Broadband DSL Technology

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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
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Positioning of DSL wrt. Technology Cost-Effectiveness

Source: Boston Consulting Group
DSL based Multi Service Reference Model

Source: The DSL Sourcebook, Paradyne 2000
Access Convergence
Towards the Universal DSLAM: Triple-play Services and NGN Networks

Universal
- Class 5 Switch
- Voice: POTS
- Voice—V5.2 or VoDSL

7300 ASAM

> One wire for multiple services
  - Voice
  - HSI and IP services
  - Video

Local Exchange

Diversity
- Legacy Interface
  - CPE or IAD
  - Data

Customer Premises

Voice

NGN Softswitch

IP (Ethernet, ATM)

Internet: Worldwide Web

Local Content

Universal Diversity

One wire for multiple services
- Voice
- HSI and IP services
- Video

CPE or IAD

Data

Legacy Interface
DSL Variants and their potential

- **ADSL+**: Up to 10 Mbps
- **ADSL**: Up to 8 Mbps
- **ADSL-Lite**: Up to 8 Mbps
- **SDSL**: Up to 512Kbps
- **IDSL**: Up to 144Kbps
- **HDSL**: Up to 512Kbps
- **HDSL-2**: Up to 8 Mbps
- **VDSL**: 13 - 52 Mbps

* needs 2 pairs of copper lines, all other 1.

Transmission speed in Mb/s
Reach in km
Drivers for DSL: More Capacity and Speed Required

- Tele-working
- Video Conferencing
- 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

Source: PlannedapproachInc.com
DSL business have significant Revenue Streams

- **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)
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)
STEP 2: Create Margins on Business Access Services

> Business Access ADSL is ideal to address underserved SME market
  
  • Incremental cost on residential ADSL installed base is small
    – Major revenue opportunity with limited investments
  
  • Same footprint provides increased ARPU

![Diagram showing Business Access and High Speed Internet Access over time](image-url)
Addressing the SME Market with xDSL
Filling the Gap

Service Provider Market Segmentation

Corporate and high-end ME
SME
SOHO
Residential

Bandwidth Demand

LL (E1, E3, STM-1)
Revenue opportunity G.shdsl +ADSL
ADSL
2002: 25.5m installed DSL lines worldwide

Source: Point Topic
DSL growth took off in the last two years

Source: point-topic.com
Countries take turns to take off

Sources: Point Topic, Access@Ovum
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