





Comparative Internet Survey: Romania, Bulgaria, Turkey

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Jim Cowie
cowie@renesys.com

@jimcowie
@renesys 

Romania, Bulgaria, Turkey: Internet Economies

	Domestic ASNs *	ASNs with Direct Int'l Connectivity	Routed IPv4 Prefixes	Population
	1,123	409 (36%)	9,402	21.3M (2012)
	459	157 (34%)	5,091	7.3M (2012)
	311	27 (8.7%)	9,572	74 M (2012)

* Source: Renesys Market Intelligence, February 2014

Romania, Bulgaria, Turkey: Largest Providers



AdNet Telecom (AS5541): 23% national on-net
Romtelecom (AS9050): 21% national on-net
RCS & RDS (AS8708): 10% national on-net



BTC (AS8866): 34% national on-net
Spectrum NET (AS8717): 18% national on-net
LIREX NET (AS8262): 13% national on-net



Turk Telekom (AS9121): 97% national on-net
Superonline/Tellcom (AS34984): 25% national on-net
Vodafone TR (AS15924): 6% national on-net

** Source: Renesys Market Intelligence, February 2014*

Financial Services and the “Diversity Gradient”



Let’s consider an important industry that consumes a lot of telecommunications services.



How do they connect to the Internet in these countries?

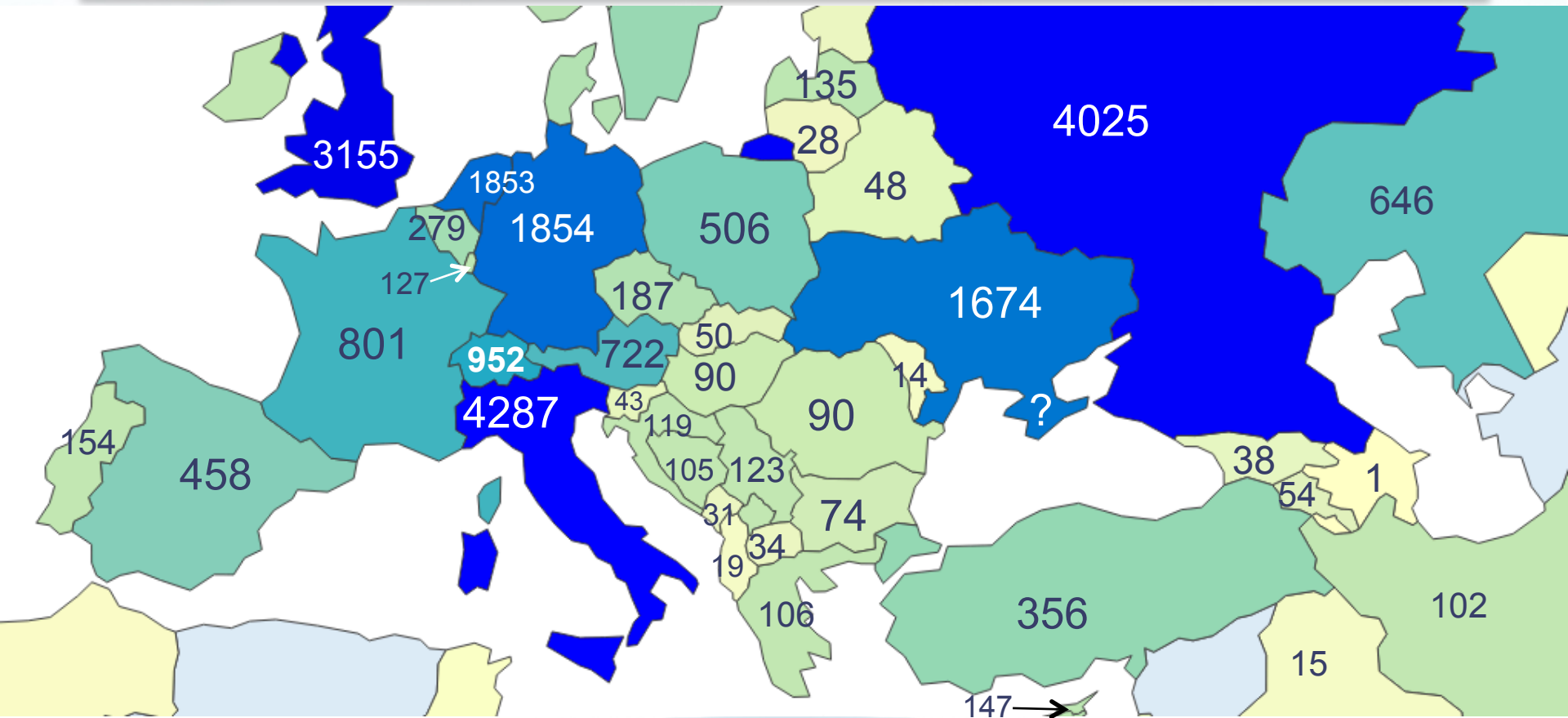


What does each country offer, in terms of competitive positioning for attracting investment in telecoms services?

Our Global Financial Services Model

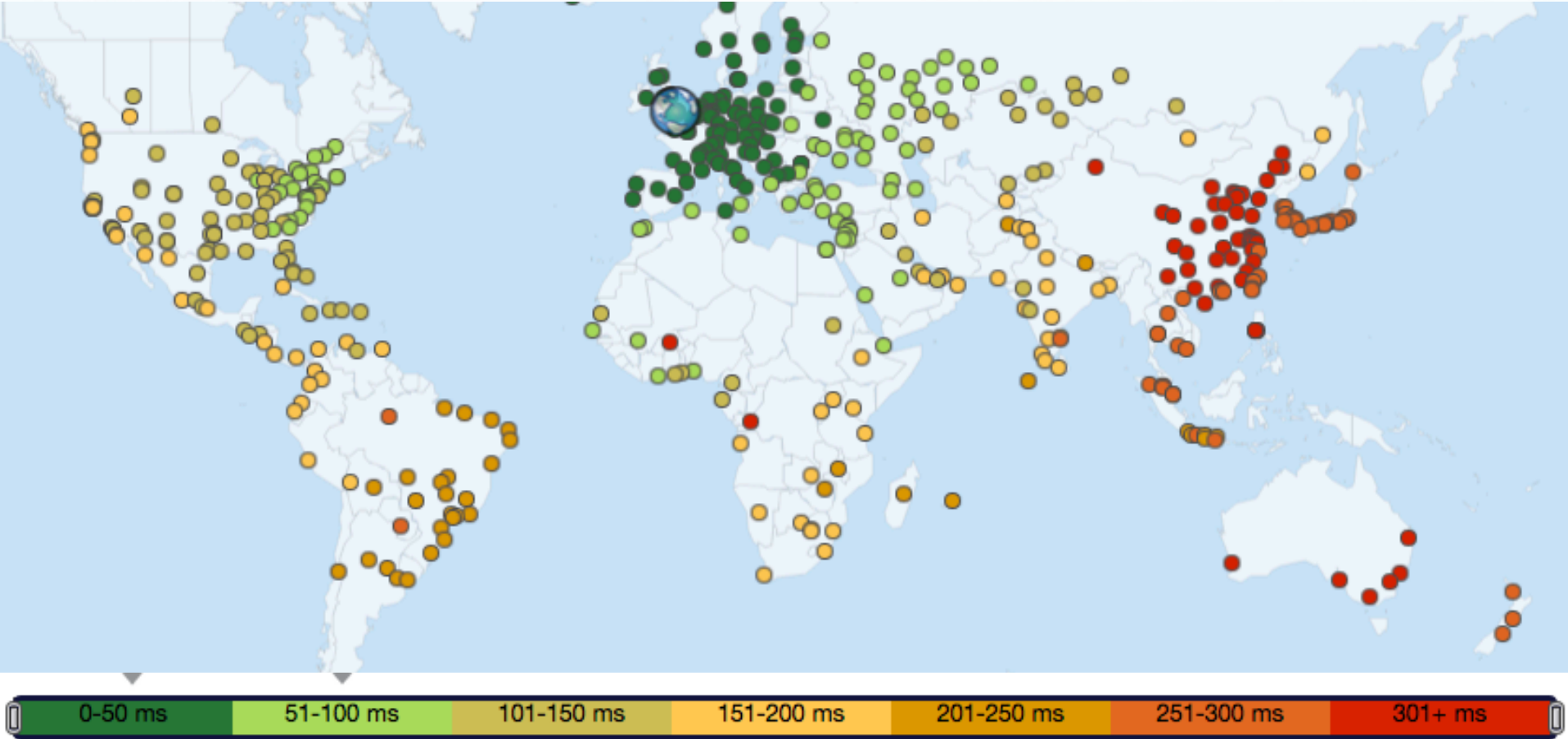
- Search registry data for registered IP prefixes and ASNs belonging to organizations with SWIFT codes, plus obvious keywords (e.g., *“bank”* and *“banc”*)
- Generate initial list of **27,863** IP blocks and **2,816** Autonomous Systems worldwide
- Folding in all originated IP blocks extends the base to **65,918** IP blocks (the “master list”)
- **36%** of these are in the USA
- **2.1% (roughly 1,400)** are in Southeast Europe

Distribution of Financial Services IP Blocks



Southeastern Europe: over 1400 financial blocks

Financial Service RTT Latencies from London

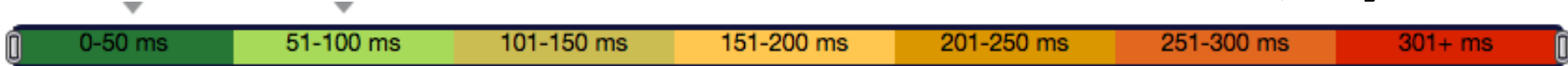


Financial Service RTT Latencies from London



The Danube marks the rough 50ms RTT horizon

100ms gets you to Cairo, Baku, Riyadh



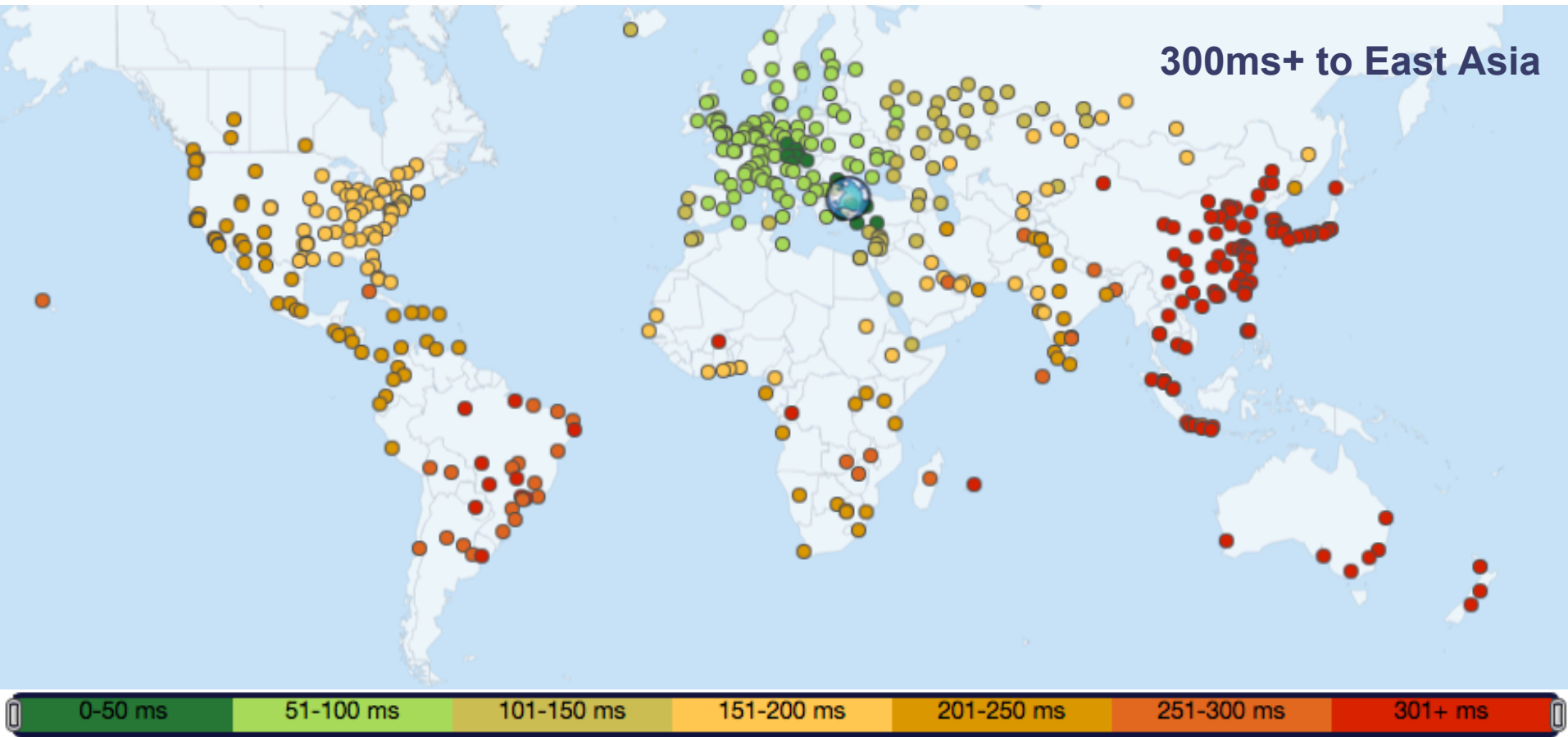
RTT Latencies from Istanbul

<50ms within Turkey, Germany

<100ms across Europe

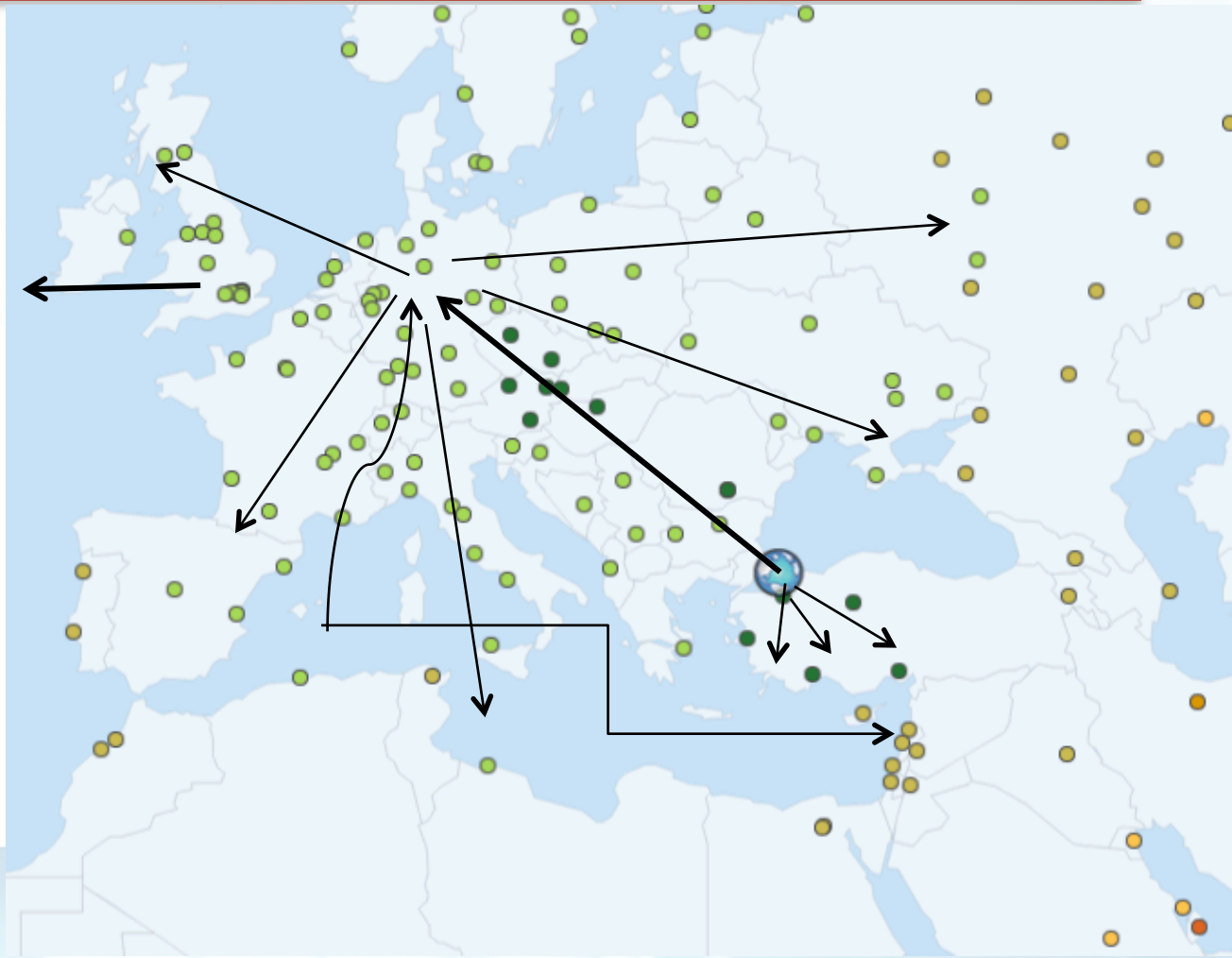
150-250ms to USA East/West

300ms+ to East Asia



RTT Latencies from Istanbul

- Latencies are lowest along the rough axis of fiber routes to European exchange points
- This is the common pattern found in many places
- Internet traffic does not necessarily follow shortest geographic paths



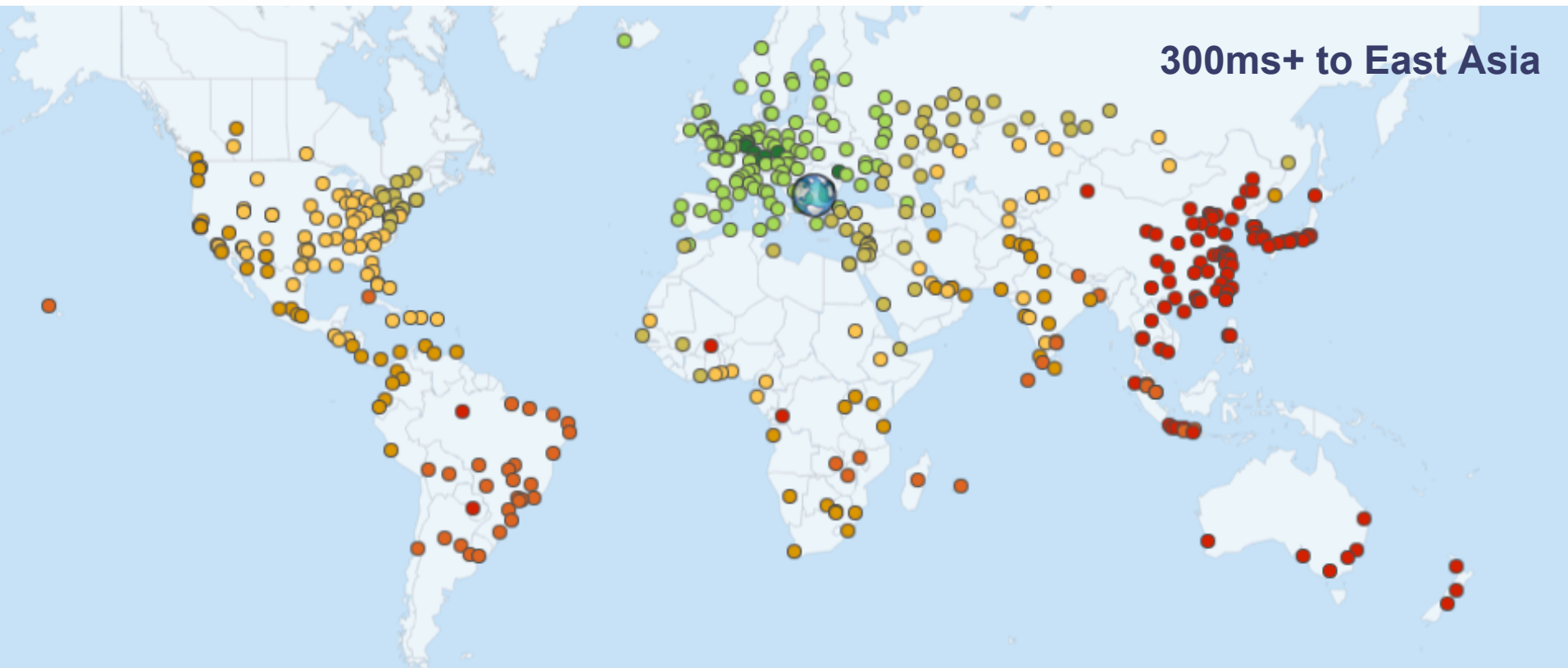
From Sofia: ~10ms closer to W. Europe

<50ms within Bulgaria, Germany

<100ms across Europe

100-250ms to USA East/West

300ms+ to East Asia

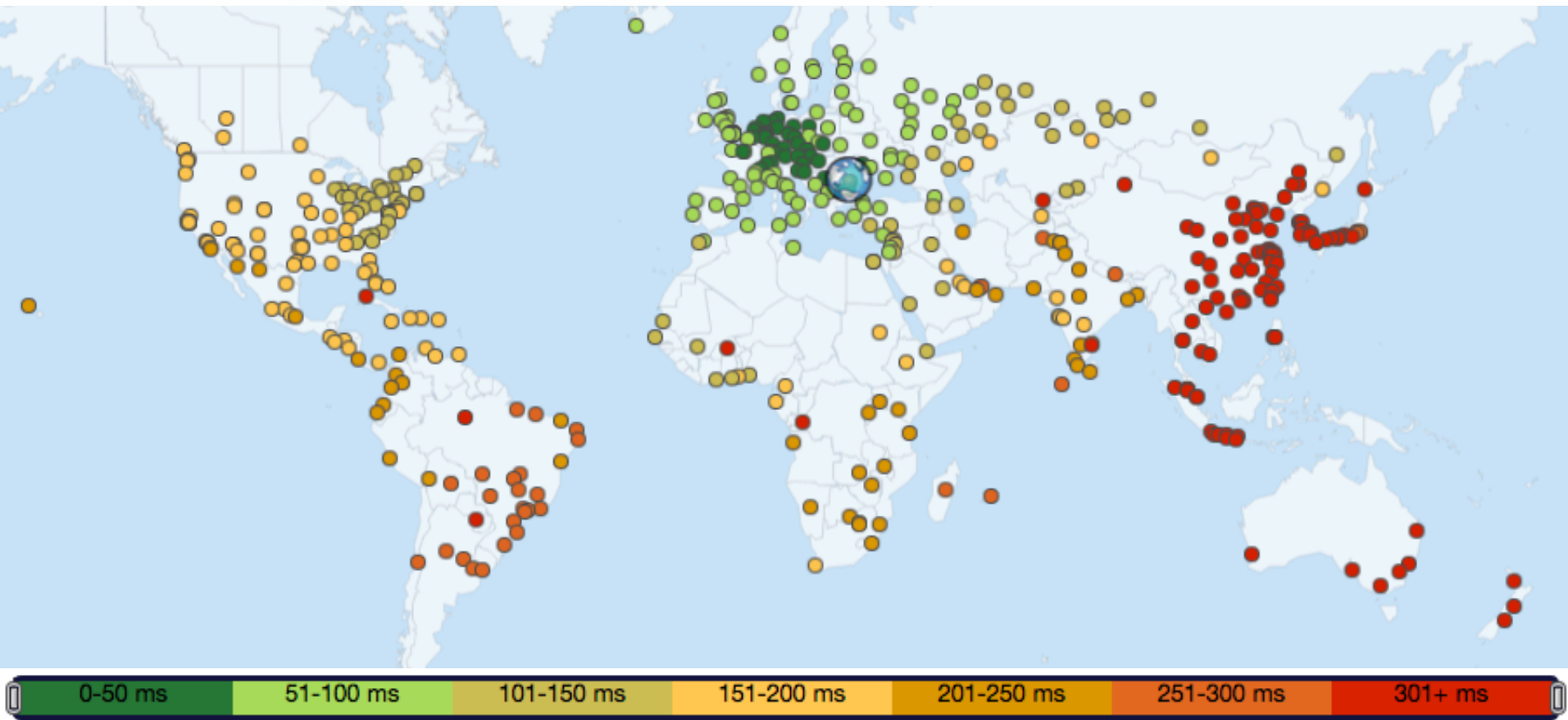


From Bucharest: ~8ms closer yet

150ms as far as Chicago, Atlanta

<200ms to SFO, SEA

<50ms across much more of Europe



Bucharest faster than Sofia; Sofia faster than Istanbul



- Much more of the continent available within 50ms
- North Africa, Israel, Lebanon coming within 100ms
- **In the absence of alternative routes, closest to Europe means closest to global content.**

0-50 ms

51-100 ms



101-150 ms

151-200 ms


201-250 ms

251-300 ms

301+ ms

 Turkey
Data from:  Friday, April 11, 2014
 > Turkey > Geographic Network Topology

Geographic Network topology

Update topology map 

Selection

Cities/Provinces

AS Organizations

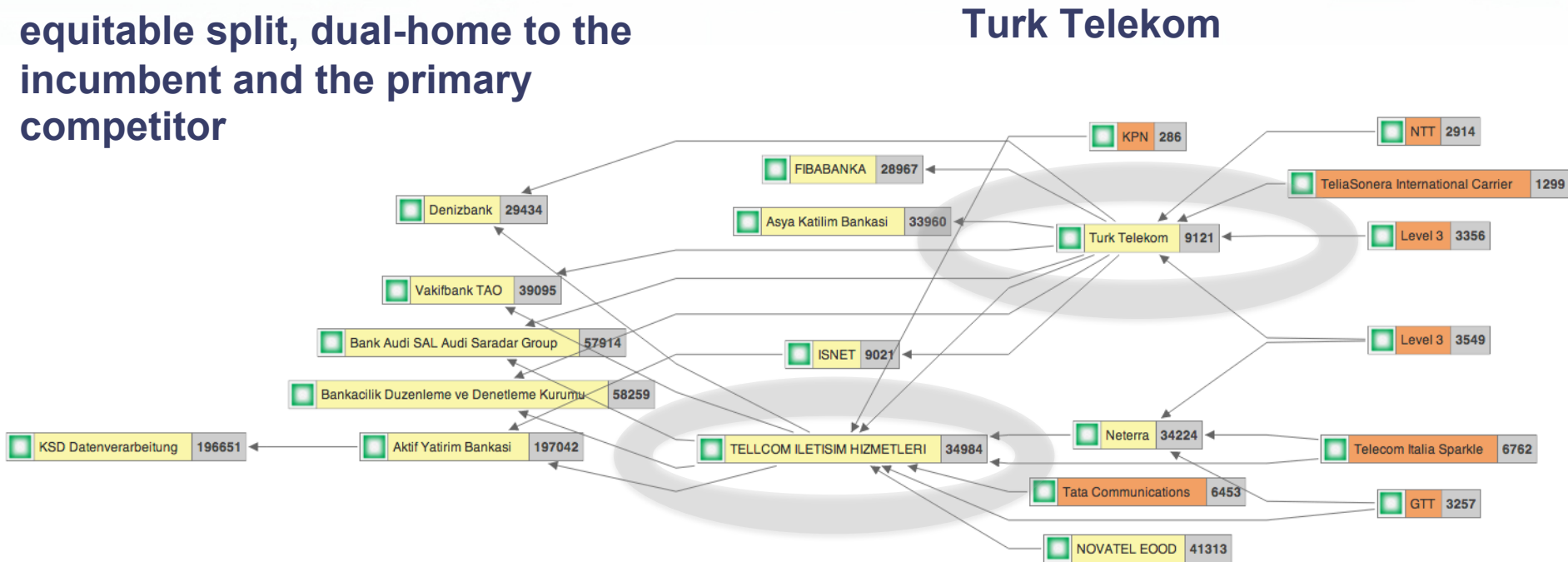
Filter:

- 12794 AKBANK TAS
- 197042 Aktif Yatirim Bankasi
- 41735 Albaraka Turk Katilim Bankasi
- 8947 AnadoluBank
- 197386 ARAP TURK ANONIM BANKASI
- 33960 Asya Katilim Bankasi
- 57914 Bank Audi SAL Audi Saradar Group
- 33830 Bankalararasi Kart Merkezi
- 43210 Bankpozitif Kredi Ve Kalkinma Bankasi
- 62187 CREDITWEST BANK
- 29434 Denizbank
- 42701 Deutsche Bank TR
- 31645 Eurobank Tekfen
- 28967 FIBABANKA
- 8831 FINANSBANK
- 12729 HSBC BANK
- 34403 ING BANK
- 60596 KIBRIS TURK KOOPERATIF MERKEZ BAN
- 35185 Kuveyt Turk Katilim Bankasi
- 28865 Sekerbank Turk
- 58109 STARCARD BANKA KARTLARI MERKEZI
- 29549 T.C. Ziraat Bankasi
- 2600 TEKSTILBANK
- 13138 Turk Ekonomi Bankasi
- 42421 Turkiye Finans Katilim Bankasi
- 20967 TURKIYE HALKBANKASI
- 49027 Turkiye Sinai Kalkinma Bankasi
- 39095 TURKIYE VAKIFLAR BANKASI
- 38920 Turkland Bank
- 25323 YAPI VE KREDI BANKASI
- 199333 Yapi ve Kredi Bankasi Genel Mudurluk



Turkey – Ankara : Competition in Evidence

Banks with ASNS maintain equitable split, dual-home to the incumbent and the primary competitor



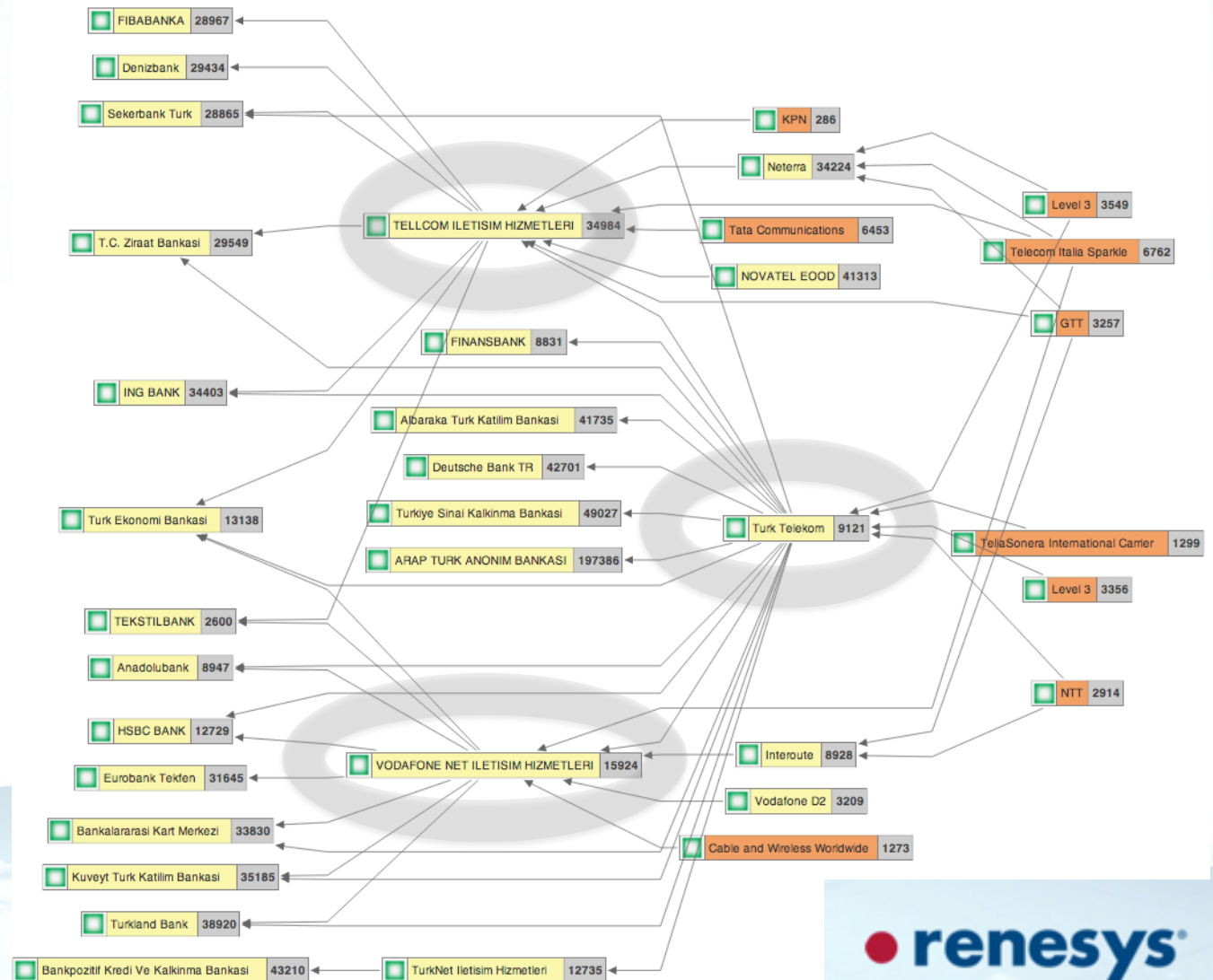
Tellcom/SuperOnline with Tata + Bulgarian transit to Western Europe

Turkey – Istanbul: Three-Way Competition

Tellcom/
Superonline

Turk Telekom

Vodafone/
Cable &
Wireless



Geographic Network topology

Update topology map

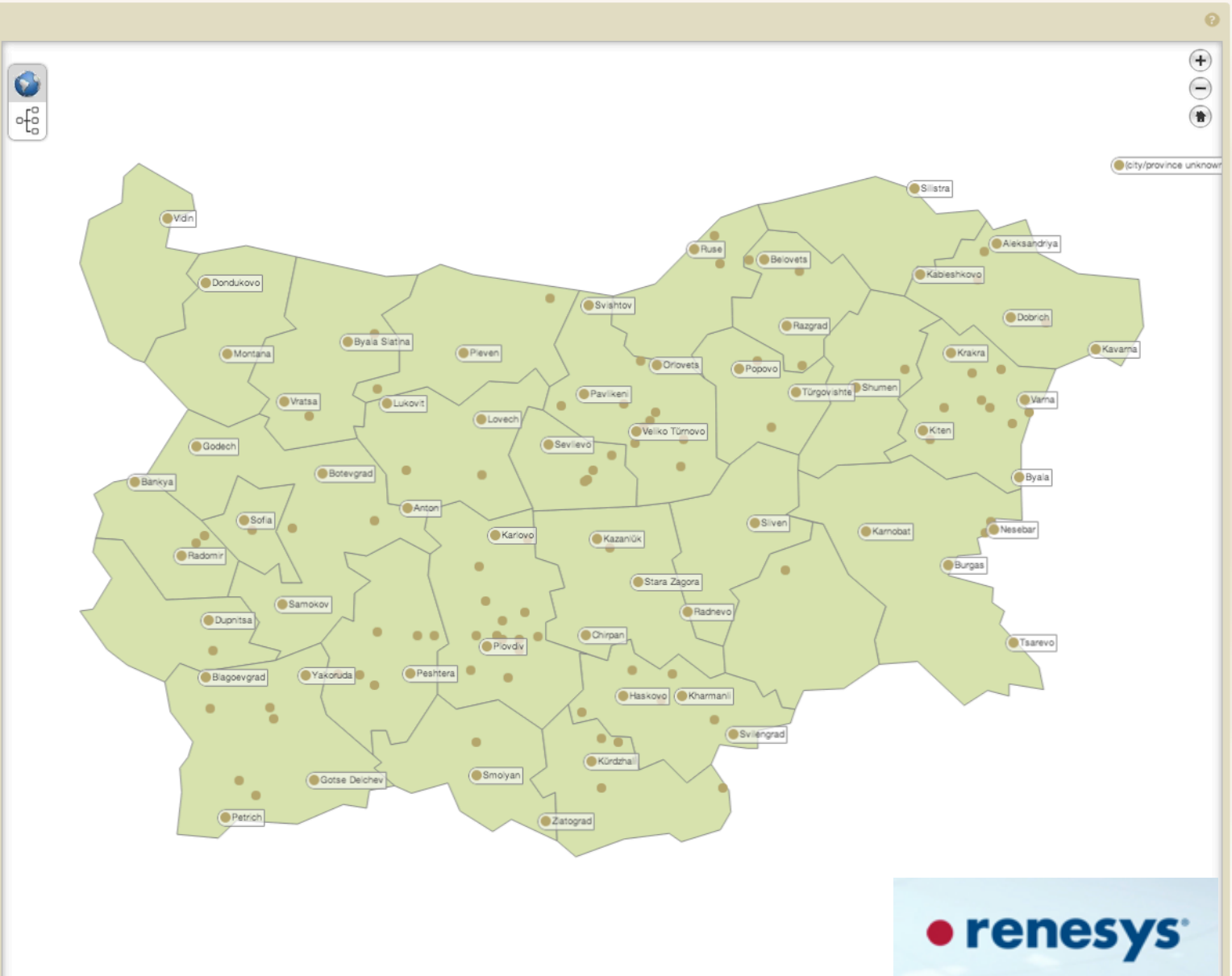
Selection

Cities/Provinces

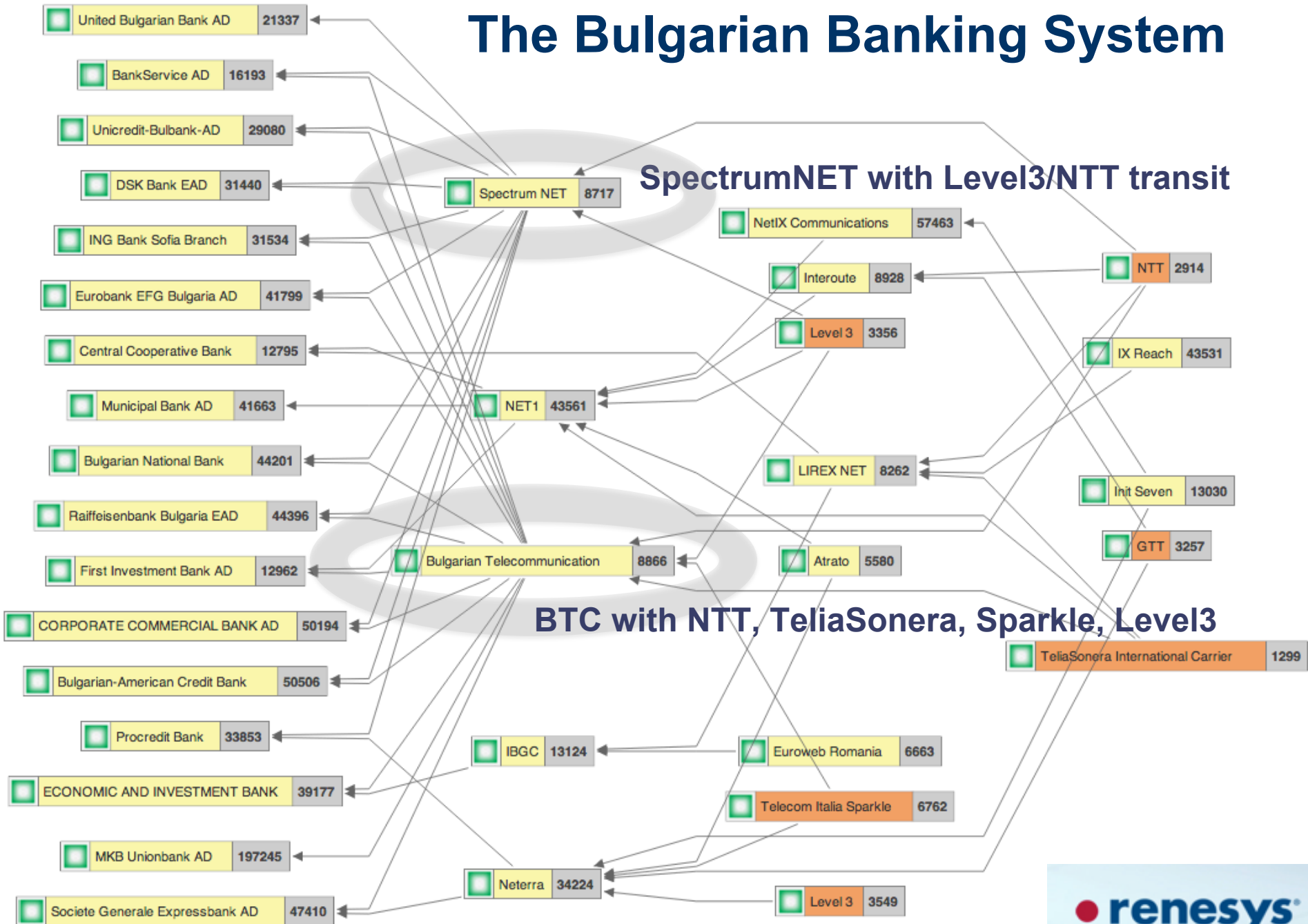
AS Organizations

Filter: bank

- 16193 BankService AD
- 44201 Bulgarian National Bank
- 50506 Bulgarian-American Credit Bank
- 12795 Central Cooperative Bank
- 50194 CORPORATE COMMERCIAL BANK AD
- 31440 DSK Bank EAD
- 39177 ECONOMIC AND INVESTMENT BANK
- 41799 Eurobank EFG Bulgaria AD
- 12962 First Investment Bank AD
- 31534 ING Bank Sofia Branch
- 197245 MKB Unionbank AD
- 41663 Municipal Bank AD
- 33853 Procredit Bank
- 44396 Raiffeisenbank Bulgaria EAD
- 47410 Societe Generale Expressbank AD
- 29080 Unicredit-Bulbank-AD
- 21337 United Bulgarian Bank AD



The Bulgarian Banking System



Romania

Data from: Friday, April 11, 2014

Romania > Geographic Network Topology

Geographic Network topology

Update topology map

Selection

Cities/Provinces

AS Organizations

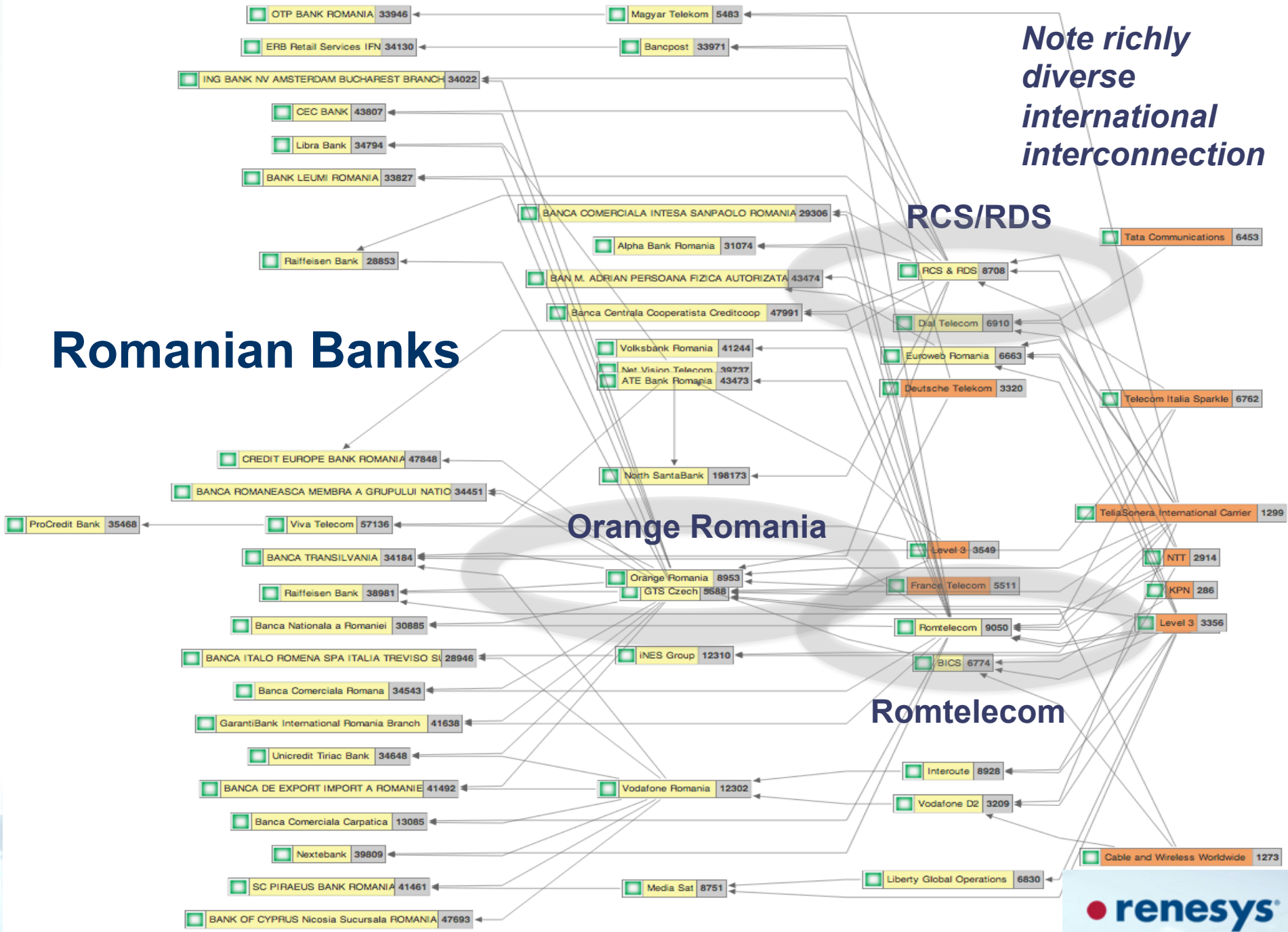
Filter: ban

- 31074 Alpha Bank Romania
- 43473 ATE Bank Romania
- 43474 BAN M. ADRIAN PERSOANA FIZICA AUTOC
- 20532 BANANA HOSTING
- 47991 Banca Centrala Cooperatista Creditcoop
- 13085 Banca Comerciala Carpatica
- 29306 BANCA COMERCIALA INTESA SANPAOLO
- 34543 Banca Comerciala Romana
- 41492 BANCA DE EXPORT IMPORT A ROMANIEI
- 28946 BANCA ITALO ROMENA SPA ITALIA TREVI
- 30885 Banca Nationala a Romaniei
- 34451 BANCA ROMANEASCA MEMBRA A GRUPULUI
- 34184 BANCA TRANSILVANIA
- 33971 Bancpost
- 33827 BANK LEUMI ROMANIA
- 47693 BANK OF CYPRUS Nicosia Sucursala ROMANIA
- 43807 CEC BANK
- 47848 CREDIT EUROPE BANK ROMANIA
- 41638 GarantiBank International Romania Branch
- 34022 ING BANK NV AMSTERDAM BUCHAREST
- 49774 Interlink Banat
- 34794 Libra Bank
- 39809 Nextebank
- 198173 North SantaBank
- 33946 OTP BANK ROMANIA
- 35468 ProCredit Bank
- 28853 Raiffeisen Bank
- 38981 Raiffeisen Bank
- 41461 SC PIRAEUS BANK ROMANIA
- 34648 Unicredit Tiriac Bank
- 41244 Volksbank Romania



Romanian Banks

Note richly diverse international interconnection



Concluding Observations

- Latencies to US/European Content grow as you cross Southeast Europe (speed of light)
- International provider diversity and domestic Internet market diversity follow same gradient
- Risks of disconnection appear to vary inversely with the degree of market diversity
- Financial services are a good example of an industry that is latency-sensitive and risk-averse
- Turkey has to work hard to overcome slight natural disadvantage of geography, but is key to future development of Middle East region

Thank you!

Teşekkürler!

Муğумим!

благодаря!

Jim Cowie
cowie@renesys.com

@jimcowie
@renesys

