Broadband DSL Technology
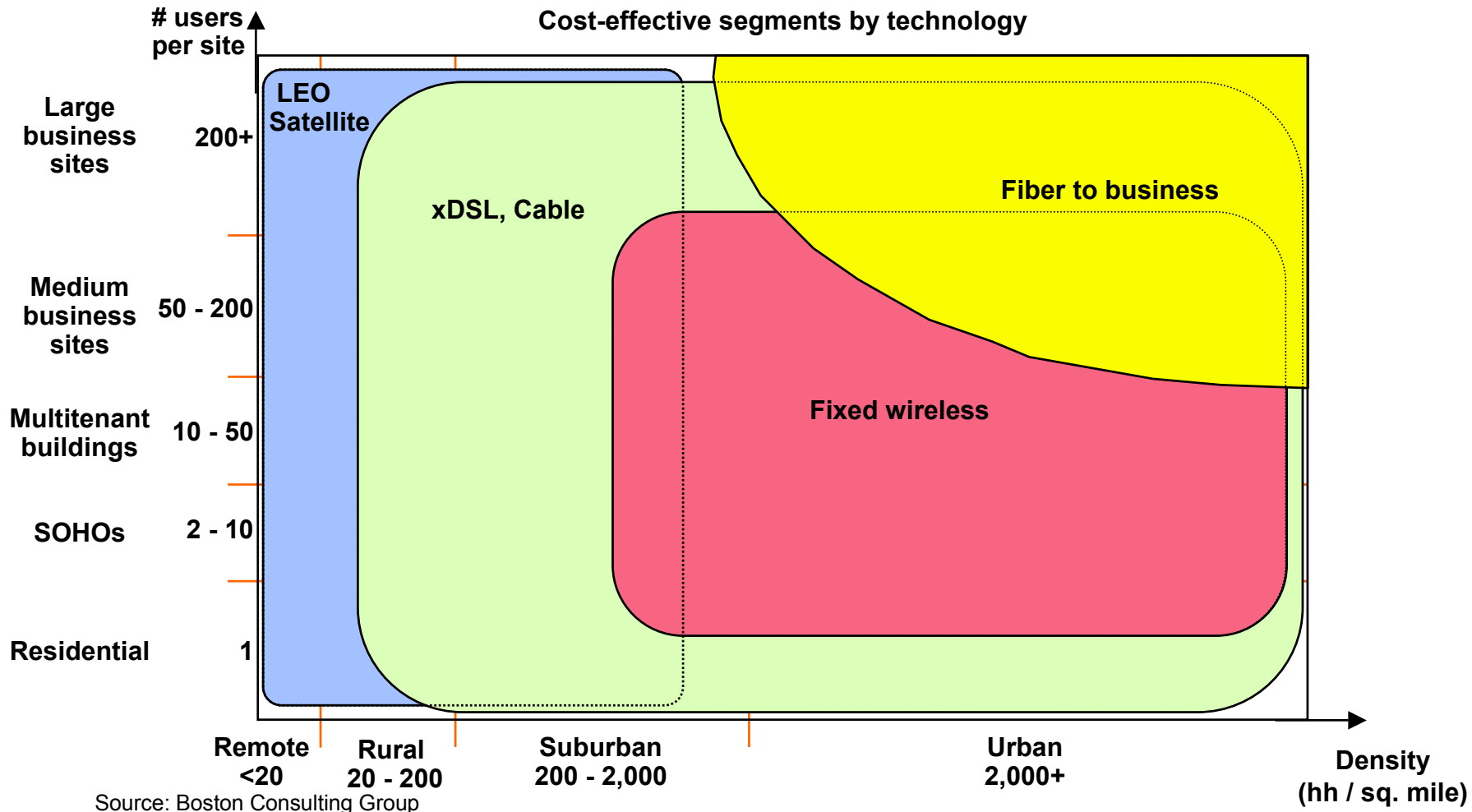
Friedrich Kiel
Solutions Marketing Manager
Germany
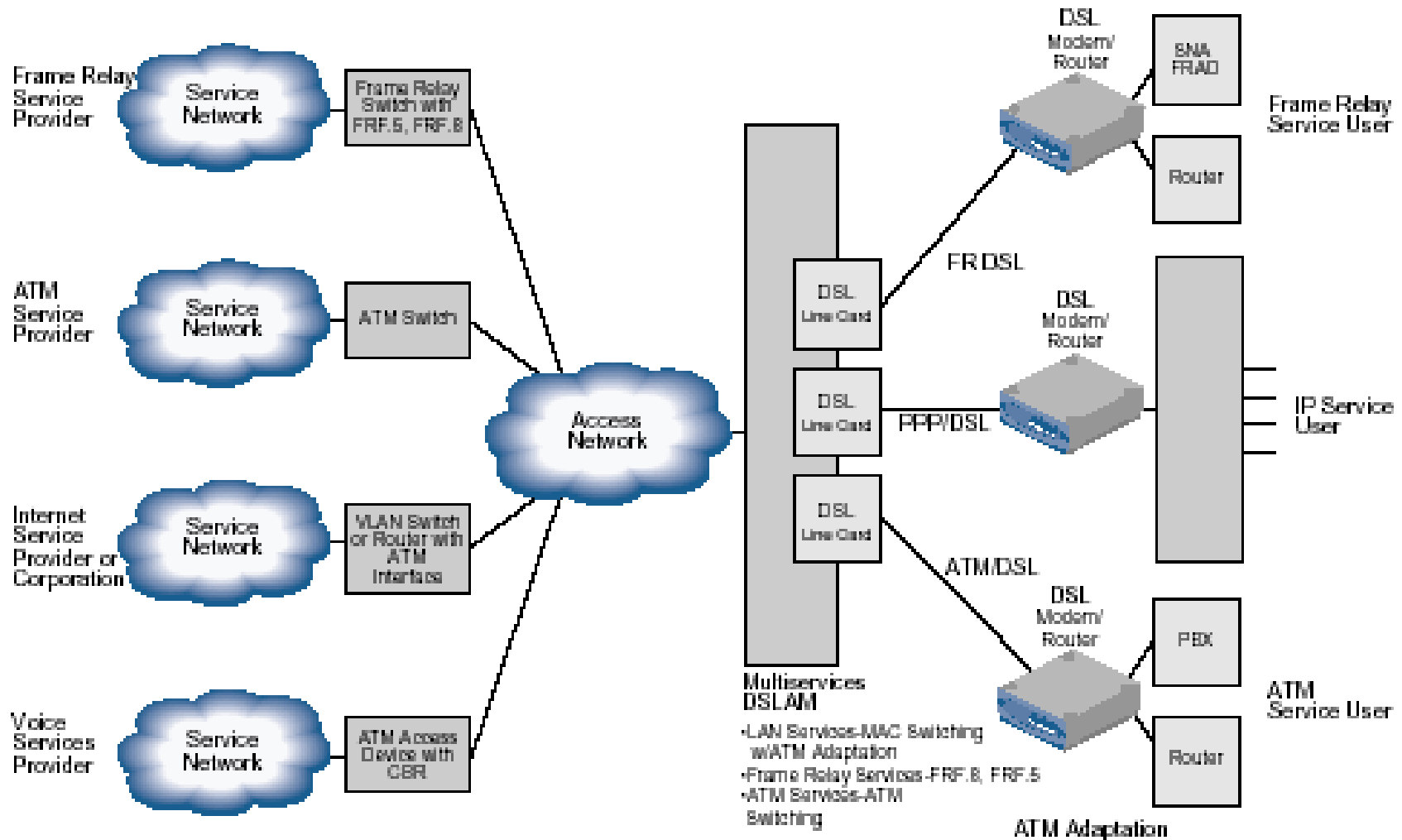
Content

> Positioning of DSL as access technology

> Macro trends in the broadband market

> Broadband multi service reference model

> DSL types and their potential

> Drivers for DSL

> Creating business with DSL in a stepwise approach

> DSL Market potential

> Conclusion

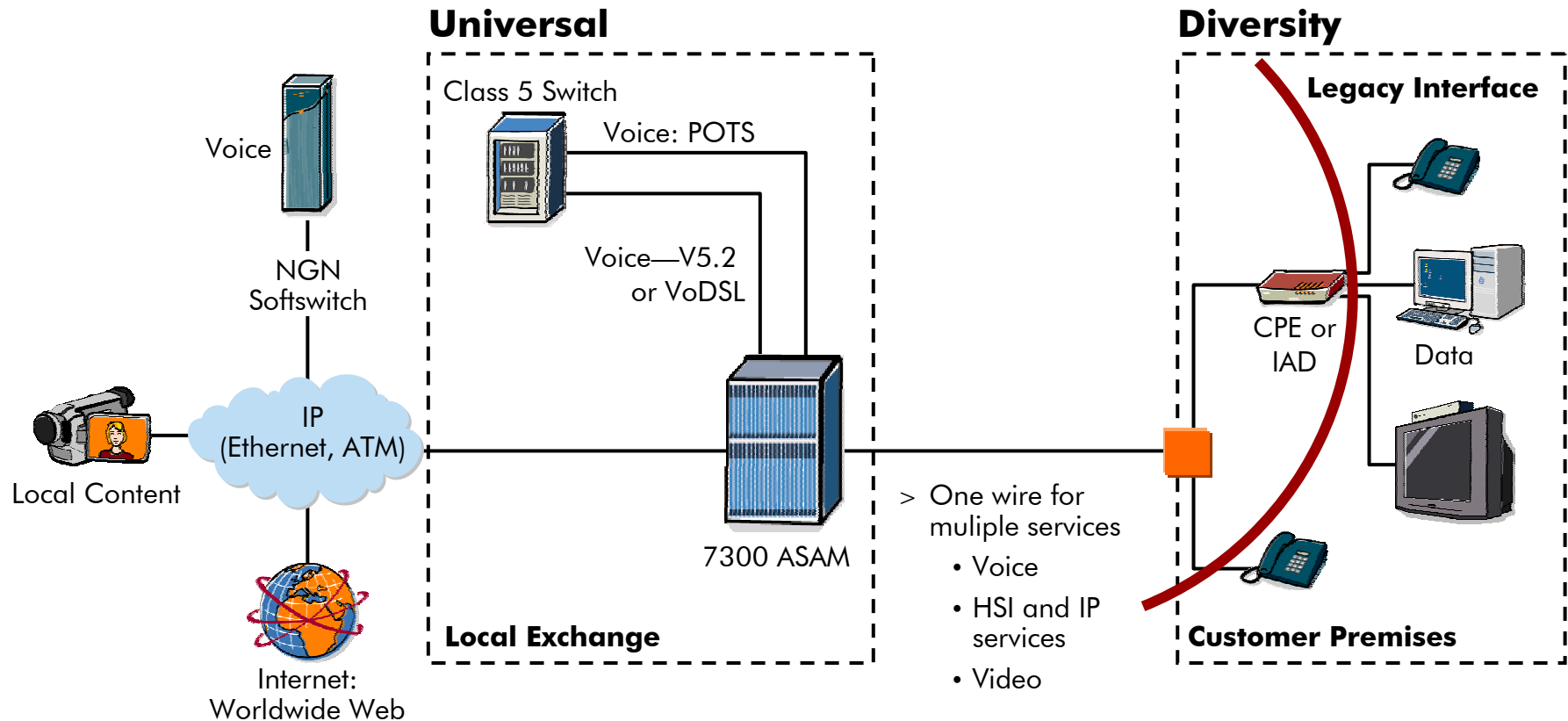**ALCATEL**

Positioning of DSL wrt.Technology Cost-Effectiveness

Cost-effective segments by technology

users per site

- Large business sites — 200+
- Medium business sites — 50 - 200
- Multitenant buildings — 10 - 50
- SOHOs — 2 - 10
- Residential — 1

LEO Satellite

xDSL, Cable

Fiber to business

Fixed wireless

Remote <20   Rural 20 - 200   Suburban 200 - 2,000   Urban 2,000+

Density (hh / sq. mile)

Source: Boston Consulting Group

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DSL based Multi Service Reference Model

Source: The DSL Sourcebook, Paradyne 2000

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Access Convergence
Towards the Universal DSLAM: Triple-play Services and NGN Networks

Universal

Diversity

Class 5 Switch

Voice: POTS

Legacy Interface

Voice

NGN
Softswitch

Voice—V5.2
or VoDSL

Voice

IP
(Ethernet, ATM)

CPE or
IAD

Data

Local Content

7300 ASAM

> One wire for
muliple services

• Voice

• HSI and IP
services

• Video

Local Exchange

Customer Premises

Internet:
Worldwide Web

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DSL Variants and their potential

Reach in km

| | 0 | 1.5 | 3 | 4.5 | 6 | 7,5 | 10 | 11,5 |

ADSL+ — Up to 10 Mbps

ADSL — Up to 8 Mbps

ADSL-Lite

SDSL

IDSL

*HDSL

HDSL-2

VDSL — 13 - 52 Mbps

Downstream
Upstream
Reach

Transmission speed in Mb/s

0   0.5   1   1.5   2   2.5   3   3.5
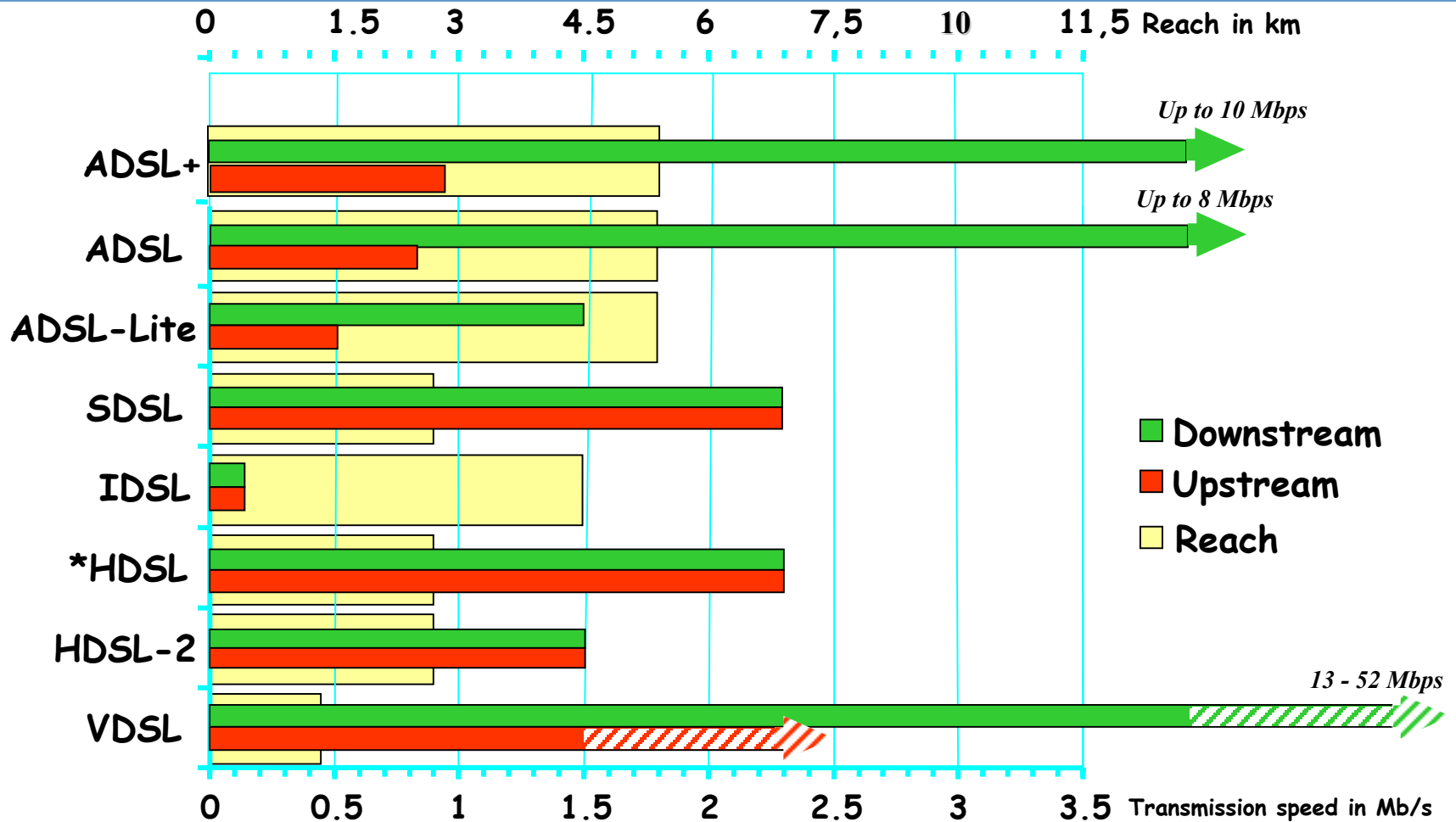
* needs 2 pairs of copper lines,
all other 1 .

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Drivers for DSL: More Capacity and Speed Required

1.5 Mbps

Tele-working
VideoConferencing
Tele or E-Learning
Tele-medicine
Video Telephony
Near VoD
Movies-on-demand
Audio-on-demand
Telegames
Home Shopping
Electronic Banking
Elect. Newspaper
Digital TV

10   100   1000   10000

Kilobits/second
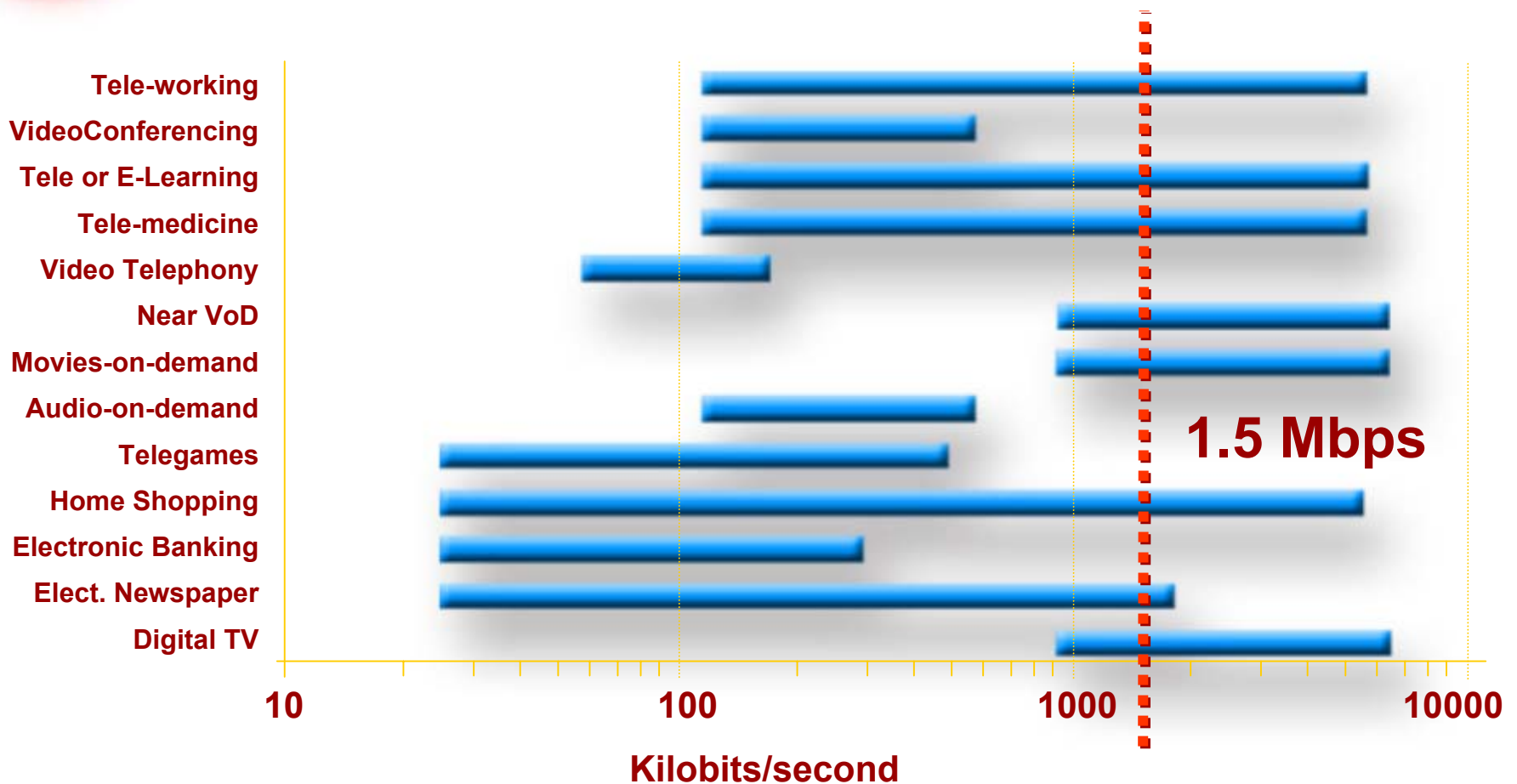
Source: PlannedapproachInc.com

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> **Three revenue streams in DSL deployment**

- High speed Internet access (limited by # of on-line households)
- Business access (SOHO/SME)
- Residential multimedia (gaming/video/entertainment)

TIME
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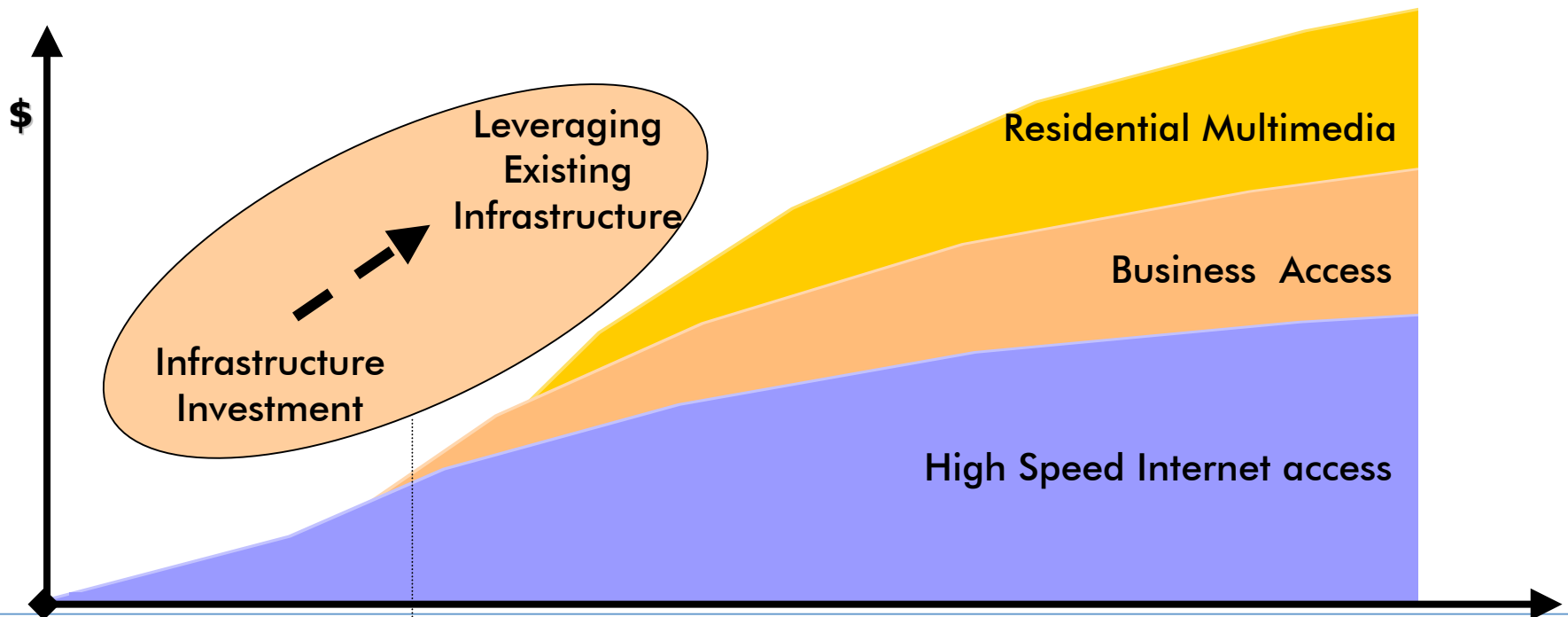
STEP 1: Expand on high speed internet access

> WHY

- Internet access is greenfield for all players, low step-in barriers
- Able to build on existing voice client base
  - *ADSL* can reach *more than 70%* of the voice customer base of most Western European countries
- Potential market coverage of 30% by 2004 (McKinnsey)
- *ADSL installed base* can be leveraged to make *incremental* business case for multimedia
- Once market leader, always market leader (cfr. Mobile)
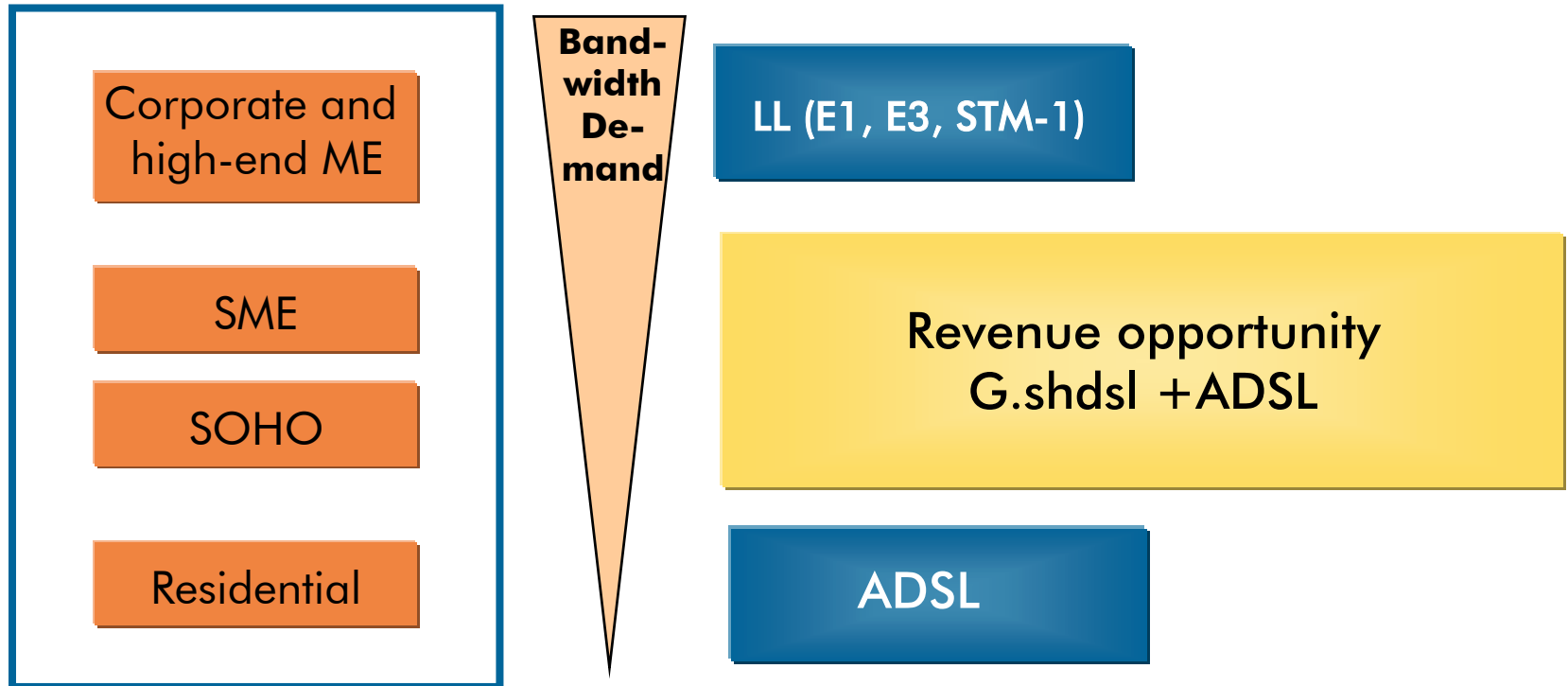
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High Speed Internet access

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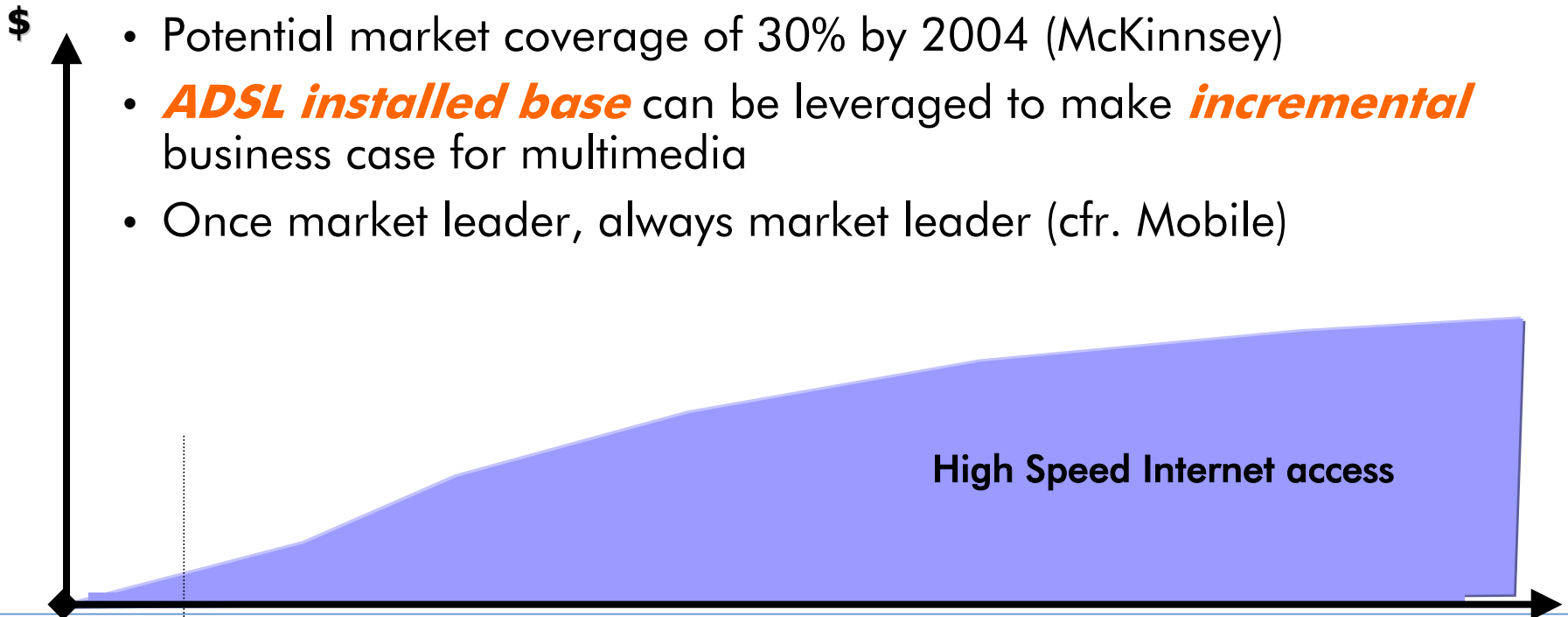
> Business Access ADSL is ideal to address underserverd SME market

- Incremental cost on residential ADSL installed base is small
  - Major revenue opportunity with limited investments
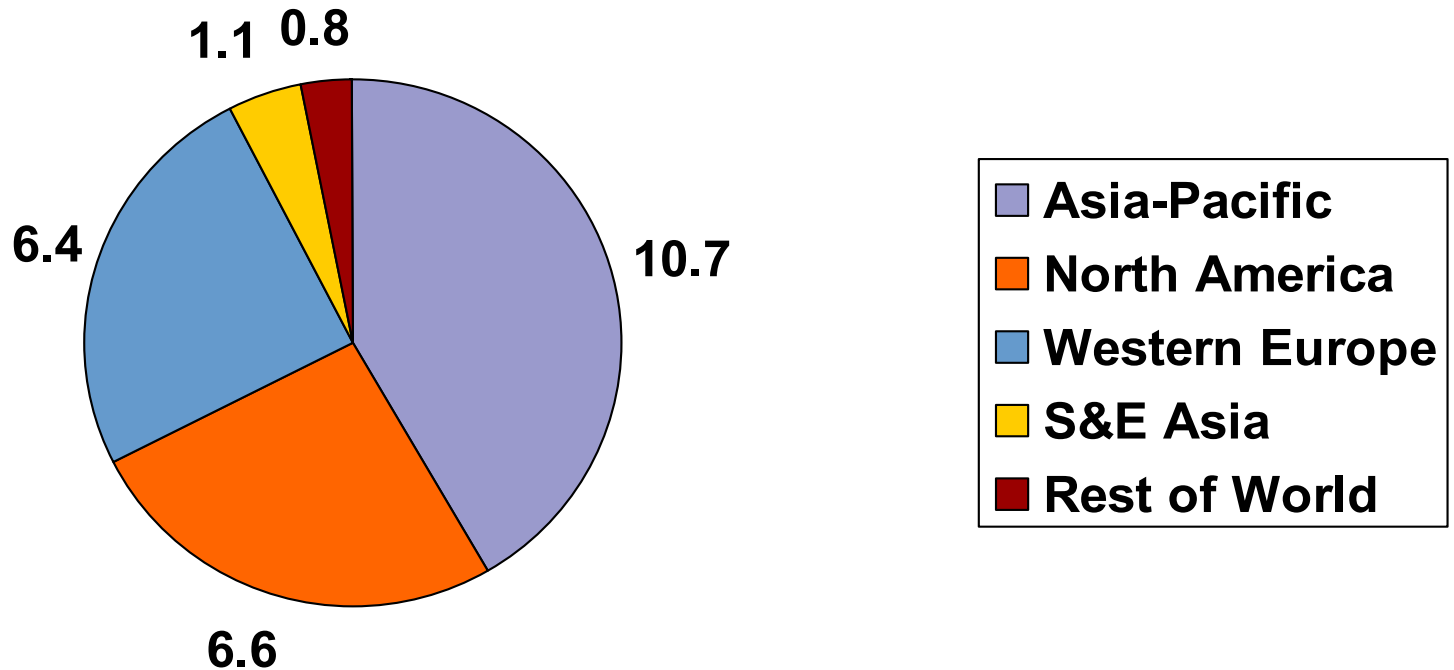- Same footprint provides increased ARPU

$

Business Access

High Speed Internet Access

TIME

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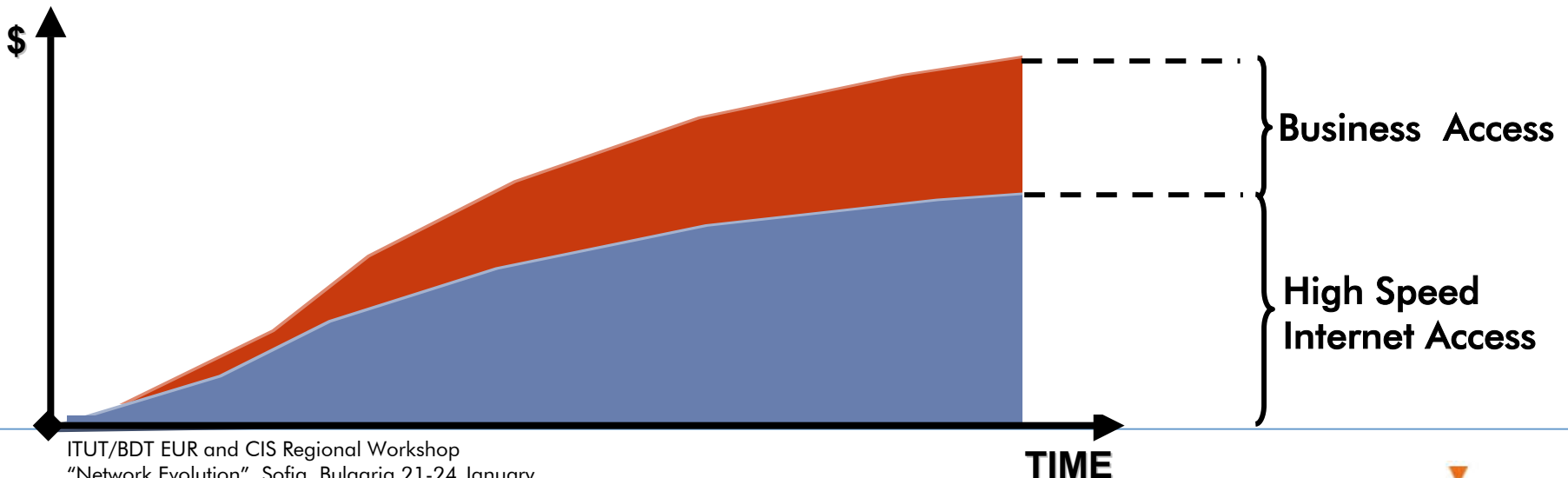
Addressing the SME Market with xDSL
Filling the Gap

Service Provider Market Segmentation

Corporate and high-end ME
SME
SOHO
Residential

Band-width De-mand

LL (E1, E3, STM-1)

Revenue opportunity G.shdsl +ADSL

ADSL

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2002: 25.5m installed DSL lines worldwide

1.1 **0.8**

6.4

10.7

6.6

Legend:
- Asia-Pacific
- North America
- Western Europe
- S&E Asia
- Rest of World

Source: Point Topic

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DSL growth took off in the last two years
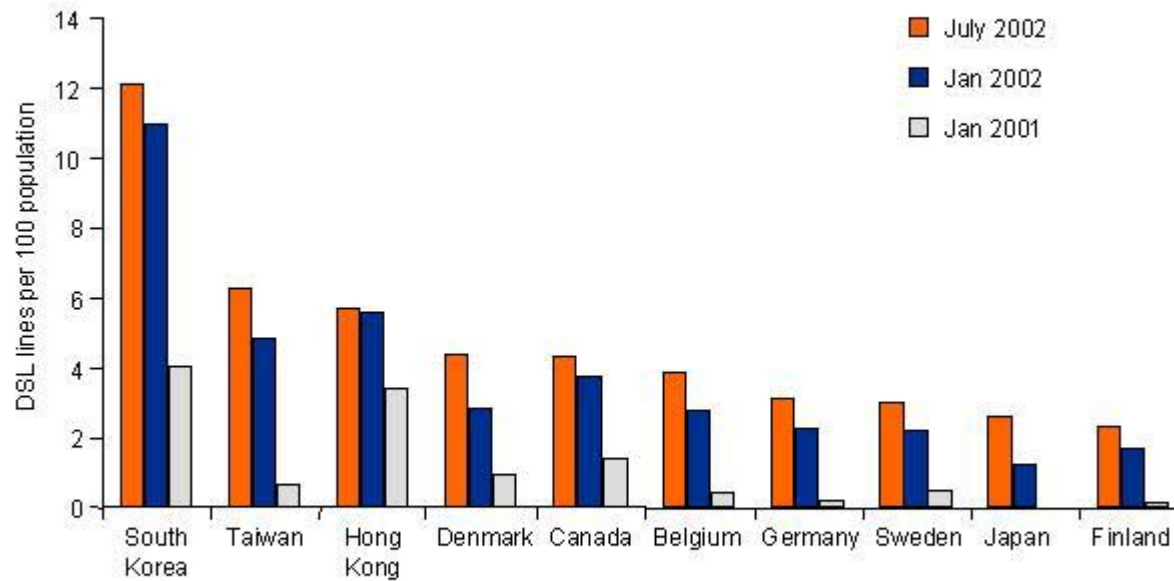
Source: point-topic.com

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Countries take turns to take off

Chart: Million DSL lines by quarter (Q4 1999 – Q2 2002)

Legend:
- USA
- Germany
- South Korea
- Japan

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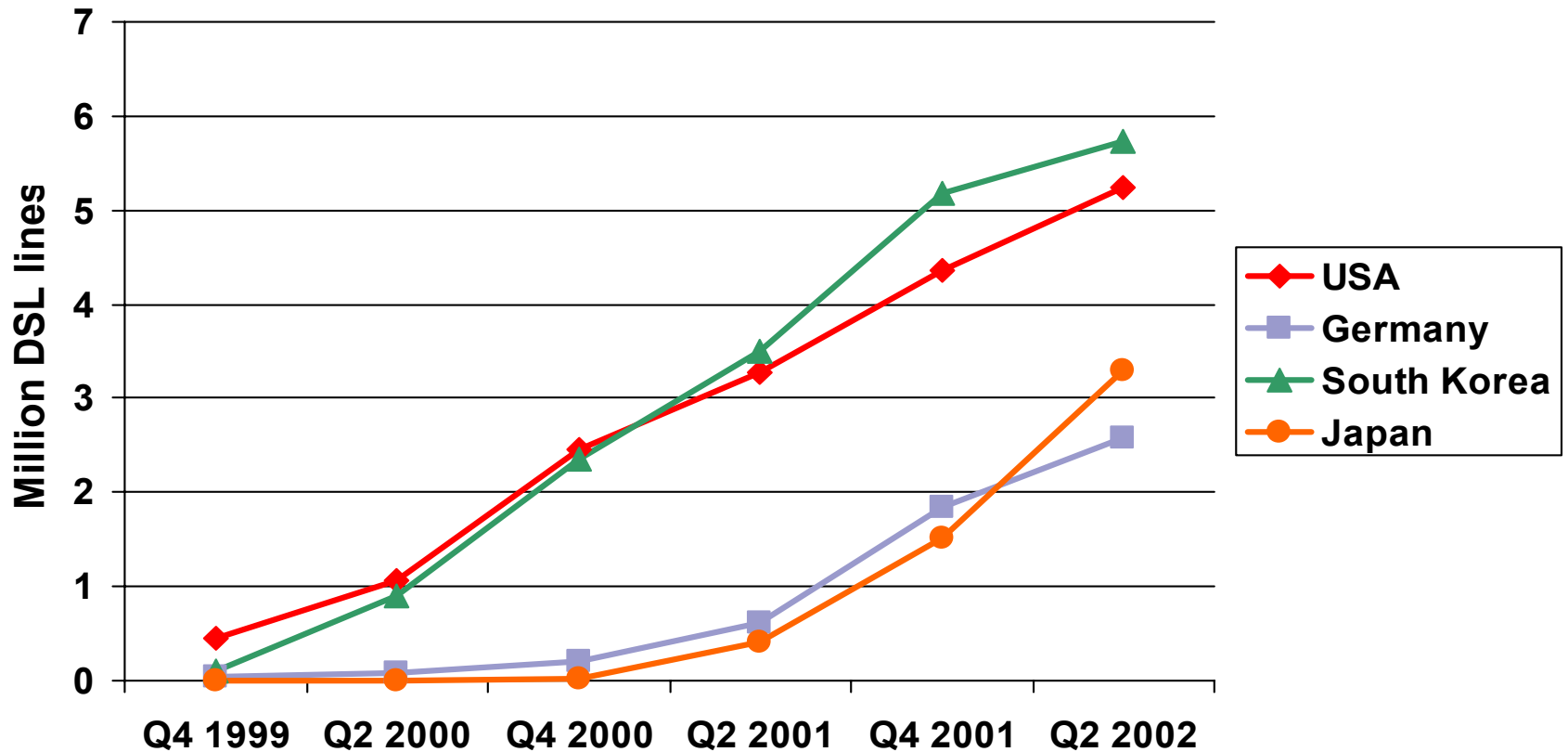
Conclusion: DSL is a key Technology for Broadband Access

> DSL leverages the installed base of worldwide about one Billion copper wire access lines for broadband

> DSL allows to grow the access network bandwidth driven by application demand of today and tomorrow

> DSL is suitable for both, business and residential users

> DSL allows for full triple play: High speed Internet (HSI), Voice, and Video

> All relevant protocols in the local loop are supported by DSL

> DSLAMs are multi talents, offering a broad variety of DSL types, high scalability, in door and out door variants and full integration in the CO networks

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www.alcatel.com

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