



Wi-Fi Alliance 

Wi-Fi is  
**everywhere!**

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WLAN Business Forum  
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# ▶ Agenda

- Wi-Fi in the work environment
- Wi-Fi Standards review
- Securing the Enterprise – WPA™ and WPA2™
- Quality voice – Introducing WMM™
- Wi-Fi CERTIFIED™ – The safe buy
- System planning considerations
- A look into the future



# ▶ Overview of the Wi-Fi Alliance

- Created the Wi-Fi® brand in 1999
- **Mission:** Global interoperability certification and promotion of 802.11 technology
- Supported by over 200 leading technology companies – [www.wi-fi.org](http://www.wi-fi.org)
- Representation across all major world markets and product segments
- Wi-Fi is \$3B+ global market and growing



# ▶ Where Will We Work?

- At home?
  - On the road?
  - At work?
- ...and we use the same laptop in all three places
- Seamless interoperability across these environments is required
  - Where we work is becoming less important as connectivity improves

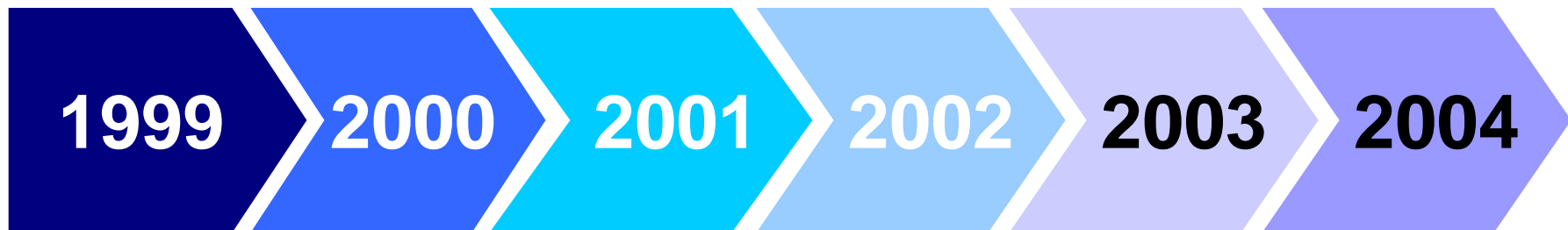




# ▶ Wi-Fi® at Work

Initial corporate feasibility testing, <1% penetration in new laptops shipped

Corporate deployments up sharply, Wi-Fi shipping 50% of new laptops at year end



Significant deployment to enhance productivity in industries w/ mobile workers:

- Transportation
- Healthcare
- Warehousing

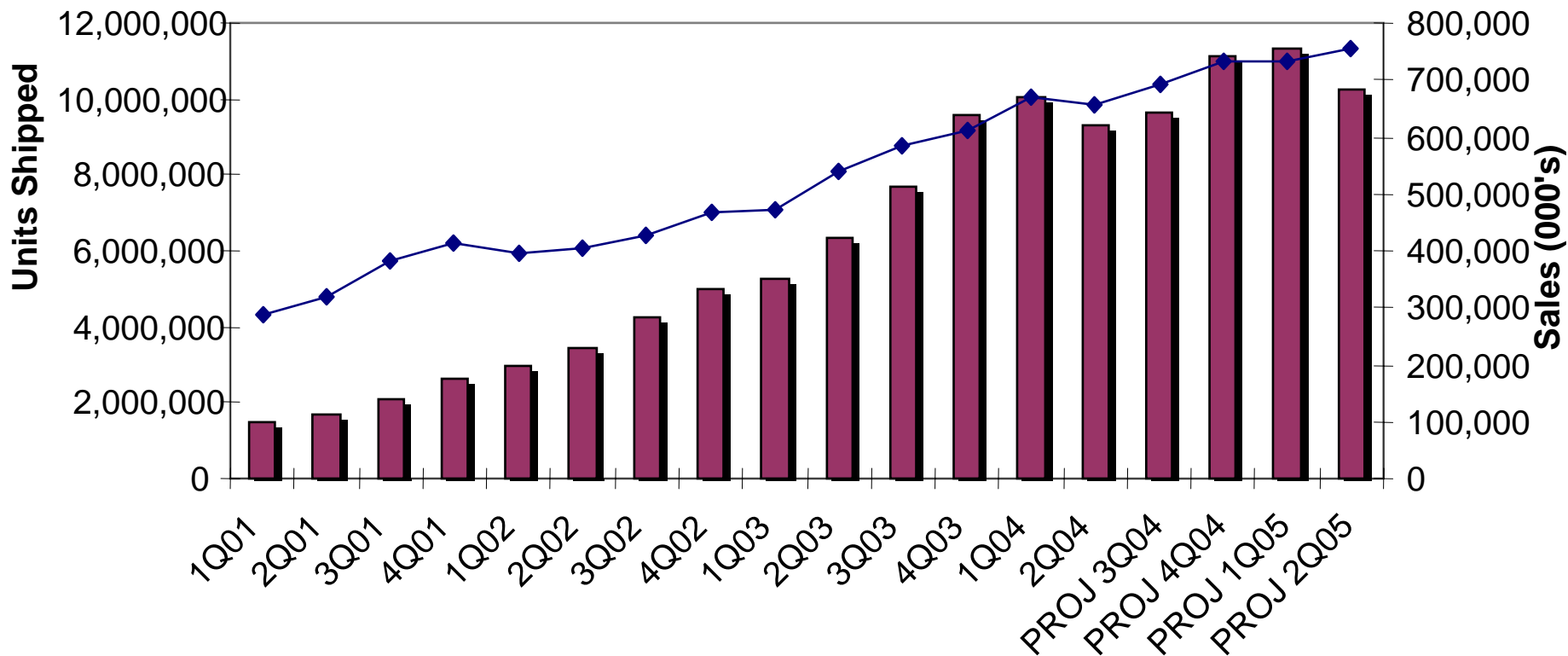
Dramatic reduction in corporate IT spending – Wi-Fi sales dipped slightly except in Europe

Corporate IT spending begins to pick up, release of WPA2™ spurs growth in Wi-Fi enterprise deployments, significant growth in Europe, Wi-Fi shipping 60% of new laptops at year end



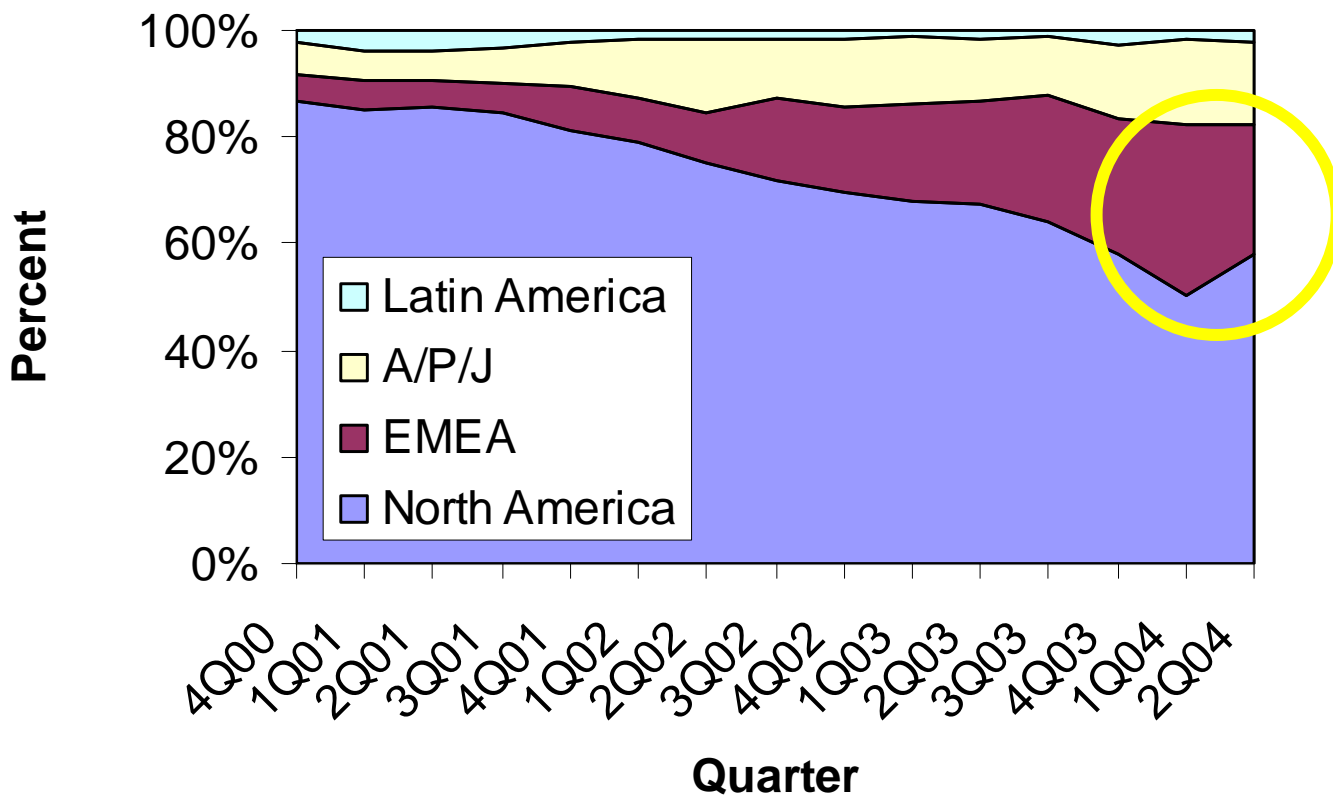
# ▶ Wi-Fi Sales

## World Wide Wi-Fi® Sales and Forecast



# ▶ Wi-Fi Enterprise Equipment

## WW Enterprise WLAN Equipment Revenue





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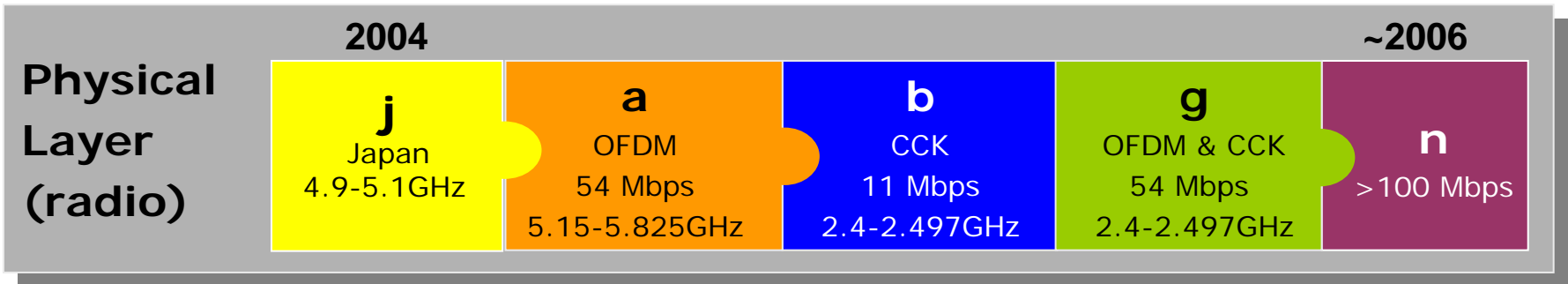
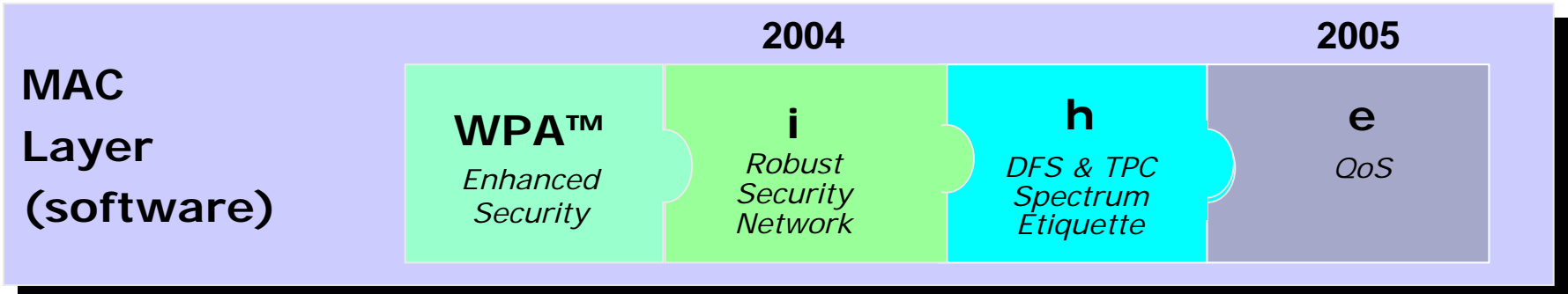
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**Wi-Fi® Standards  
Review**





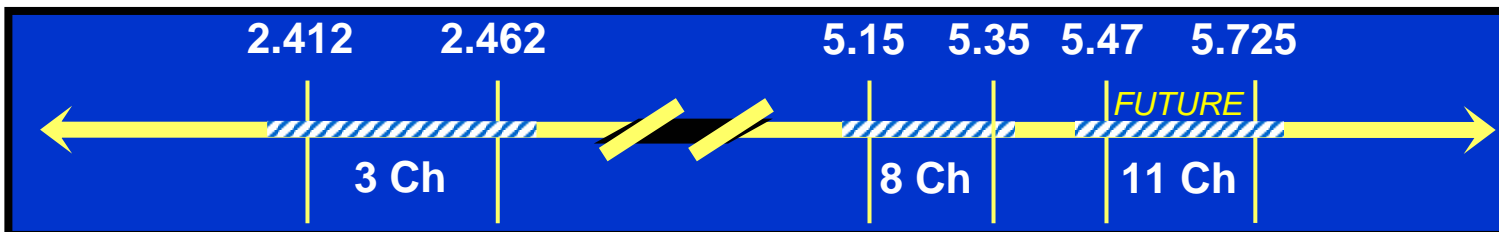
# ▶ The 802.11 Alphabet Soup



# ▶ 5 Ghz and 2.4 Ghz

	<b>5Ghz</b>	<b>2.4Ghz</b>
<b>IEEE Radio Standards</b>	802.11a - OFDM	802.11b - CCK 802.11g - OFDM/CCK
<b>Speed</b>	54Mbps (a)	11Mbps (b/g) 54Mbps (g)
<b>Channels</b>	8 + 11	3
<b>Interference</b>	Less populated spectrum	More populated spectrum

*Frequency Spectrum in GHz*



***Migration towards dual band (tri-mode) products***



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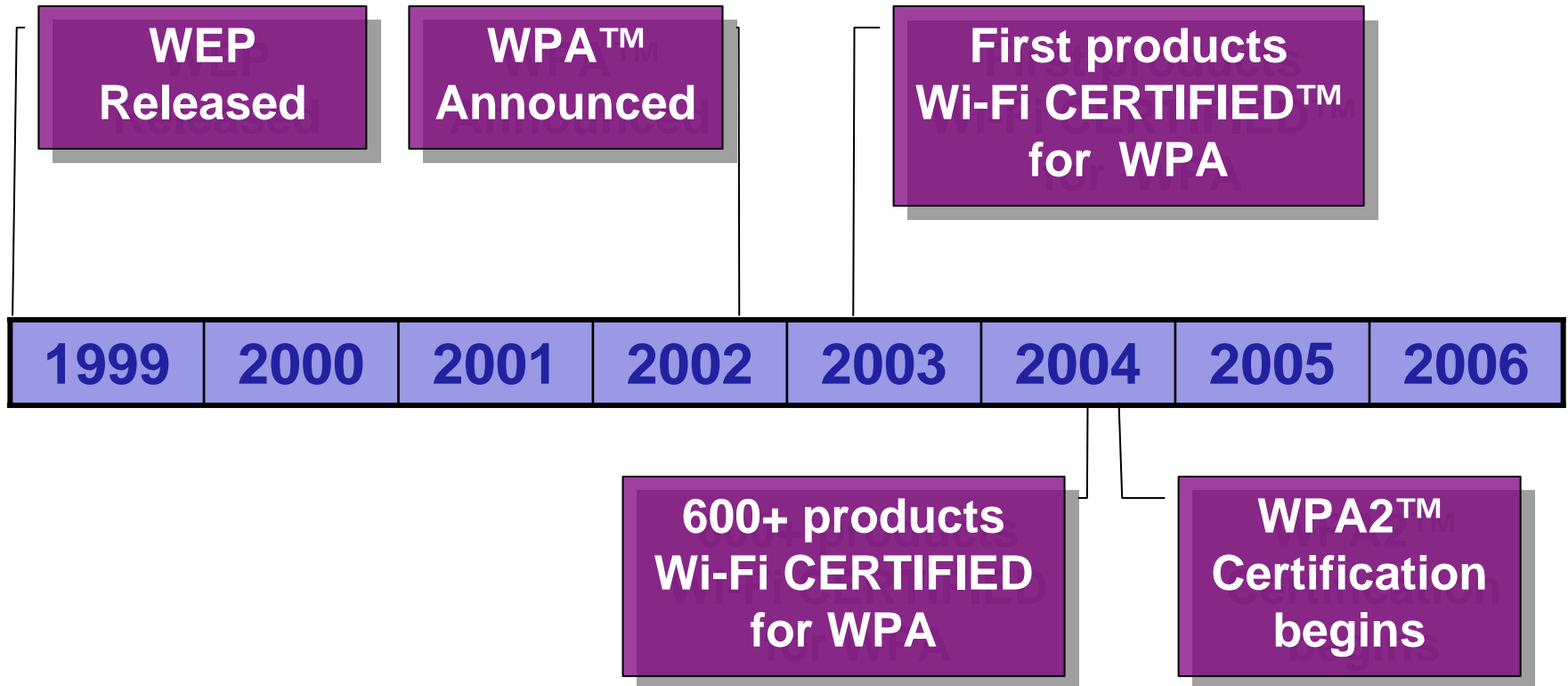
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**Securing the Enterprise -  
WPA™ and WPA2™**





# ▶ Wi-Fi® Security Certification Timeline





# ▶ WPA2™- Strong Enterprise Security

- Based on the ratified IEEE 802.11i standard
- Security must stay ahead of the threat to remain effective
- The industry is now two generations of security beyond problems associated with WEP
- Achieves a government grade security level by implementing the National Institute of Standards and Technology (NIST) recommended AES encryption algorithm
- Allows for U.S. government FIPS 140-2 compliance
- Both WPA™ and WPA2 provide authentication using IEEE 802.1X and Extensible Authentication Protocol (EAP) types
- WPA2 is backward compatible with WPA



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**Introducing WMM™**

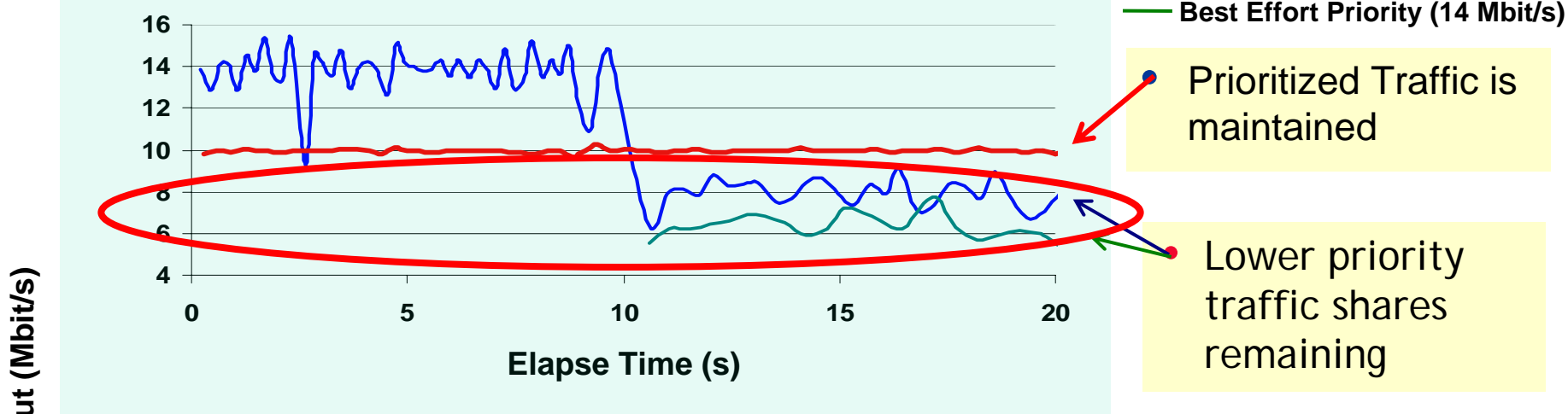


# ▶ Introducing WMM™

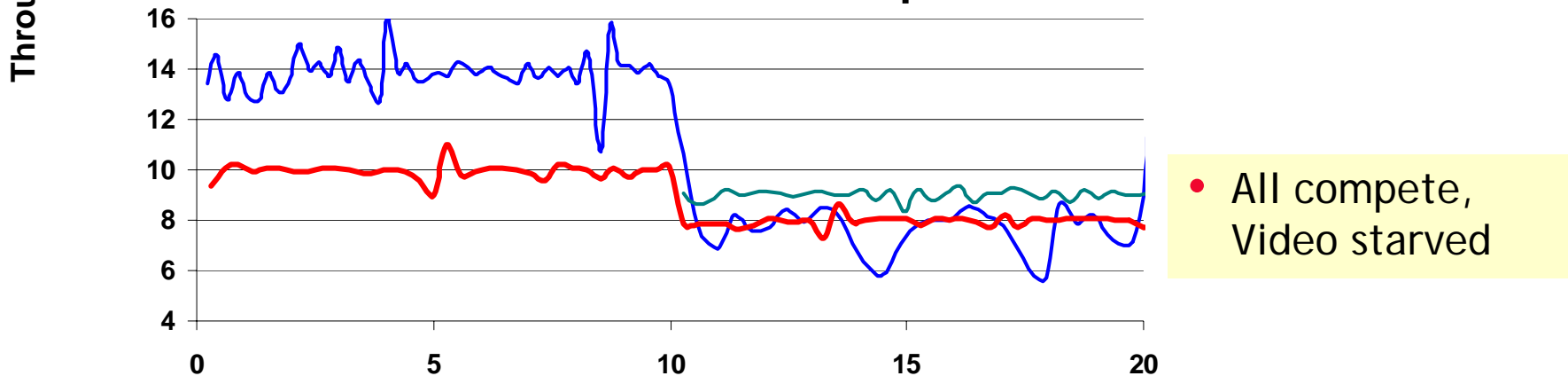
- Wi-Fi Multimedia
- Improves user experience for audio, video and voice applications over a Wi-Fi® network.
- Prioritizes streams of “content” and optimizes the way the network allocates bandwidth among competing applications
- Wi-Fi CERTIFIED™ for WMM is based upon IEEE 802.11e standard
- First products Wi-Fi CERTIFIED for WMM were announced in September

# ▶ WMM™ In Action

## with WMM: Video has priority over Data



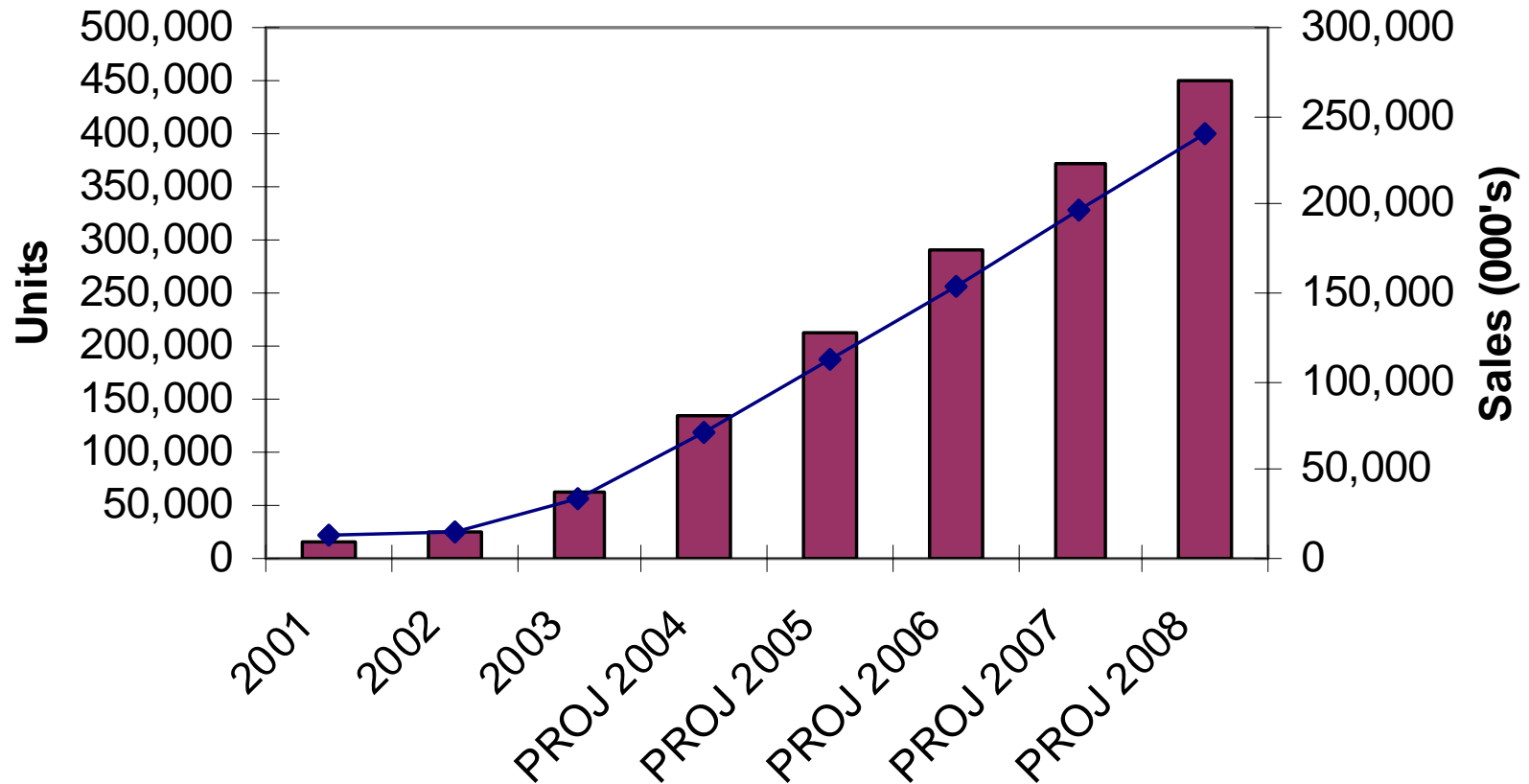
## no WMM: new data streams impacts video



# QoS for Wi-Fi® is Becoming Increasingly Important



## World Wide Wi-Fi VoIP Sales





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**Wi-Fi CERTIFIED™ -  
The Safe Buy**





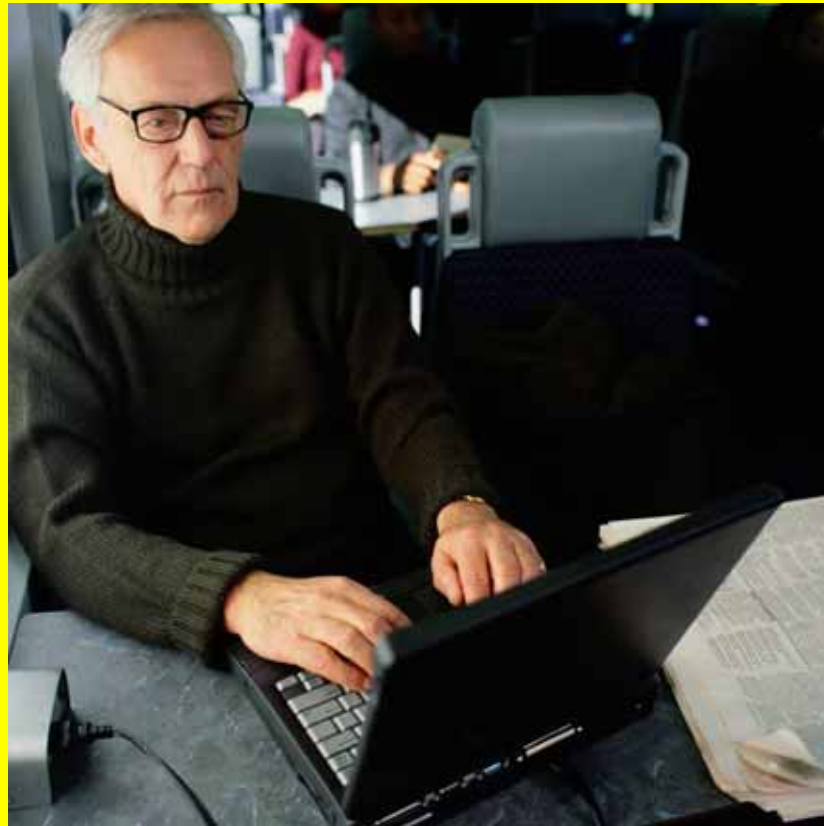
# ▶ Wi-Fi CERTIFIED™ Overview

- 1,500+ products have been Wi-Fi CERTIFIED
- Products are tested at independent labs in the Asia, U.S.A., and Europe.
- **One in four products fails testing** the first time – Major impact on users
- Both new and mature technologies fail
- **Wi-Fi® certification is the only way to protect the user experience**



# ▶ What Users Experience When a Product is Not Wi-Fi CERTIFIED™

- Products won't work together - even from the same vendor!
- Products work together intermittently
- Significantly reduced performance
- Dropped connections



**Wi-Fi CERTIFIED™ - - *The Safe Buy!***

# ▶ What the Enterprise IT Manager Experiences



- Increased support needed from
  - Work
  - Home
  - The road
- Frustrated executives
- An unnecessary increase in technology complexity for users



# Wi-Fi® Certification Will Become Even More Important




- **Product complexity is increasing** - The number of standards is increasing – 802.11b, 802.11g, 802.11a, dual band products, WPA2™ Security, WMM™ with more standards to come
- **More chip sets** and MAC implementations increase probability for interoperability failure
- **Cost pressures** will impact product quality
- **Different brands** used at many different locations - home, work and public access venues – increases interoperability challenge



# Wi-Fi® Interoperability Certificate

**Wi-Fi® Interoperability Certificate** **Certification ID: W000000**

 This certificate represents the capabilities and features that have passed the interoperability testing governed by the Wi-Fi Alliance. Detailed descriptions of these features can be found at [www.wi-fi.org/certificate](http://www.wi-fi.org/certificate)

**Certification Date:** June 28, 2004  
**Category:** Name of Category  
**Company:** Name of Company  
**Product:** Name of Product  
**Model/SKU #:** #####

This product has passed Wi-Fi certification testing for the following standards:

IEEE Standard	Security	Multimedia
802.11a 802.11b 802.11g	WPA™ - Personal WPA™ - Enterprise WPA2™ - Personal WPA2™ - Enterprise	WMM™

**For more information:** [www.wi-fi.org/certificate](http://www.wi-fi.org/certificate)

**Interoperability Certificate including notice of WPA™ - Personal or WPA2™ - Personal, WPA - Enterprise or WPA2 - Enterprise Certification and WMM™**



# ▶ Development Road Map

Planned Enhancement	Estimated IEEE Task Group Completion	Earliest Wi-Fi Alliance Certification	Product Availability
Enhanced Security – WPA™	Q4 2002	April 29, 2003	Q2 2003
802.11g	Q2 2003	July 8, 2003	Q3 2003
WPA2™ (802.11i)	Q2 2004	September 2004	Q3 2004
WMM™ (QoS)	Q1 2005	September 2004	Q3 2004
802.11a for Europe (802.11h)	Q1 2005	Q2 2005	Q2 2005
WMM (802.11e)	Q1 2005	Q2 2005	Q2 2005
802.11n	Q2 2006	Q3 2006	Q3 2006



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**Enterprise  
System Planning  
Considerations**



# Where is a Good Place to Develop Corporate Efficiencies?



- **Conference rooms** – allows people to stay connected and double as an extra work area
- **Board rooms** – adds cool factor and helps external officers stay connected
- **Many executives with laptops** – keeps them connected and in touch with role of technology
- **Knowledge workers** – telecommuters, outside sales staff – improved space utilization
- **Company cafeterias** – improved space utilization, acts as additional meeting space, plus it is often perceived as an employee benefit



# Systems Planning Considerations - Trends



- 802.11b will be around a while
- Dual band Clients – 802.11b and dual band a/b, a/g
- Penetration of Wi-Fi® into laptops continues to increase
- Even greater Wi-Fi penetration in the consumer market
- Strong open standards security is available – WPA2™
- Employees and executives use Wi-Fi at home, and are beginning to ask for it and expect it at work

# System Planning Considerations - Implications



- All new access point deployments should consider dual band deployment requirements
- Need a plan to support public access and telecommuters over Wi-Fi ZONE™ locations
  - Service provider relationships
  - VPN support for remote security
- New deployments should support the WPA2™ open standard
- **Require Wi-Fi® certification in RFPs**



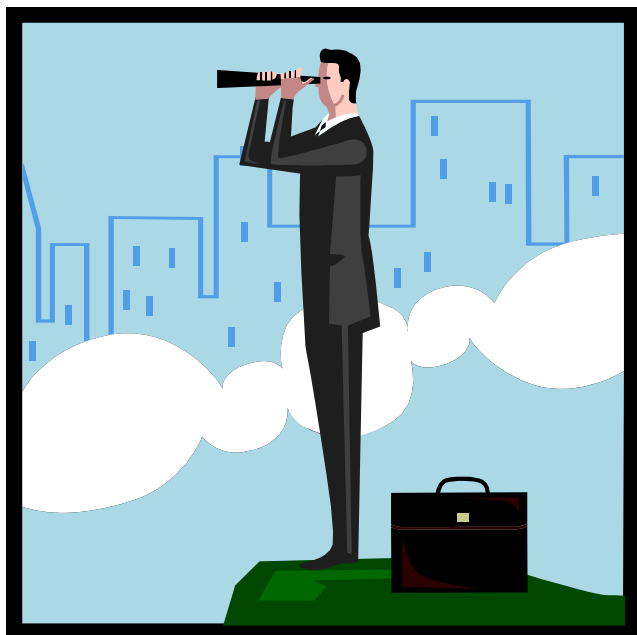
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**A Look Into the Future  
and Summary**



# ▶ What's Ahead?



- 2005 – More Wi-Fi® in the enterprise driven by home users wanting it at work and business travelers wanting it on the road
- 2006 – Integration of wireless WAN and LAN technologies
- Smaller form factors and lower power leading to higher handheld integration
  - PDAs/Cell Phones w/ Wi-Fi
  - Multi-mode Wireless – Wi-Fi + 2.5/3G
- Increasing use of Voice over Wi-Fi
- More enhancements to the current standard – more manageable, faster, better

## ▶ Summary

- New work environment requires seamless interoperability
- WPA2™ – Strong security for Enterprise is here today
- Wi-Fi complexity is increasing; certification ensures positive user experience
- Wi-Fi CERTIFIED™ equipment deployment issues – Require in your RFPs
- On the horizon – Increasing use of voice, enhancements to the current standards
- Thank you and enjoy your day at the WLAN Business Forum