IoT Communication APIs

Internet of Things , Lecture-6

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REST-based Communication APIs

Representational State Transfer (REST) is a set of architectural principles by which you can design web services and web APIs that focus on a system's resources and how resource states are addressed and transferred. REST APIs follow the request-response communication model. The REST architectural constraints apply to the components, connectors, and data elements, within a distributed hypermedia systems.

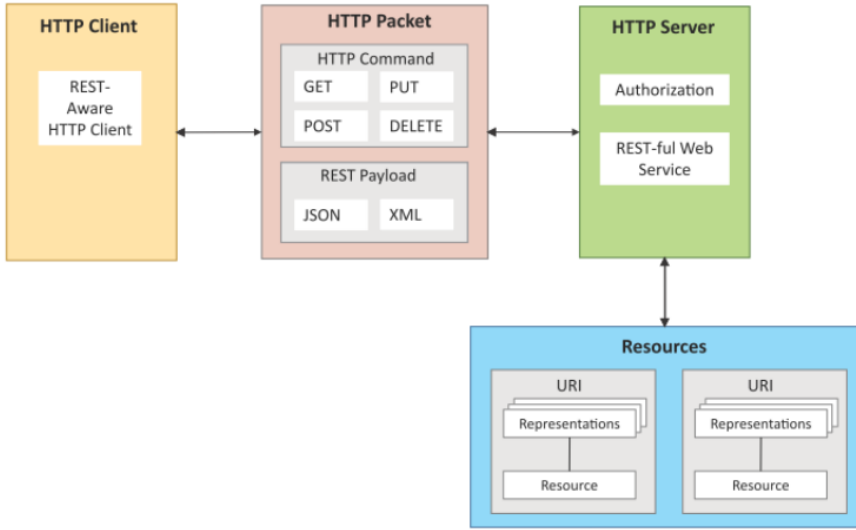

Figure: REST based API

REST Constraints

The REST architectural constrains are as follows:

- **Client-Server:** The principle behind the client-server constraint is the separation of concerns. For example, clients should not be concerned with the storage of data which is a concern of the server. Similarly, the server should not be concerned about the user interface, which is a concern of the client. Separation allows client and server to be independently developed and updated.

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- **Stateless:** Each request from client to server must contain all the information necessary to understand the request, and cannot take advantage of any stored context on the server. The session state is kept entirely on the client.
- **Cache-able:** Cache constraint requires that the data within a response to a request be implicitly or explicitly labeled as cache-able or non-cache-able. If a response is cache-able, then a client cache is given the right to reuse that response data for later, equivalent requests. Caching can partially or completely eliminate some interactions and improve efficiency and scalability.

- **Layered System:** Layered system constraint, constrains the behavior of components such that each component cannot see beyond the immediate layer with which they are interacting. For example, a client cannot tell whether it is connected directly to the end server, or to an intermediary along the way. System scalability can be improved by allowing intermediaries to respond to requests instead of the end server, without the client having to do anything different.

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- **Uniform Interface:** Uniform Interface constraint requires that the method of communication between a client and a server must be uniform. Resources are identified in the requests (by URIs in web based systems) and are themselves separate from the representations of the resources that are returned to the client. When a client holds a representation of a resource it has all the information required to update or delete the resource (provided the client has required permissions). Each message includes enough information to describe how to process the message.

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- **Code on demand:** Servers can provide executable code or scripts for clients to execute in their context. This constraint is the only one that is optional.

WebSocket-based Communication APIs

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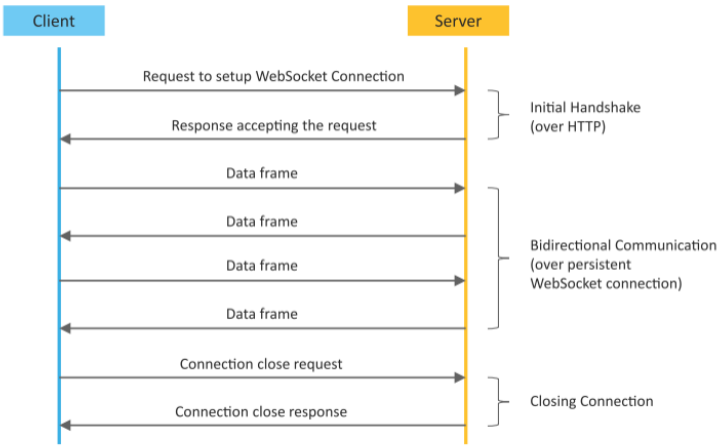

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- WebSocket APIs reduce the network traffic and latency as there is no overhead for connection setup and termination requests for each message. WebSocket is suitable for IoT applications that have low latency or high throughput requirements.