

School of Electrical, Electronics and Communication Engineering

Course Code : BEEE4001

Course Name: Smart Grid and Energy Mngement

UNIT V

IP Based protocol in Smart Grid

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Program Name: B.Tech

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What is Internet Protocol ?

The Internet Protocol (IP) is a protocol, or set of rules, for routing and addressing packets of data so that they can travel across networks and arrive at the correct destination.

Data traversing the Internet is divided into smaller pieces, called packets. IP information is attached to each packet, and this information helps routers to send packets to the right place.

Every device or [domain](#) that connects to the Internet is assigned an [IP address](#), and as packets are directed to the IP address attached to them, data arrives where it is needed.

Why IP based protocol in smart grid ?

IP is a communications foundation that was developed for helping data networks talk to each other, and it helps to answer some of the issues faced by the smart grid.

It has been proven in some of the largest networks in the world and provides practically unlimited scalability. Its original purpose was to help unrelated network systems communicate, so it was designed with flexibility in terms of protocols as well as the underlying physical connections, whether wired or wireless.

IP has the greatest number of tools to fine-tune performance, security, and reliability.

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Today IP is the glue that allows multiple types of physical equipment to operate transparently from end to end over a wide variety of media without adding the burden of conversion of protocols.

Smart grid deployments need the kind of transparent interconnection that IP provides to connect the various types of equipment and sensors that will be deployed to make the grid smart.

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Advantage of IP for smart Grid

- Transmitting data over multiple media: IP can run over any link layer network, including Ethernet, wireless radio networks, and serial lines, providing a common and flexible way to use and manage a network composed of disparate parts. ●
- Changing and growing with the industry: One of the principal benefits of IP is its ability to add a capability such as a new application without having to change IP itself. A good analogy is a highway and cars: car designs change constantly in response to emerging consumer demands, but nonetheless can still use the same roads and traffic management. That is why IP can run applications it was not originally designed to support, such as secure Internet commerce, voice, collaboration, and Web 2.0 applications. And just as highways are designed to support traffic for the next 100 years, IP will be able to support new applications as they are developed for decades to come.

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Connecting large numbers of devices: One of the main challenges with connecting large numbers of devices is providing a unique identifier, or address, for each device. Unlike the many architectures that went before it, IPv6 offers straightforward addressing and routing for a huge network such as the smart grid.

Maintaining reliability: IP already has more tools and applications to help manage the network and maintain reliability than any other communication protocol.

Connecting multiple types of systems: IP is device independent. This means that it can identify any type of system to which data is addressed and deliver it to its destination. IP can also identify the system from which the data came, so it enables the receiving device to respond back to the sending device to let it know the data has arrived.

Ensuring security: IP is secure as you want to make it. Although IP was designed to be open and flexible, over the years more and more tools have been built to provide security in the communications that travel over an IP network. In fact, of all communications protocols,

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Conclusion:

IP is the proven, scalable, secure, cost-effective, and interoperable foundation for the communications, information, and commercial networks around the world.

Cisco believes that the Internet architecture should similarly serve as the foundation for the smart grid.

The IP protocol suite includes a number of protocols and mechanisms to ensure high quality of service that meets the requirements of the most stringent applications, high availability, and a very strong and secure architecture. The flexibility of the layered architecture also ensures mkes sure of investment protection for utilities for decades to come.

IP has also demonstrated its ability to scale with billions of connected devices, and smart grid networks require similar scalability requirements.

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