



SNS COLLEGE OF ENGINEERING

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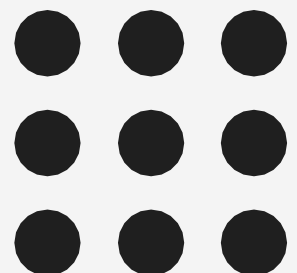
Department of AI & DS

Course Name -Internet of Things & AI

V Semester

Unit 1 - IoT INTRODUCTION AND APPLICATIONS

Topic 3- Basic Nodal Capabilities



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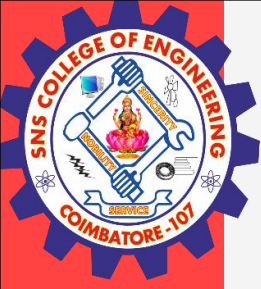


IPv6



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

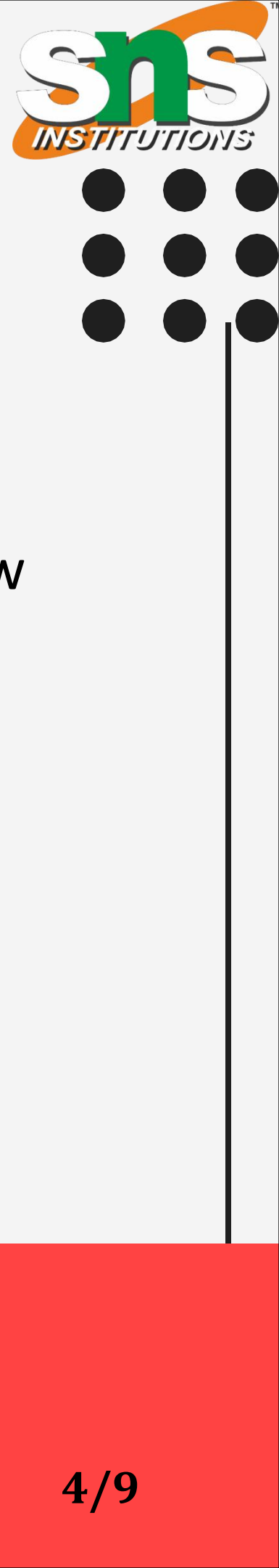


Advances of IPv6

- 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

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

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

3. Addition some higher layer application support protocol are needed



Basic Nodal Capabilities

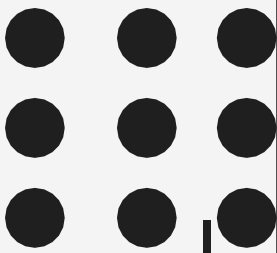


IoT devices may have capability differences such as

- 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



1. Typical requirements include the following capabilities

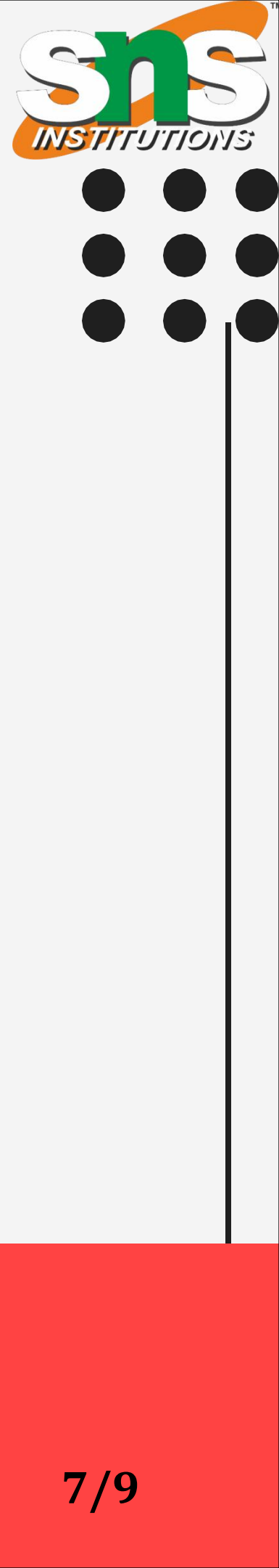
- Retransmission
- Network recovers from packet loss or informs application
- Recovery is immediate
- Network independent of MAC/PHY address

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)

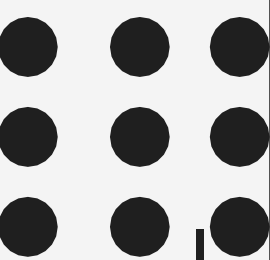
4.Emergency messages

- 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



THANK YOU