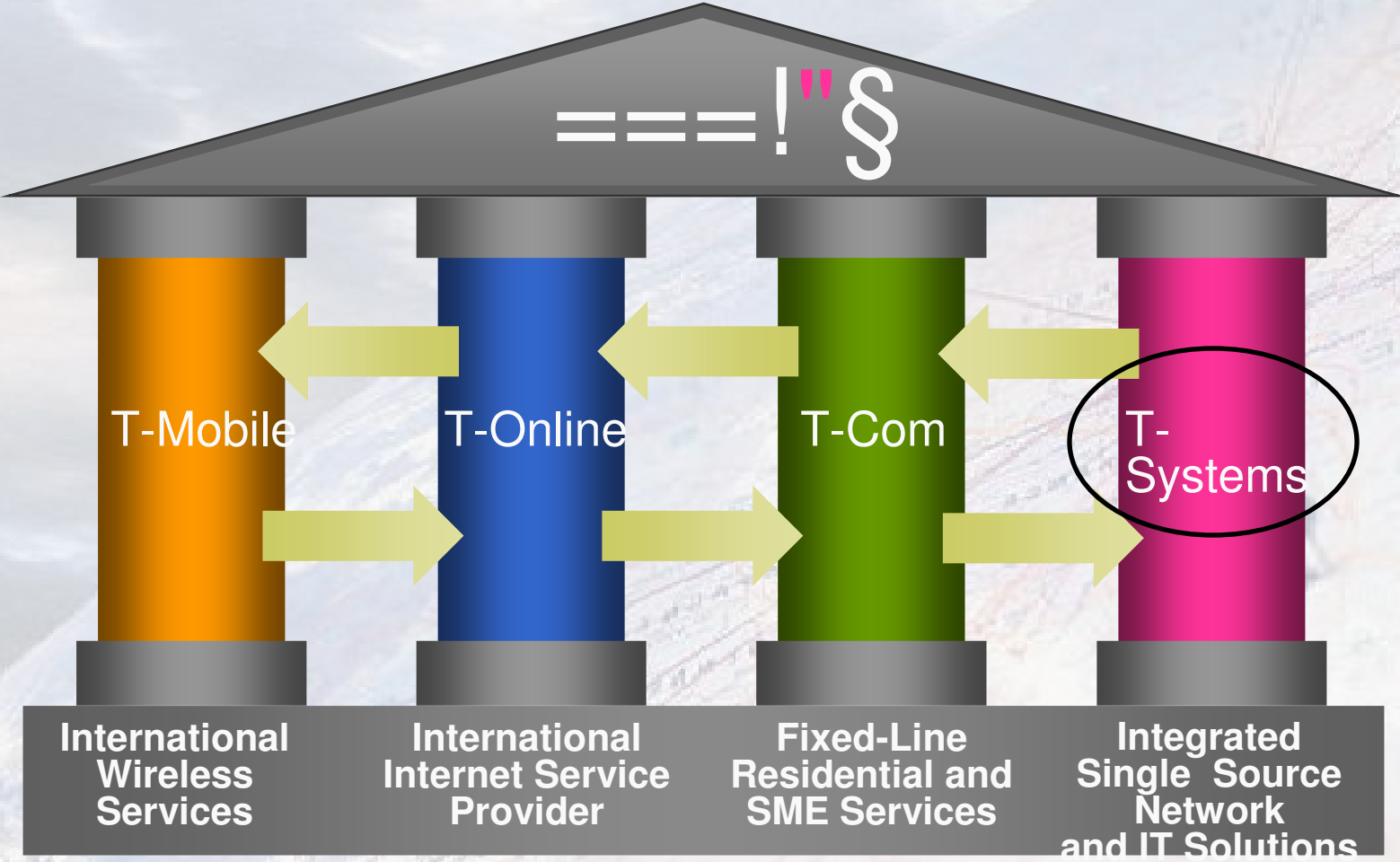
Manager, IP Products – Asia Pacific & Middle East

International Carrier Sales & Solutions

February 2004

====!"§==Systems=

Deutsche Telekom's Four Pillar Strategy



====!"§====Systems=

Company Overview

Deutsche Telekom's Company for System Solutions/IP Data

! " § == Systems =

- One of largest systems houses globally
- Comprehensive IT/telecommunications and carrier's carrier solutions for global customers/carriers
- International presence with 44,000 employees in more than 20 countries

==== ! " § == Systems =

Company Overview

Facts about T-Systems IP

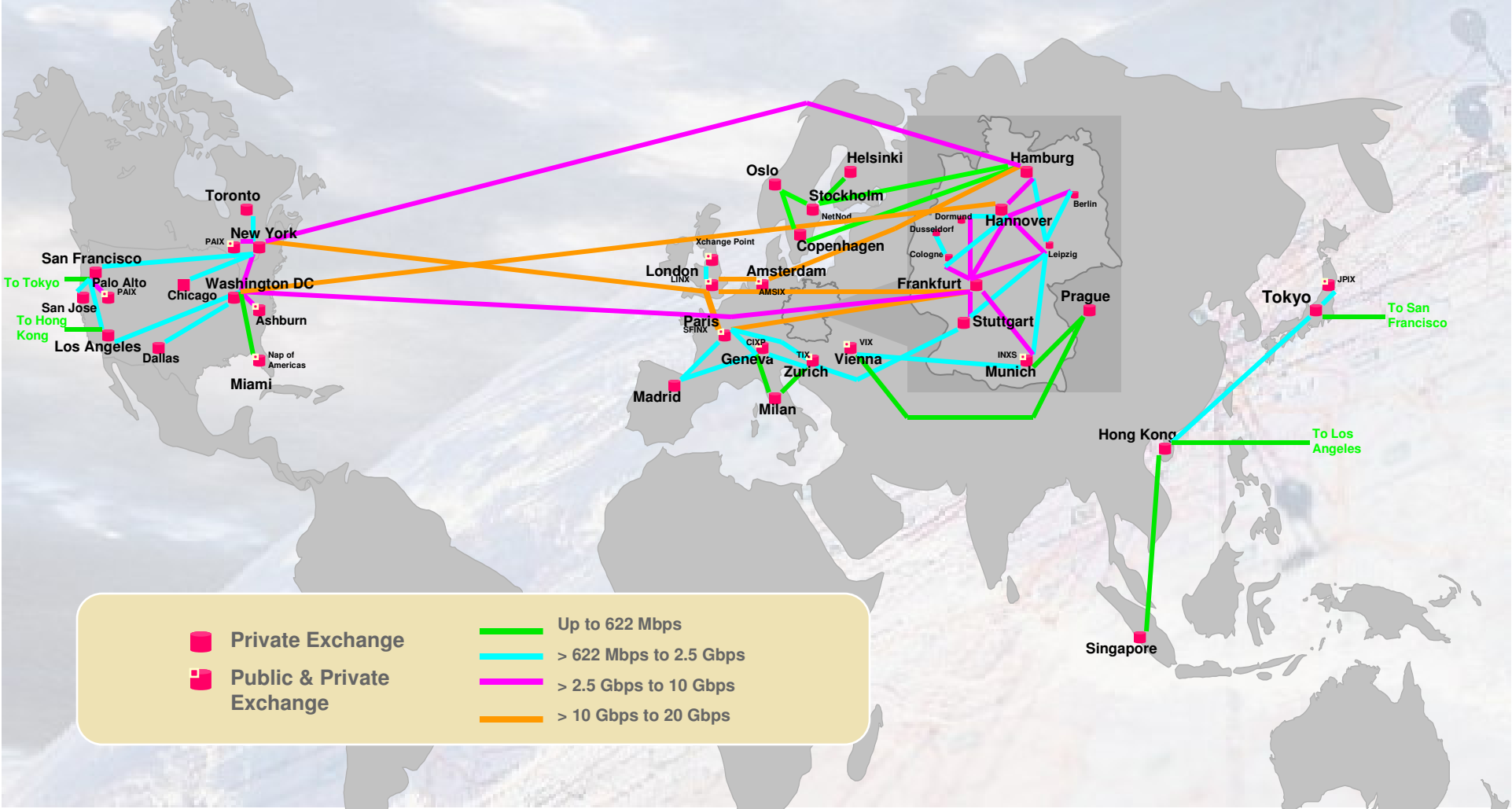


- Serves 13+ million subscribers of T-Online, Europe's largest ISP
- DT has 4+ million DSL Internet access subscribers in Germany
- 200+ Peerings, total 100+ Gbps, 41% in USA
- 45+ Gbps IP on North-Atlantic
- MPLS based Global IP network
- Mobile Carrier Extranet based on MPLS: GRX links 120 carriers

====!"§==Systems=

Deutsche Telekom/T-Systems AS3320

Global IP Network – Q1 2004

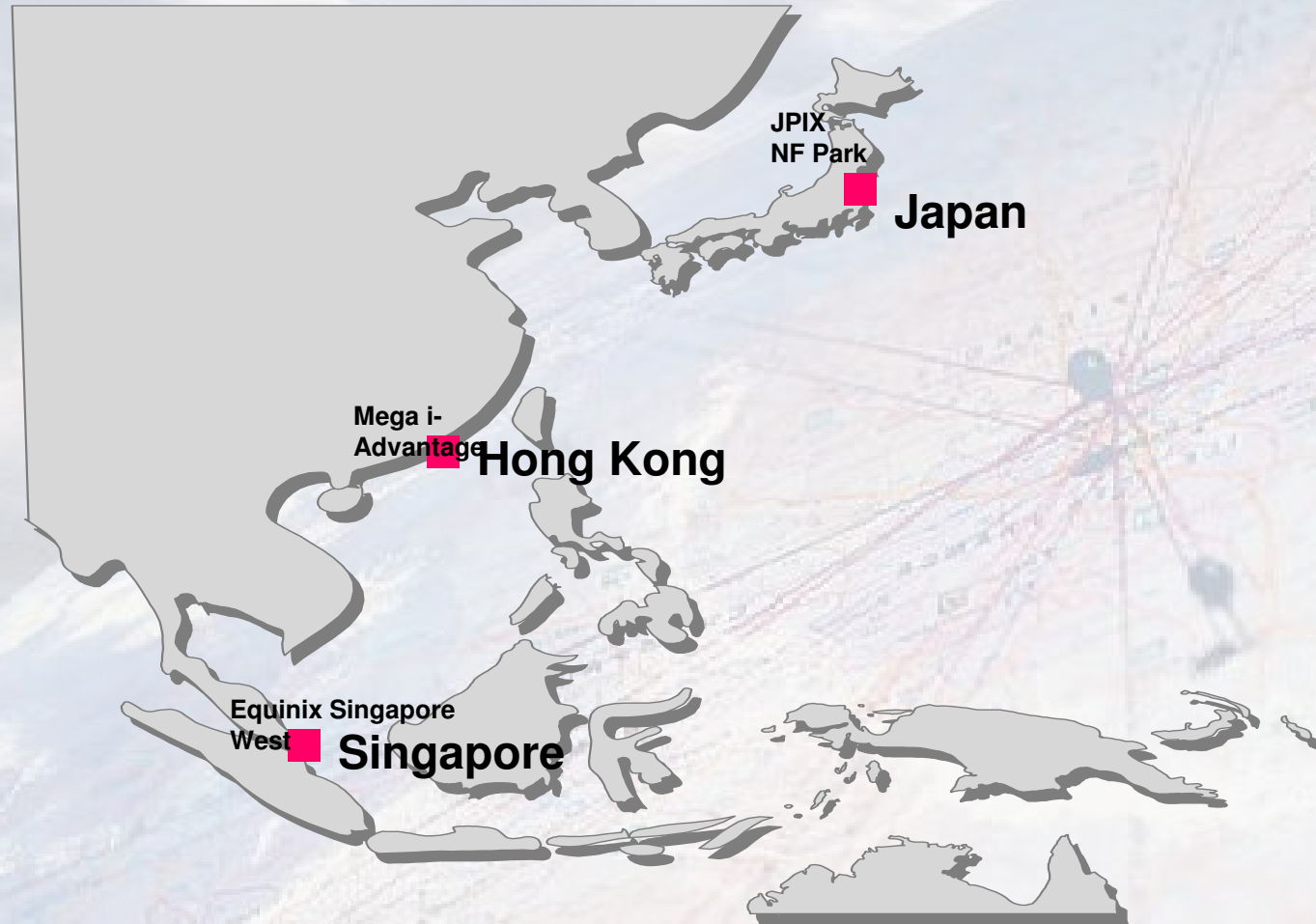


====!"§====Systems=

Asia IP Market Characteristics

- Some countries with liberalised markets but others not
- Diverse cultures and languages
 - Communities of interest based on language
 - Chinese language based content: China, Hong Kong, Taiwan
 - Others: Japan/Korea, Australia/New Zealand
 - High interest for US content
- Countries separated by sea
- Higher cost network infrastructure
 - Expensive sea cables to tie together countries

T-Systems in Asia



====!"§====Systems=

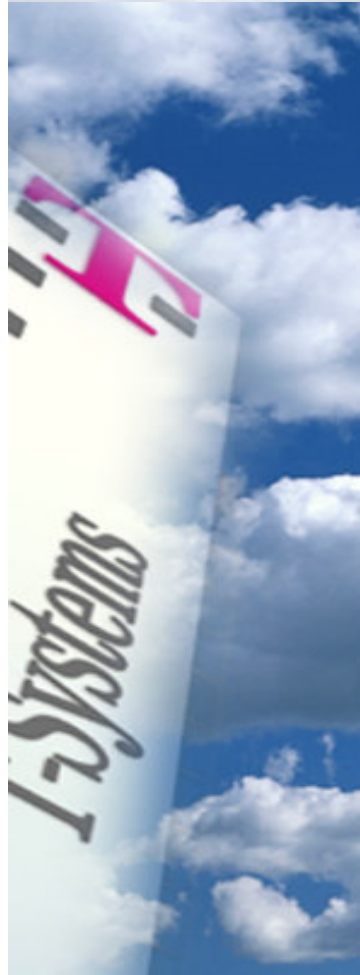
Why these Countries and Locations

Country

- Liberalised market
 - Flexibility to offer services
- Where other carriers are present
 - Allow interconnection to exchange traffic
 - Opportunity to sell services
- MNCs presence
- Cost of network infrastructure

Location

- Presence of voice carriers for trading
- Presence of ISPs to sell IP bandwidth
- Presence of carriers for peering



====!"§==Systems=

Peering Challenges (1)

- Intra-Asia traffic can route out of region when peering with Asia region ASes of global partners
 - Big Asian ISPs tend to interconnect on the US west coast, not Asia, with transit providers (i.e. regional AS for US)
 - Additional AS hop increases latency
- Careful traffic engineering when peering in multiple world regions with global partners under single ASes
 - Exchange significant US/Europe-bound traffic (from Asia) in the US/Europe, not in Asia
- Domestic/regional provider refuse to peer to maintain hold on local content and customers

====!"§==Systems=

Peering Challenges (2)

- Peering partner POP not in countries where T-Systems is present
 - Expensive IPL to connect to partner location
- Minimize high network infrastructure costs
 - Peer at major Internet exchanges
 - Optimize with few and/or cheaper port interface types
 - Sea cable paths to high value content
 - Avoid domestic peering via local loop

====!"§==Systems=

Peering Challenges

Network Infrastructure – Peering Location Considerations

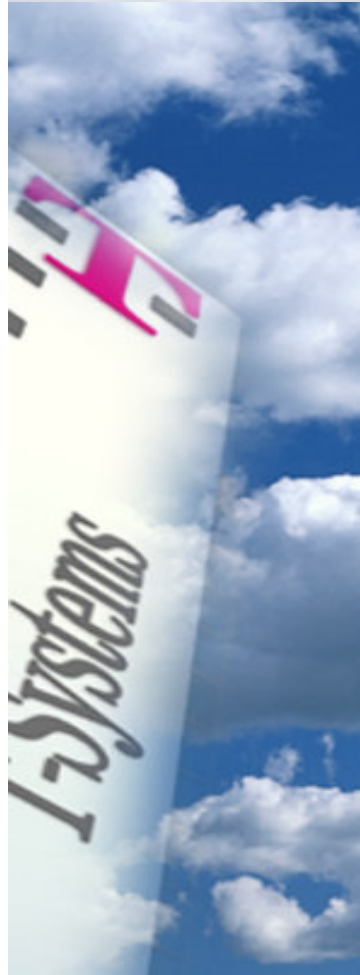
- Critical mass of peering targets
- Cost of private interconnection -- local loop, in-house fiber and/or cross-connect
- Cost of public Internet exchange
- Mandatory multi-lateral peering (“open peering policy”)
- Ability to consolidate traffic

====!"§==Systems=

Peering Challenges

Network Infrastructure – Optimize on Port Interface Types

- POS Interface
 - Not popular with smaller ISPs
 - Higher cost Interface card
 - Big ISPs use them if local loop is required
- Ethernet Interface
 - Favoured by smaller ISPs, broadband providers and content providers
 - Cheaper Interface card
 - Widely use within telehouses
- ATM
 - Popular in some parts of Asia
 - Consolidates multiple peerings/upstreams in a single link verses expensive individual local loops.
 - But high overhead on cell. Also single point of failure.

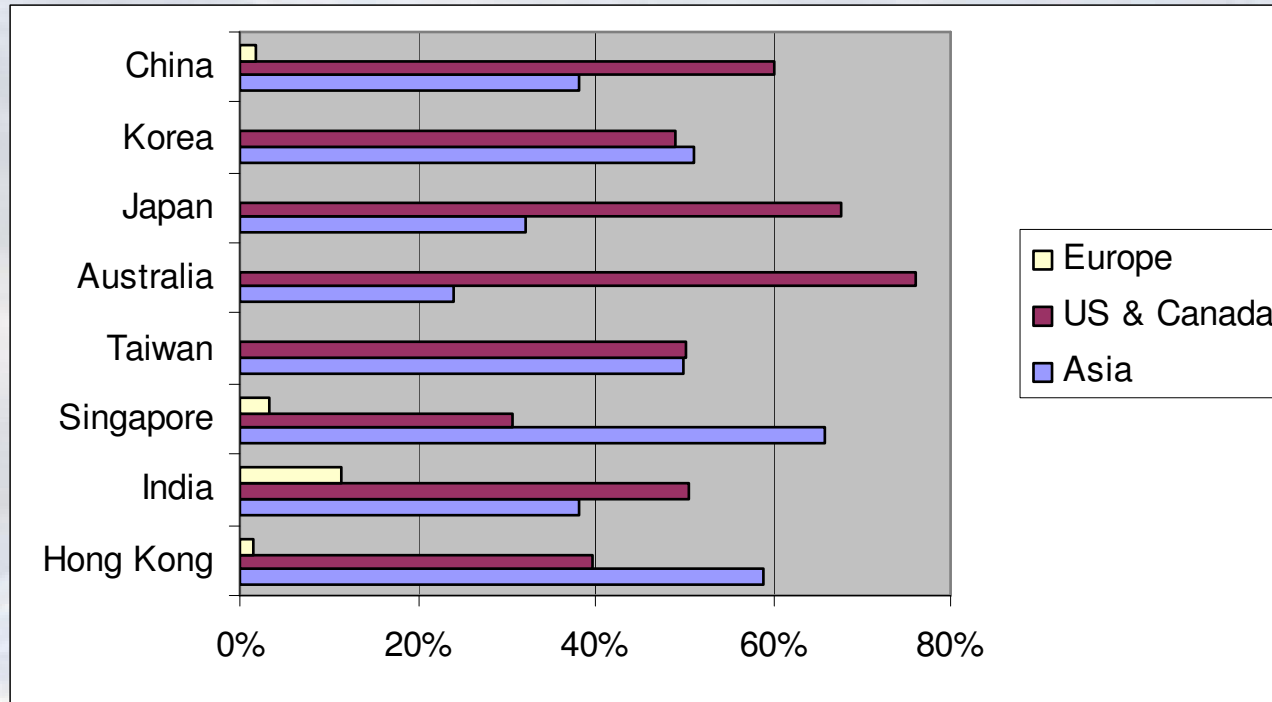


====!"§====-Systems-====
- Consider PVC cost in selecting ATM network provider

Peering Challenges

Network Infrastructure – Where is High Value Content?

(1)
Invested cable capacities to regions / countries



	Hong Kong	India	Singapore	Taiwan	Australia	Japan	Korea	China
Region								
Asia	58.90%	38.20%	66%	49.90%	24%	32.20%	51.10%	38.20%
US & Canada	39.60%	50.50%	30.60%	50.10%	76%	67.80%	48.90%	60.20%
Europe	1.50%	11.30%	3.40%	0.10%	0%	0.10%	0.10%	1.70%

* Result formulated using Telegeography Mid2002 Report on Internet Bandwidth Connection

Peering Challenges

Network Infrastructure – Where is High Value Content?

(2)

Cable capacity ranking from selected 8 Asian countries

*

Ranking	Countries
1	United States
2	Japan
3	Hong Kong
4	China
5	Singapore
6	Taiwan
7	korea
8	Australia

* Singapore, Hong Kong, China, Taiwan, India, Korea, Australia & Japan



It's not easy being the new kid on the block!

====!"§==Systems=

Thank you for your attention!

..... **T** System

Erasmus Ng

Manager, IP Products – Asia Pacific & Middle East

International Carrier Sales & Solutions

8 Shenton Way #10-01 Temasek Tower
Singapore 068811

Phone +65 63170598

E-mail: erasmus.ng@t-systems.com.sg