SNS COLLEGE OF TECHNOLOGY

Coimbatore-35

An Autonomous Institution

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Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19ECE308- WIRELESS TECHNOLOGIES FOR IOT

III ECE / VI SEMESTER

UNIT 1 – OVERVIEW OF INTERNET OF THINGS

TOPIC 9 –web communication protocols used by connected IoT/M2M devices,

Web communication protocols

- Data of connected devices routes over the web in two types of communication environments

    - Constrained RESTful Environment (CoRE)

    - Unconstrained Environment:

Constrained Environment for Connected Devices

- Data is limited in size

- 10s of Bytes from a device

- Limited compared to data interchange of 1000s of bytes between web clients and web servers when using HTTP, TCP and IP

Constrained Environment for Connected Devices

- Data routes over the low power and lossy (ROLL) network

- Devices may sleep most of the time in low power environment

- Awakes when required (when a client initiates)

- The connectivity breaks for long periods

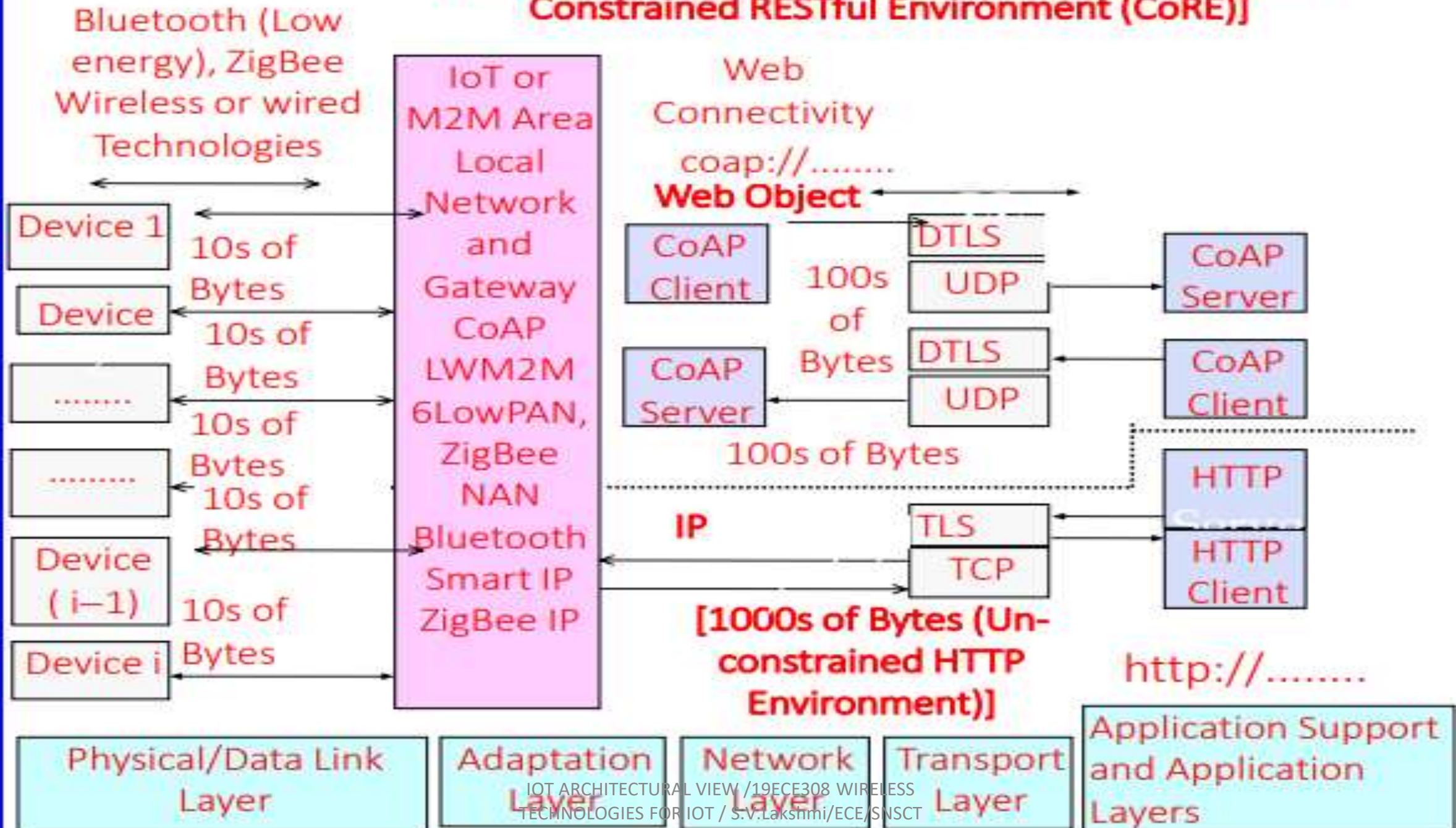- Have limited up intervals in lossy environment

Constrained RESTful Environment (CoRE)

- The gathered data from number of devices consists of 100s of Bytes after enriching and consolidating at Gateway

- Communication framework enables that data of networked devices communicate over the Internet using the REST software architecture

[10s and 100s of Bytes Communication Framework Constrained RESTful Environment (CoRE)]

Bluetooth (Low energy), ZigBee Wireless or wired Technologies

IoT or M2M Area Local Network and Gateway CoAP LWM2M 6LowPAN, ZigBee NAN Bluetooth Smart IP ZigBee IP

Web Connectivity coap://........

Web Object

Device 1
10s of Bytes

Device
10s of Bytes

....
10s of Bytes

....
10s of Bytes

Device (i–1)
10s of Bytes

Device i
10s of Bytes

CoAP Client

CoAP Server

100s of Bytes

DTLS
UDP

DTLS
UDP

100s of Bytes

CoAP Server

CoAP Client

HTTP

IP

TLS
TCP

HTTP Client

[1000s of Bytes (Un-constrained HTTP Environment)]

http://........

Physical/Data Link Layer	Adaptation Layer	Network Layer	Transport Layer	Application Support and Application Layers

CoAP (Constrained Application Protocol)

- An IETF recommended protocol for constrained environment devices

- A web-object's data transfer standard protocol for sending a request or response
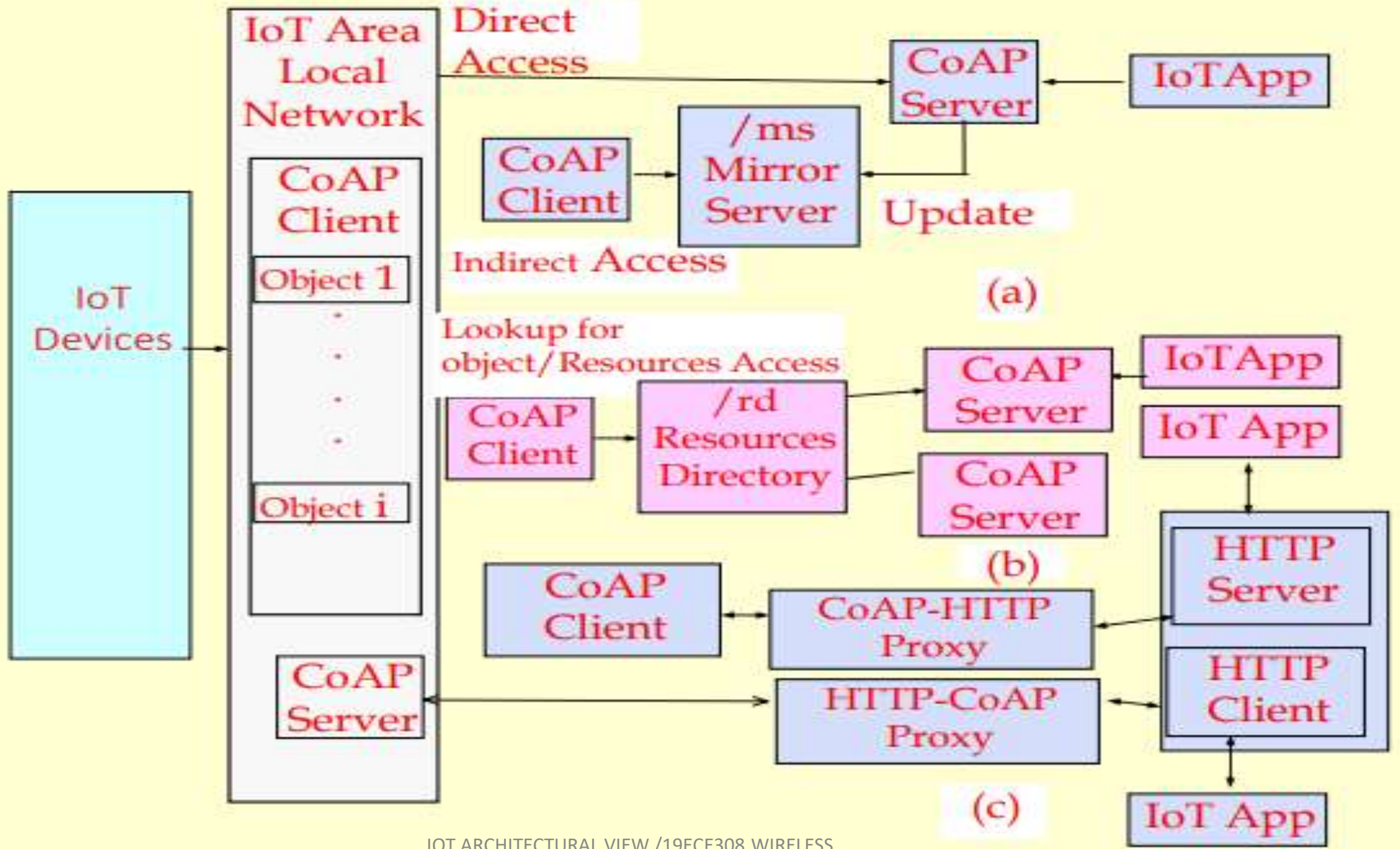
- For example, RESTful CoAP

CoAP Client and Server

- Object or resource uses CoAP

- CoAP client at a device, IoT/M2M Area Local Network or Gateway sends requests to a server

- CoAP server sends the responses, messages, resources and notifications

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CoAP Features

- Standard organisation IETF defined Application support layer protocol

- CoAP web-objects communication using request/response interactions model

CoAP Client and Server

- A specialized web transfer protocol used for CoRE using ROLL network.

- Use of object model for resources, and each object can have single or multiple instances.

- Each resource can have single or multiple instances

CoAP Features

- Supports resource directory and resource discovery functions.

- The resource identifiers use the URIs coap://...

- Small message-header of 4 bytes.

- CoRE communication is asynchronous communication over the ROLL

- Integrates easily with the web using the CoAP application cross-protocol proxies. Because HTTP and CoAP both share the REST model

UDP (Universal Datagram Protocol)

- A transport layer standard protocol sending a request or

  response datagrams

DTLS (Datagram Transport Layer Security protocol)

- Provisions for three types of security

- services (integrity, authentication and confidentiality

- Security binding with PSK or RPK or Certificate