SNS COLLEGE OF ENGINEERING

Kurumbapalayam(Po), Coimbatore – 641 107

Accredited by NAAC-UGC with 'A' Grade

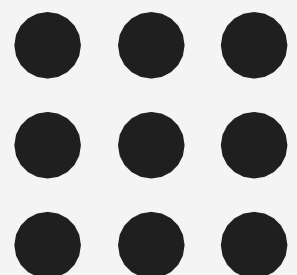**Approved by AICTE, Recognized by UGC & Affiliated to Anna University, Chennai**

Department of Information Technology

Course Name – 19IT503 Internet of Things

III Year / V Semester

Unit 1 – IoT INTRODUCTION AND APPLICATIONS

Topic 3- IPv6 Role and Nodal Capabilities

IPv6

Role of IPv6

- IPv6 with its abundant address spaces,

- globally unique object (thing) identification

- permanent unique identifier, an object ID (OID)

- unique network address (Nadr)

- IPv4 supports $2^{32} \sim 10^{10}$ NAdr location can be identified uniquely. 4,294,967,296

- IPv6 offers a much larger 2^{128} space

- the number of available unique node addressees is $2^{128} \sim 10^{39}$

- 340,282,366,920,938,463,463,374,607,431,768,211,456

IPv6

Advances of IPv6

- Scalability and expanded addressing capabilities

- IPv6 has 128-bit addresses versus 32-bit IPv4 addresses.
    Example IPv4 Address : 192.168.1.1
    Example IPv6 Address : 2001:0db8:3c4d:0015:0000:0000:1a2f:1a2b

- "Plug-and-play": IPv6 includes a "plug-and-play" mechanism that facilitates the connection of equipment to the network.

- Security: IPv6 includes and requires security in its specifications such as payload encryption and authentication of the source of the communication.

- Mobility: IPv6 includes an efficient and robust mobility mechanism namely an enhanced support for mobile IP, specifically, the set of mobile IPv6

Basic Nodal Capabilities
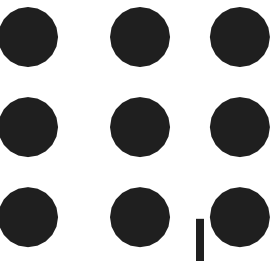
Node or Device - have a basic protocol stack that supports as a minimum local connectivity and networking connectivity.

In addition, some higher layer application support protocols are generally needed.

IoT devices may have capability differences such as
- maximum transmission unit (MTU) differences,
- Simplified versus full-blown web protocol stack (COAP/UDP versus HTTP/TCP),
- single stack versus dual stack,
- sleep schedule,
- security protocols,
- processing and communication bandwidth.

Basic Nodal Capabilities
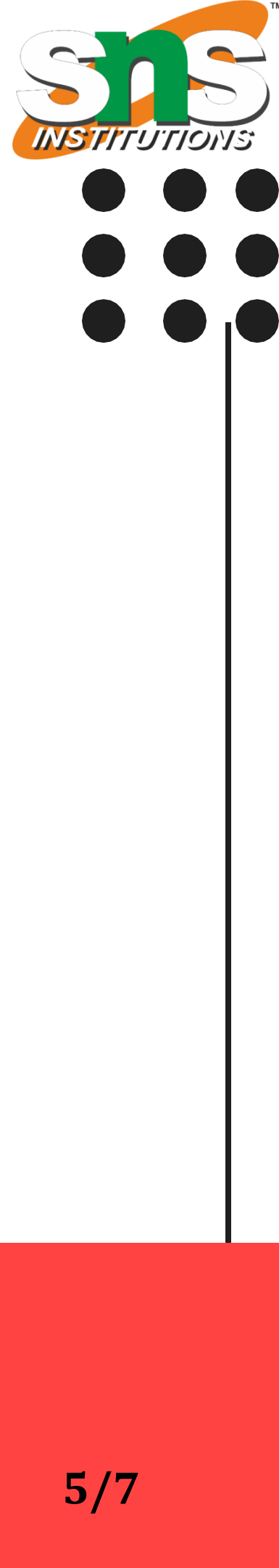
Typical requirements include the following capabilities

Retransmission
– Network recovers from packet loss or informs application
– Recovery is immediate: on the order of RTTs, not seconds
Network independent of MAC/PHY

Scale
– Thousands of nodes
– Multiple link speeds

Multicast
– Throughout network
– Reliable (positive Ack)

Duplicate suppression

Emergency messages
– Routed and/or queued around other traffic
– Other traffic slushed as delivered

Basic Nodal Capabilities

Routine traffic delivered in sequence

Separate timers by peer/message

Polling of nodes
– Sequential
– Independent of responses

Paradigm supports peer-to-peer
– Not everything is client/server

Capabilities
– Discover nodes
– Discover node capabilities
– Deliver multisegment records (files)

Exchange of multisegment records

Network and application versioning

Simple publish/subscribe parsers

Security
– Strong encryption
– Mutual authentication
– Protection against record/playback attacks
– Suite B ciphers

THANK YOU