

ITR-4

4th Infocomm
Technology
Roadmap
Seminar

iDA

INFOCOMM
DEVELOPMENT
AUTHORITY OF
SINGAPORE

The Connected Home

Raymond Lee
Dy Director, Technology Direction

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collaborate

communicate

innovate

- Overall Trends
- Home Networking Technologies
- Digital Home Platforms
- End-to-End Technology
- Singapore Landscape
- Conclusion

Overall Trends

The Connected Home

- Broadband sharing is the key driver for home networking
- Rise of household with multiple PCs and the desire to share peripherals (data centric, files sharing)
- Emergence of smart devices & home platforms with standard networking capabilities for ease of sharing digitised information within the home

Overall Trends

The Connected Home

- Bandwidth will not be an issue for in-home network
- Wireless connectivity will be the key networking technology providing mobility to user
- Data networking was the first wave. Home entertainment as the catalyst for the next wave of home network applications
- Digital media will be transported over common IP-based protocols to support convergence of data networking devices and home entertainment systems

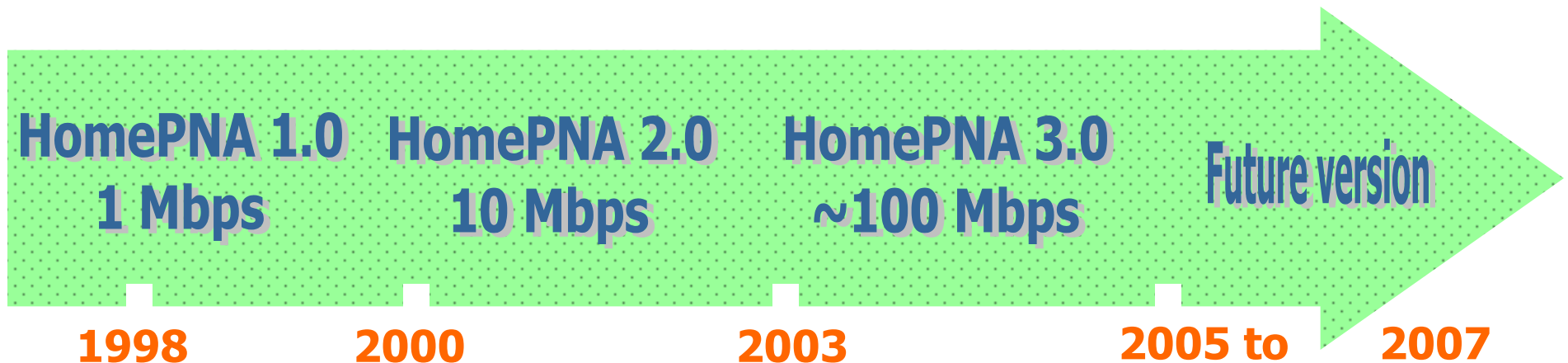
- Bundled end-to-end services will become increasingly strategic for service providers. The completion of OSGI spec. is expected to enhance platforms like Residential Gateway for end-to-end applications
- Smart home applications will evolve from home automation and control, to home security, surveillance and healthcare; Smart kitchen appliances will not see demand before 2007

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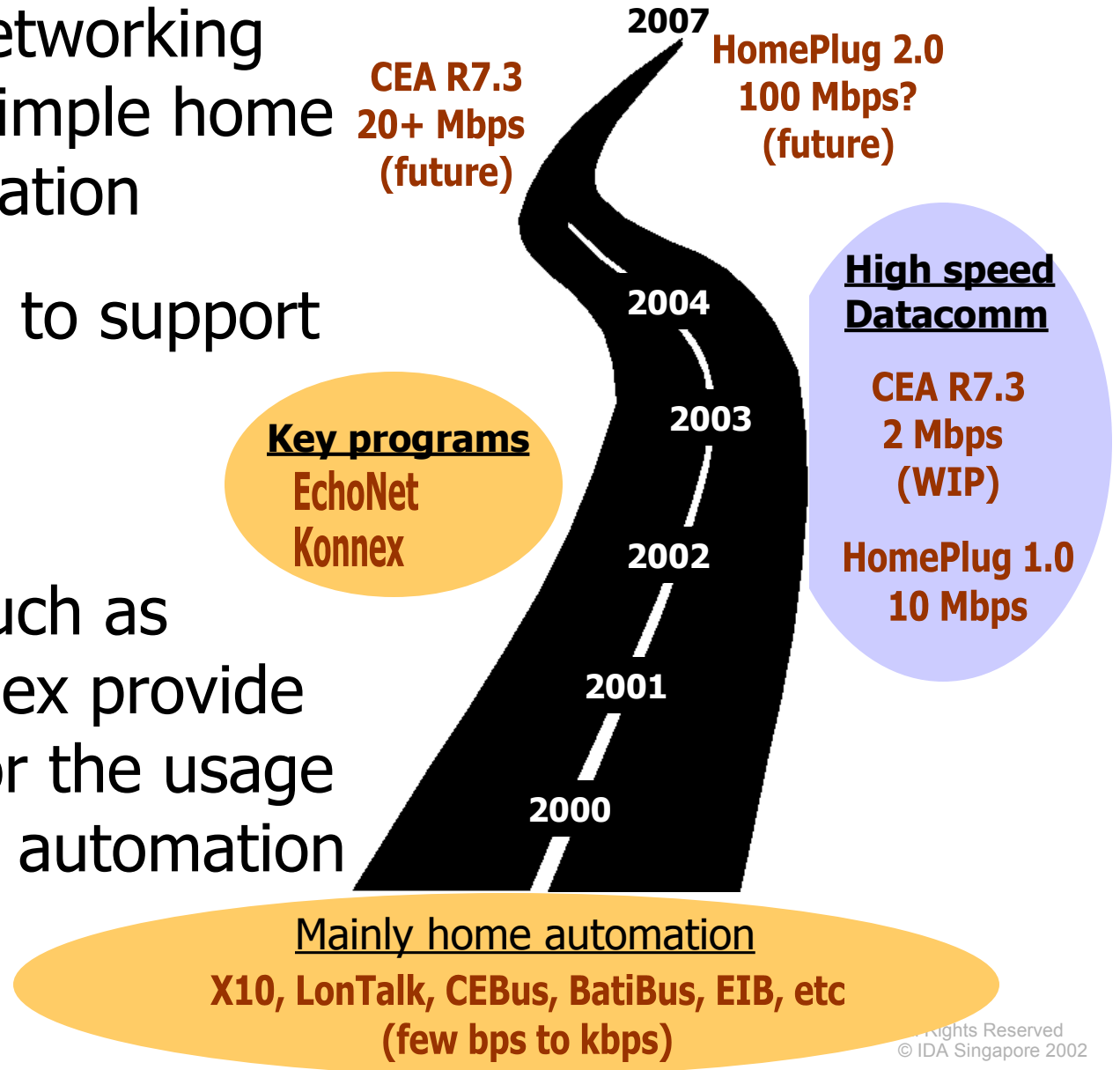
- Phoneline Networking
 - HomePNA (**H**ome **P**honeline **N**etworking **A**lliance)
- Powerline Communication
 - HomePlug, CEA R7.3 (Consumer Electronics Assoc.)
- Wireless Networking
 - IEEE 802.11a/b/g, HomeRF, Bluetooth, ZigBee, UWB
- Structured Wiring
 - CAT-5, Coax, Fibre, ...

**Most moving towards higher data rate
with better features!**

- “No New Wire” Approach
- Phone wiring has the bandwidth, is low cost, is user installable but has failed to capture the market
- HomePNA version 1.0 (1Mbps) and 2.0 (10Mbps) products are available
- Specification for version 3.0 (>100Mbps) is expected to be ready by 2003



- Earliest home networking technology for simple home control & automation
- PLC has evolved to support high-speed data communication
- Key programs such as EchoNet & Konnex provide more impetus for the usage of PLC for home automation



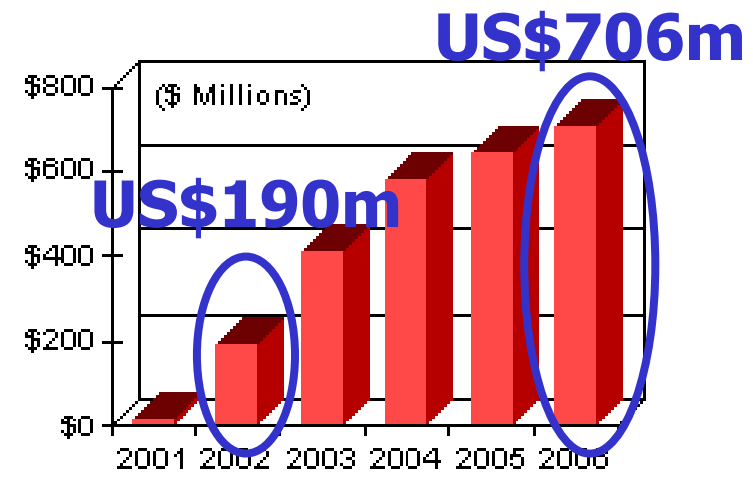
Powerline Communication

The Connected Home

- Many different PLC standards and proprietary technologies - Interoperability is thus an issue
- Overlap of spectrum with PLC last mile access - Interference will remain a challenge
- Increasing market size



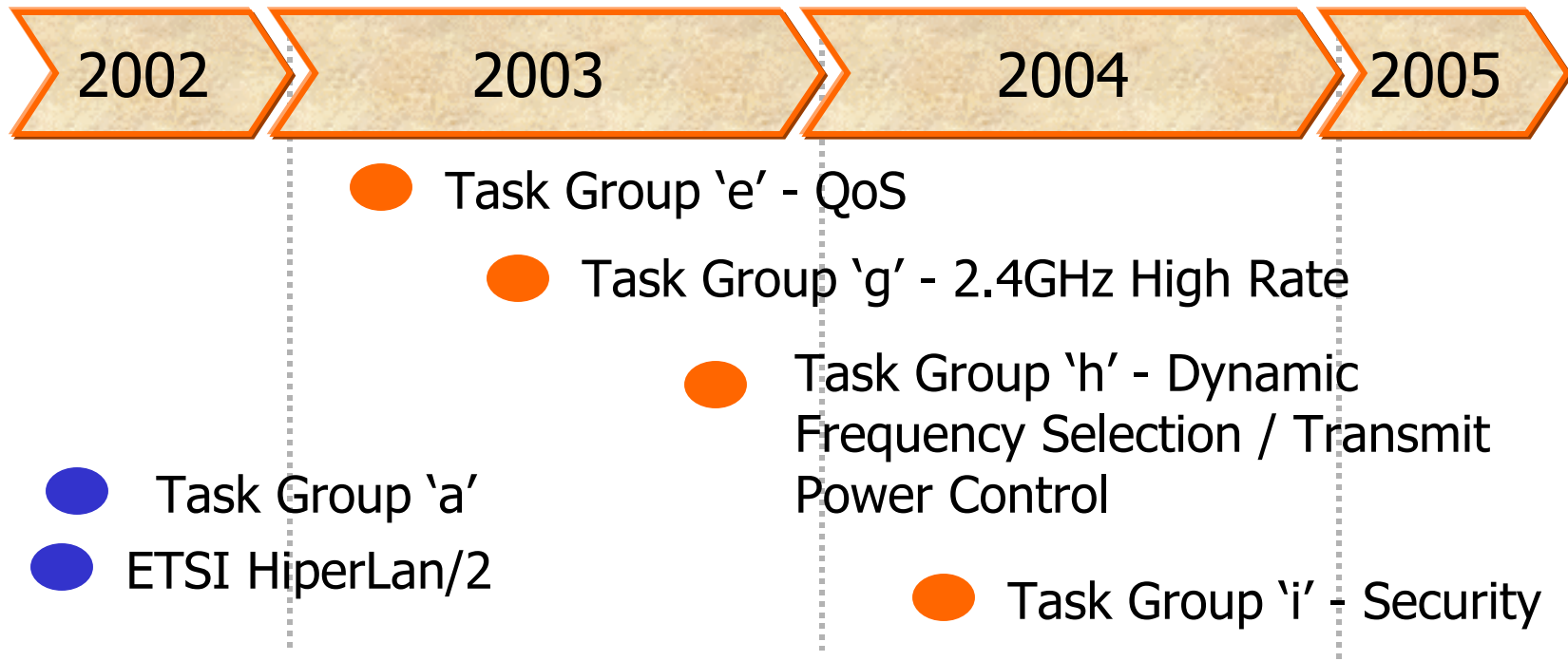
Forecast for Overall Powerline Home Networking Equipment Market



Source: In-Stat/MDR Jan 2002

- A key home networking technology for 2002 and beyond -- users want mobility
- WLAN technologies include IEEE 802.11 family, HiperLAN/2 & HomeRF
- Importance of Wi-Fi certification. 802.11 continues to dominate the wireless home networking space, driven by the demand for wireless connectivity
- Growth of WLAN in home/SOHO is projected to surpass the enterprise market by many folds

- IEEE 802.11a/e/g/h/i ongoing standard development



Legend:

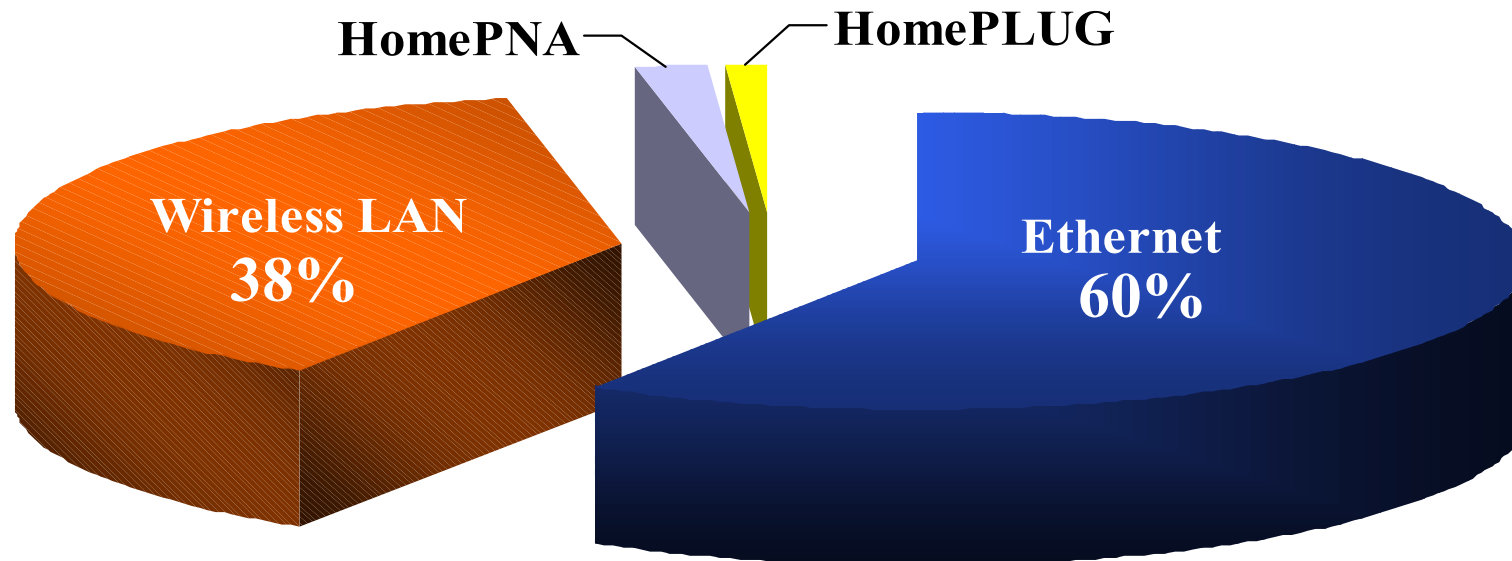
- Product availability
- Expected standard ratification

- A complementary class of wireless technologies for short range communication. Includes Bluetooth, ZigBee & Ultra-Wideband
- Bluetooth a short range wireless technology for cable replacement operating in the ISM band
- ZigBee a low cost, low power, low data rate WPAN for simple home automation devices, PC peripherals & toys
- UWB holds promise as a high speed technology for consumer electronics multimedia applications

Home Networking Market Breakdown

The Connected Home

PC Home Networking Market Breakdown [Percentage of Total Unit Shipments]



1st Half, 2002

[Source: In-Stat/MDR, 09/02]

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- Traditional CE products are standalone
- Emergence of CE products with networking capability, e.g. Hi-fi MP3 systems, network-ready Personal Video Recorder (PVR), game console with Internet connection
- Everything in the media world is going digital and can be shared over IP-based protocols
- Emergence of home centre to play the role of media storage, management and distribution
- Home centres can be any digital platform with embedded computing power and middleware/APIs e.g. Game console, PVR, DTV/ITV, Media Server, etc.

Consumer Benefits:

- Products individually do more and work together
- Improved convenience
- Greater functionality

Industry Opportunities:

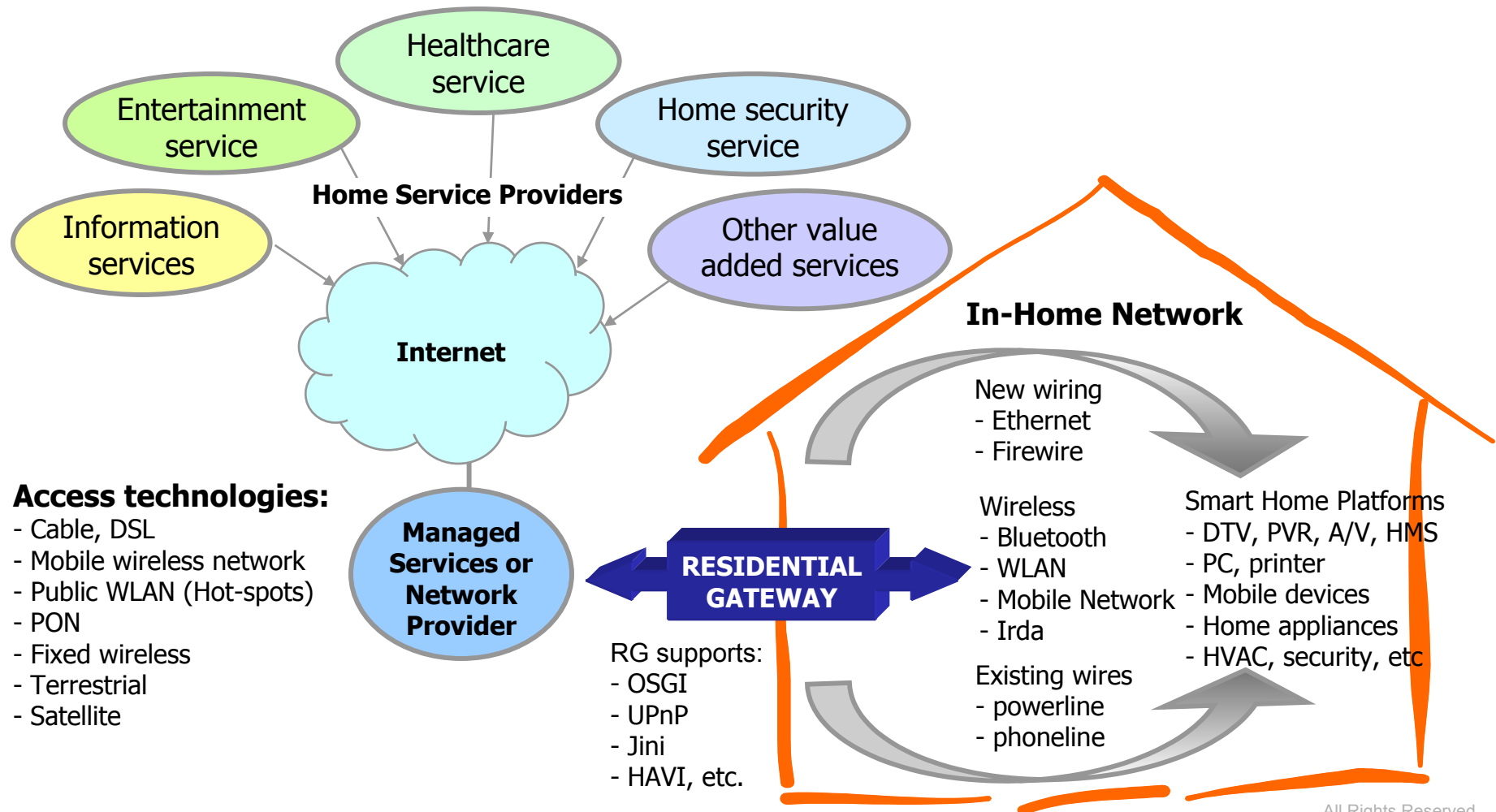
- Deliver higher value, interoperable network products
- Deliver services to broadband and broadcast devices

- Standards and Guidelines Provide Interoperability

Example of an Industry Initiative -- Digital Home Interoperability Stack from Intel

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- Need a service platform to bridge the in-home network with external service providers



Access technologies:

- Cable, DSL
- Mobile wireless network
- Public WLAN (Hot-spots)
- PON
- Fixed wireless
- Terrestrial
- Satellite

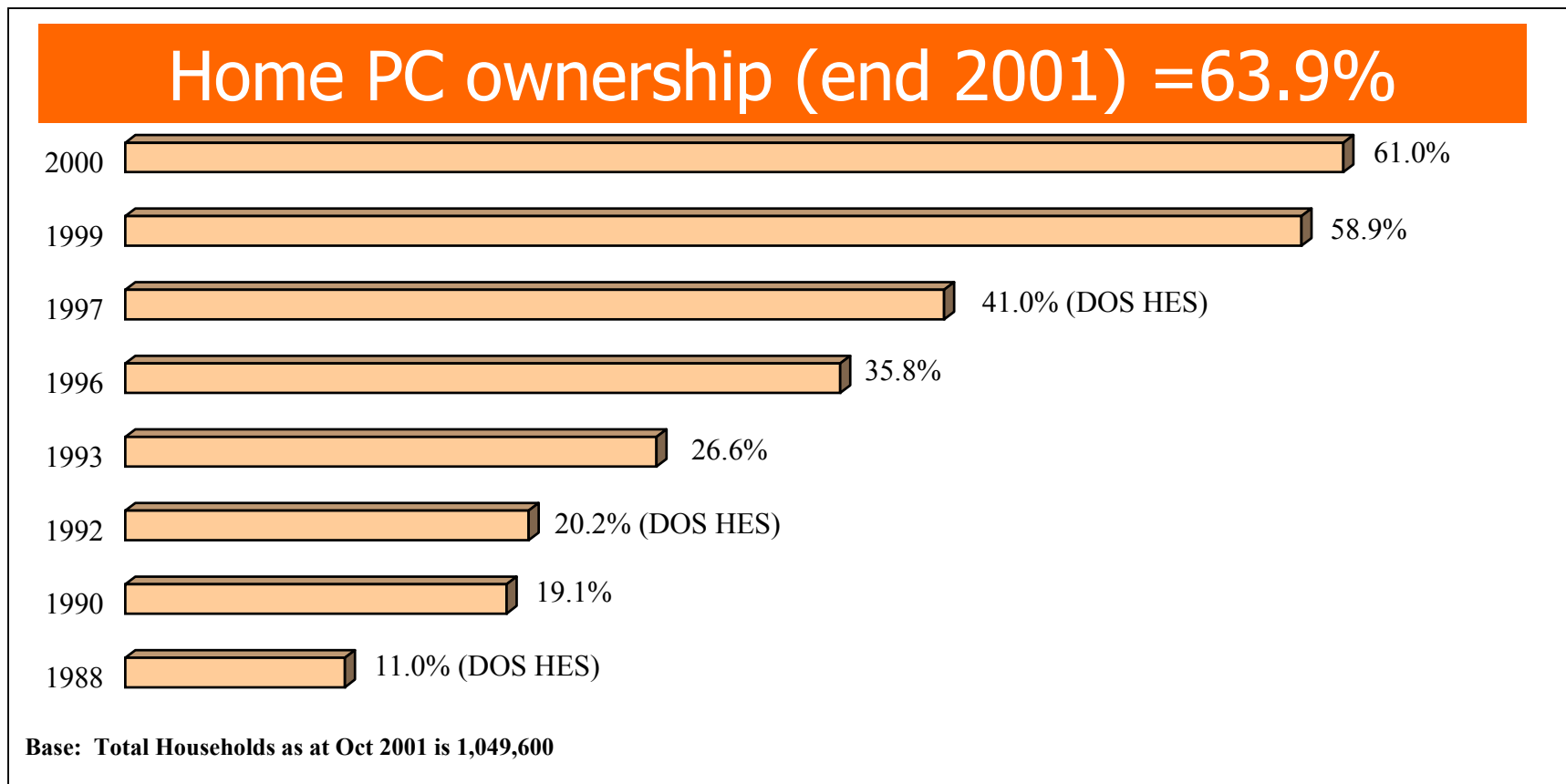
- Service platforms available today:
 - OSGI (Open Service Gateway Initiative)
 - HomeGate by JTC 1 / SC 25 Working Group 1
 - CableHome by CableLabs
- OSGI is a Java-based application layer framework that provides vendor-neutral application and device layer APIs to deploy a variety of services
- OSGI Service Platform Release 2 has simplified the delivery of bundled services. Development is underway to support telematics applications

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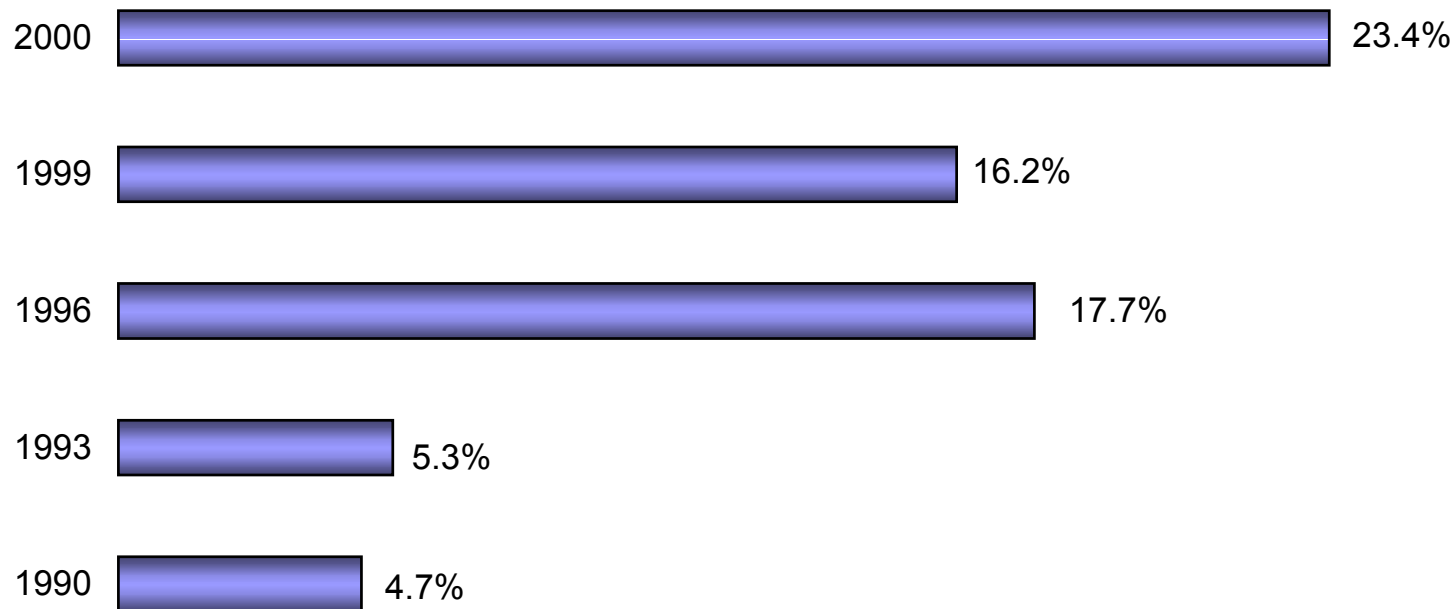
Singapore Landscape

The Connected Home

- More than 56.8% household with Internet access
- Broadband as of 2001 has reached 17.7% of household



Multiple PCs ownership (end 2001) = 26.7%



Base: Number of Households with Home Computers = 672,000

23% of these household have some form of home networking technologies

- HDB proactive in developing network-ready flats, wired with structured cabling
- IDA initiated a Connected Home Programme that aims to provide a test bed for industry to develop end-to-end solution for the homes
- IDA initiated an OSGI-compliant Residential Gateway (RG) reference design project to serve as a blueprint for industry to shorten time-to-market for manufacturing of next generation RGs
- SBA is also supporting the development of original, innovative and high quality content and services for digital radio and digital television

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In Collaboration with

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