SNS COLLEGE OF ENGINEERING

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Department of Computer Science and 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 ~ 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

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