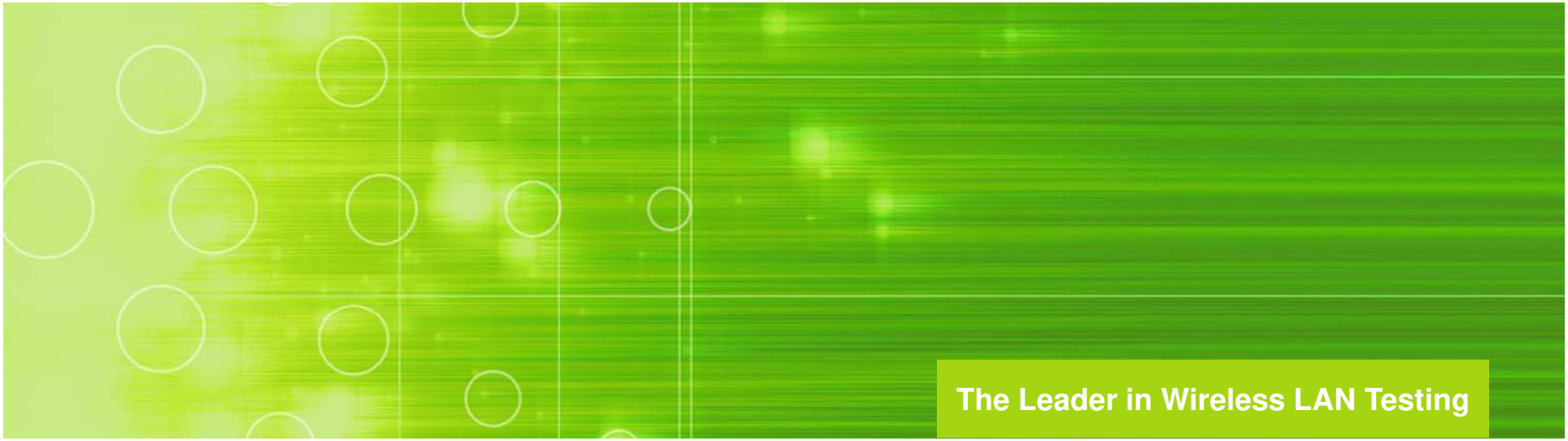
veriwave™

802.11 WLAN Systems – a tutorial



Agenda

- Introduction
- WLAN network basics
- Physical layer (radio) technologies
- Protocol architecture
- 802.11 MAC protocol
- Security protocols in WLANs
- Advanced topics in WLANs
- Wireless LAN standards
- WLAN testing challenges and test metrics
- Conclusion

What is a WLAN? What is 802.11?

- **Wireless LANs (WLANs) are LANs that use RF instead of cable or optical fiber**
  - Allows high-speed data transfer without wires or cables
  - Supports typical enterprise applications (e-mail, file transfer, audio/video conferencing, etc)
  - First introduced in 1999, evolved from legacy RF data technologies such as Hiperlan
  - 120 million ports of WLAN shipped worldwide last year (virtually all laptops have WLAN interfaces now)
- **IEEE 802.11-1999 is the basic standard governing wireless LANs**
  - Standardized by the IEEE 802.11 group, which is a working group in the IEEE 802 LAN/MAN Standards Committee (LMSC)
  - Formed in 1991 to standardize a 1 Mb/s RF-based data network technology
  - Completed its work in 1999 with the first 802.11 wireless LAN standard
  - Now driving almost all WLAN technology development worldwide

Pros and Cons of 802.11

Pros..

- Mobility
- Compatible with IP networks
- High speed data connectivity
- Unlicensed frequencies
- Highly secure
- Easy and fast installation
- Simplicity
- Scalability
- Very low cost

Cons..

- Shared-medium technology – bandwidth limited by RF spectrum
- Limited number of non-overlapping channels
- Multipath effects indoor
- Interference in the 2.4 GHz and 5 GHz bands
- Limited QoS
- Power control
- High overhead MAC protocol

Basic 802.11 Operation

- WLAN network topology
- Channel scanning and synchronization
- Authentication and association
- Data transfer mechanism