SNS COLLEGE OF ENGINEERING

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Department of AI & DS

Course Name –Internet of Things & AI

V Semester

Unit 1 – IoT INTRODUCTION AND APPLICATIONS

Topic 3- Basic 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 ~ 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~ 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

1)Remote device generally needs to have a basic protocol stack

2) remote devices ie IOT devices are controlled remote server so we need protocol to do it

3)Basic protocol stack -supports Minimum local connectivity and Network connectivity (how the connectivity established)

4)Addition some higher layer application support protocol are needed

Basic Nodal Capabilities

IoT devices may have capability differences such as

1)maximum transmission unit (MTU) differences,
2)Simplified versus full-blown web protocol stack (COAP/UDP versus HTTP/TCP),
3)single stack versus dual stack,
4)sleep schedule,
5)security protocols,
6)processing and communication bandwidth.

Basic Nodal Capabilities

Typical requirements include the following capabilities

1.Retransmission

- **Network recovers from packet loss or informs application**
- **Recovery is immediate**

Network independent of MAC/PHY address

2.Scale

-local n/w or metro n/w or global n/w (min to max)

- **Thousands of nodes -scale should support min 2 nodes to maximum node(n)**
- **Multiple link speeds**

Basic Nodal Capabilities

Typical requirements include the following capabilities

3.Multicast

– Throughout network(every communication should reach through out)

– Reliable (positive Ack)

4.Emergency messages

When there is damage in any of the device (sensor) then it should send emergency message about the damaged device

5.Network and application versioning

Basic Nodal Capabilities

Typical requirements include the following capabilities

6.Polling of nodes

Sequencial -data is going to transfer sequential

Independent of response -it will not wait for it will send data even no response

7.security

Strong encryption – iot applications are mostly wireless so hacking is easy so need strong encryption

Mutual authenticaion – ex otp mail notification

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