



SNS COLLEGE OF ENGINEERING

Kurumbapalayam(Po), Coimbatore – 641 107

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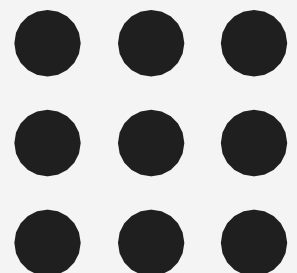
Department of AI & DS

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 $2^{32} \sim 10^{10}$ 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



- 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

Sequential - 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 authentication – ex otp mail notification



Basic Nodal Capabilities



Routine traffic delivered in sequence

Exchange of multisegment records

Separate timers by peer/message

Network and application versioning

Polling of nodes

Simple publish/subscribe parsers

- Sequential
- Independent of responses

Security

Paradigm supports peer-to-peer

- Not everything is client/server

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

Capabilities

- Discover nodes
- Discover node capabilities
- Deliver multisegment records (files)



THANK YOU