



# An Overview of Bluetooth and IEEE 802.15

Tom Siep  
Member Group Technical Staff  
Texas Instruments

[siep@ti.com](mailto:siep@ti.com)

08/05/99

1

THE WORLD LEADER IN DSP AND ANALOG





# Outline

---

- ◆ What is Bluetooth?
- ◆ Bluetooth Architecture
- ◆ IEEE 802 Architecture
- ◆ The IEEE 802.15 Project
- ◆ Timeline for 802.15



# What is Bluetooth?

---



08/05/99

3

THE WORLD LEADER IN DSP AND ANALOG





# What is Bluetooth?

## Description

- ◆ Bluetooth is an open specification for wireless communication of data and voice
- ◆ Low-cost short-range radio link
- ◆ Stationary and mobile communication
- ◆ Protected ad hoc connections
  - ◆ Codename: Bluetooth.
  - ◆ A Global Specification for Wireless Connectivity.





# What is Bluetooth?

## Technical Description

- ◆ Replacement of cables with one universal, inexpensive short-range radio link
- ◆ Operates in the unlicensed ISM band at 2.4 GHz
- ◆ Frequency hopping is used to combat interference and fading
- ◆ A shaped, binary FM modulation is applied to minimize transceiver complexity
- ◆ Gross data rate is 1Mb/s
- ◆ Time-Division Duplex scheme is used for full-duplex transmission

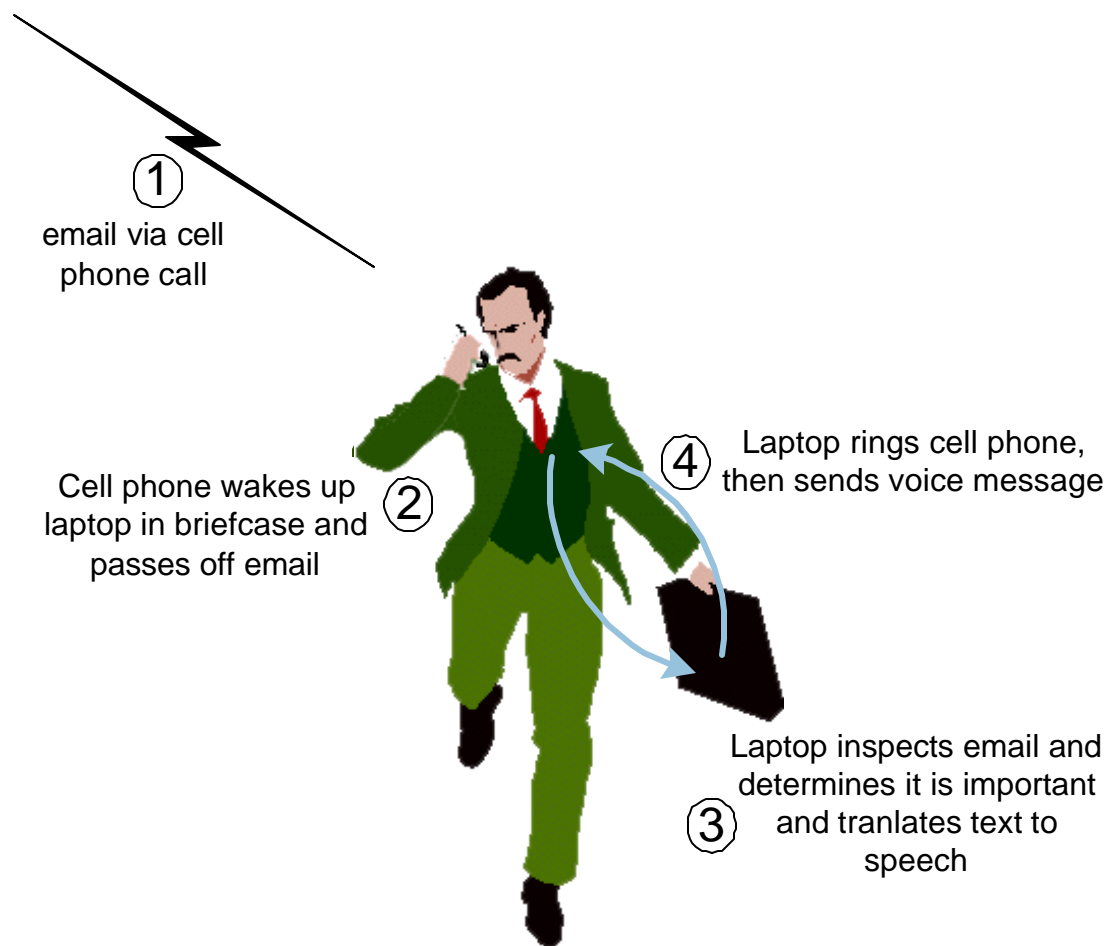
08/05/99

5



# What is Bluetooth?

## The “Briefcase Trick”



08/05/99

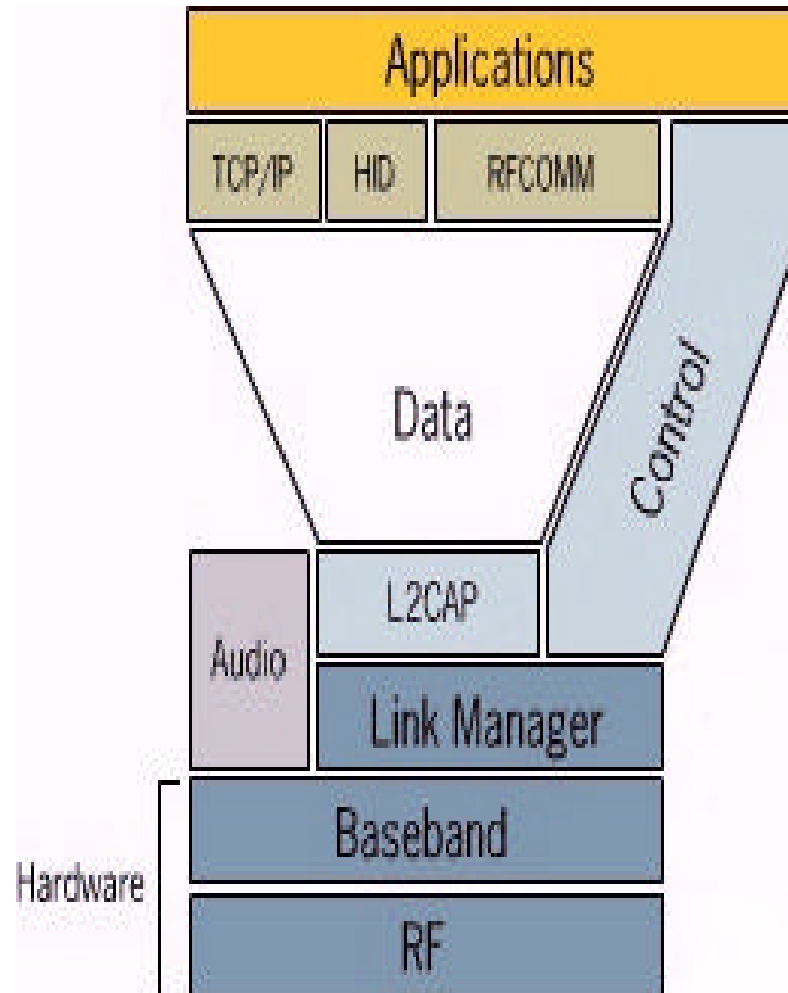
6

THE WORLD LEADER IN DSP AND ANALOG





# Bluetooth Architecture



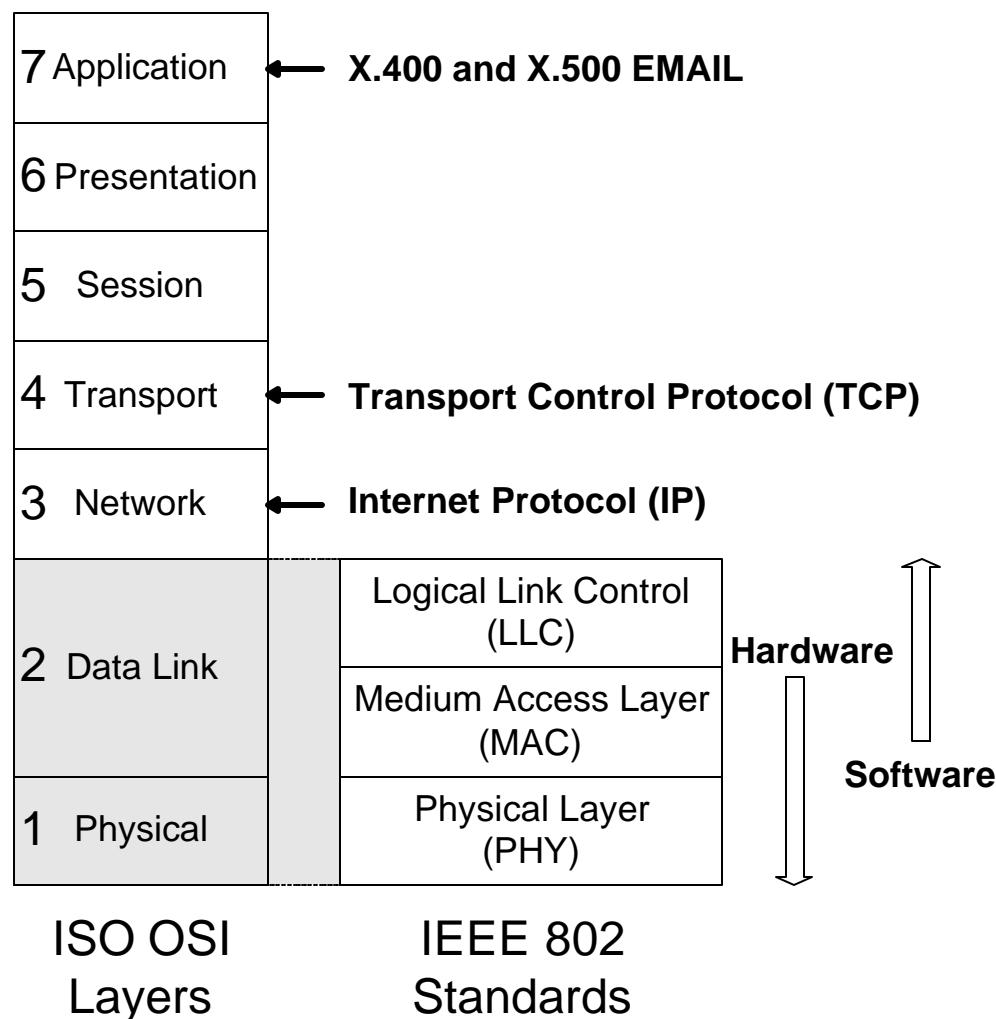
08/05/99

7



# IEEE 802 Architecture

## ISO OSI and IEEE 802



08/05/99

8



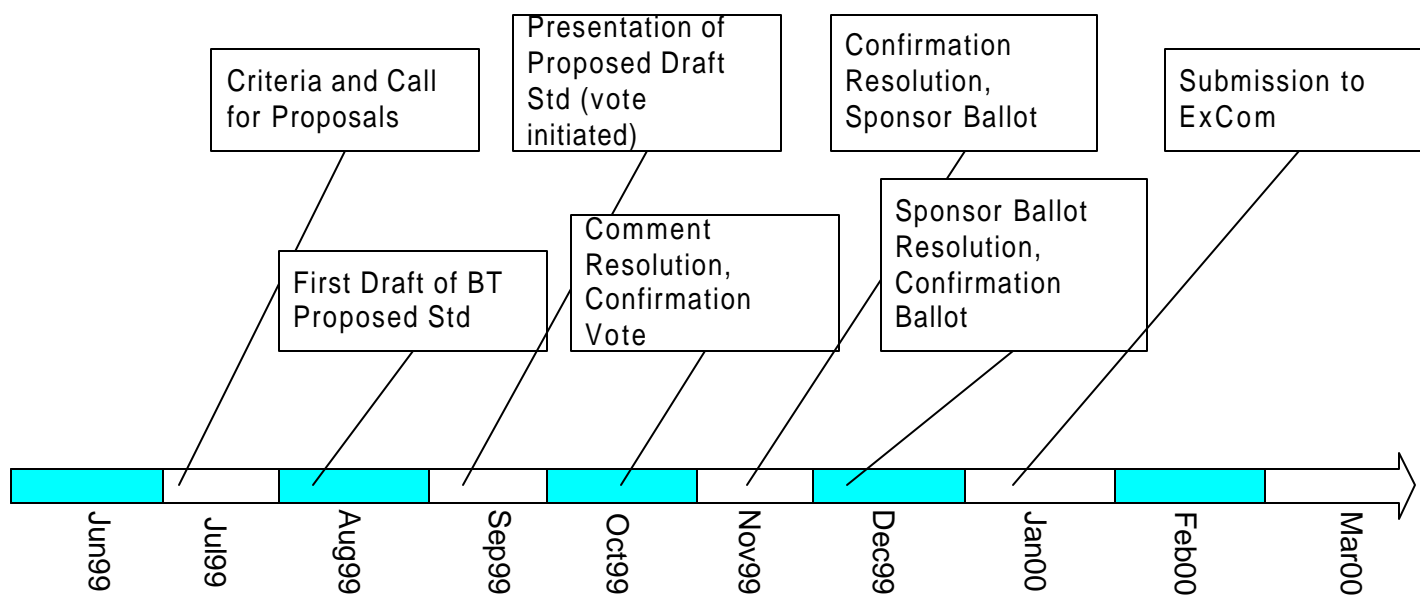


The diagram illustrates the Bluetooth protocol stack, organized into two main columns. The left column contains the user-facing and hardware layers: **Audio** (purple), **L2CAP** (light blue), **Link Manager** (dark blue), **Baseband** (dark blue), and **RF** (dark blue). The right column contains the protocol layers: **Logical Link Control (LLC)** (white), **Media Access Layer (MAC)** (white), and **Physical Layer (PHY)** (white). A vertical **Control** block (light blue) is positioned between the L2CAP/Link Manager and Baseband layers. To the far right, a vertical **Management** block (white) is shown. Data flow is indicated by red arrows: from **Audio** to **Baseband**; from **Baseband** to **PHY** (marked with a lightning bolt icon); from **PHY** to **MAC**; from **MAC** to **LLC**; from **LLC** to **Control**; from **Control** to **Link Manager**; from **Link Manager** to **Baseband**; and from **Baseband** to **RF**. A red circle with a question mark is located between the **Control** block and the **LLC** block, with red arrows pointing to it from the **Control** block, the **LLC** block, and the **Management** block. Blue double-headed arrows indicate bidirectional communication between **LLC** and **MAC**, **MAC** and **PHY**, and between the **Management** block and each of the **LLC**, **MAC**, and **PHY** blocks. Dashed blue arrows also point from the **Control** block to the **LLC** and **MAC** blocks.

# IEEE 802



# Timeline for 802.15



08/05/99

10

THE WORLD LEADER IN DSP AND ANALOG





# Questions?

---

Tom Siep  
Member Group Technical Staff  
Texas Instruments

[siep@ti.com](mailto:siep@ti.com)