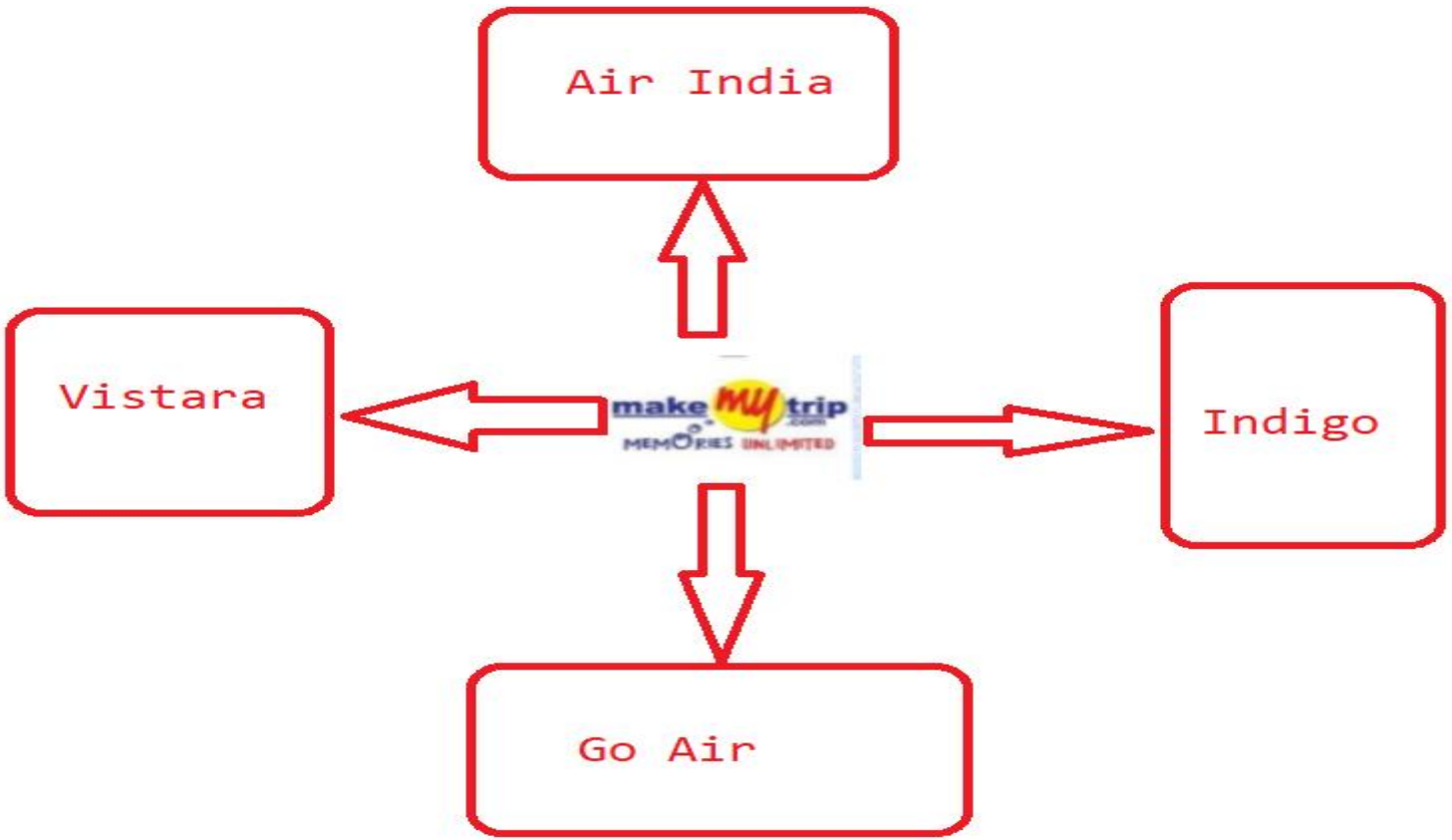
Introduction to Web Services

- What is a Webservice?
  - Service available over the Web.



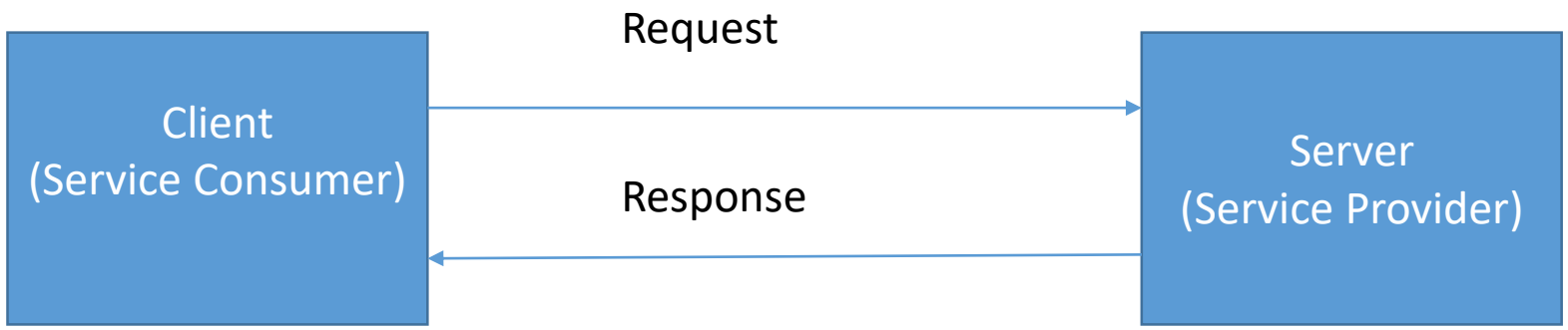
- But the question here is how Makemytrip.com have information about the flights of all airlines?

  - So if we talk about how make my trip is getting these information, there can be following possibilities:
    1. Either Makemytrip.com has the database access of all airlines.
    2. Or All airlines dumps their data onto the Makemytrip server in some regular intervals.
    3. Or Makemytrip is using the webservices provided by each airlines and by accessing those webservices Makemytrip is getting the real-time data.

    And the answer is … through webservices.

- Therefore, we can say that a Webservice :
  - Enables communication between different applications over web.
  - It provides a standard for communication between different applications.
  - It enables platform independent communication between two applications, irrespective of the technology used by the two different applications.
  - Using webservice, different applications, which are being implemented using different language can talk to each other and can shared data and information, just like in case of Makymytrip.com.

As we know that a webservice enables two different applications to communicate with each other, if we talk about the basic architect of webservice, so basically it is a Client Server based architect, where



1. Server(Service Provider): - A webservice provides develops the application and make it available for the Client

2. Client(Service consumer): - The client sends out a request to the server and the service provider processes this request and provides a response.

Therefore, this is how the communication between the client and the server happens. But to make this communication happen, we need to have a MEDIUM and a common FORMAT for this communication to be happen.

Now, if we talk about how the webservice are implemented, so the answer will be in two ways:-

- SOAP(Simple Object Access Protocol):- Where the Medium → HTTP(POST) and FORMAT→ XML.

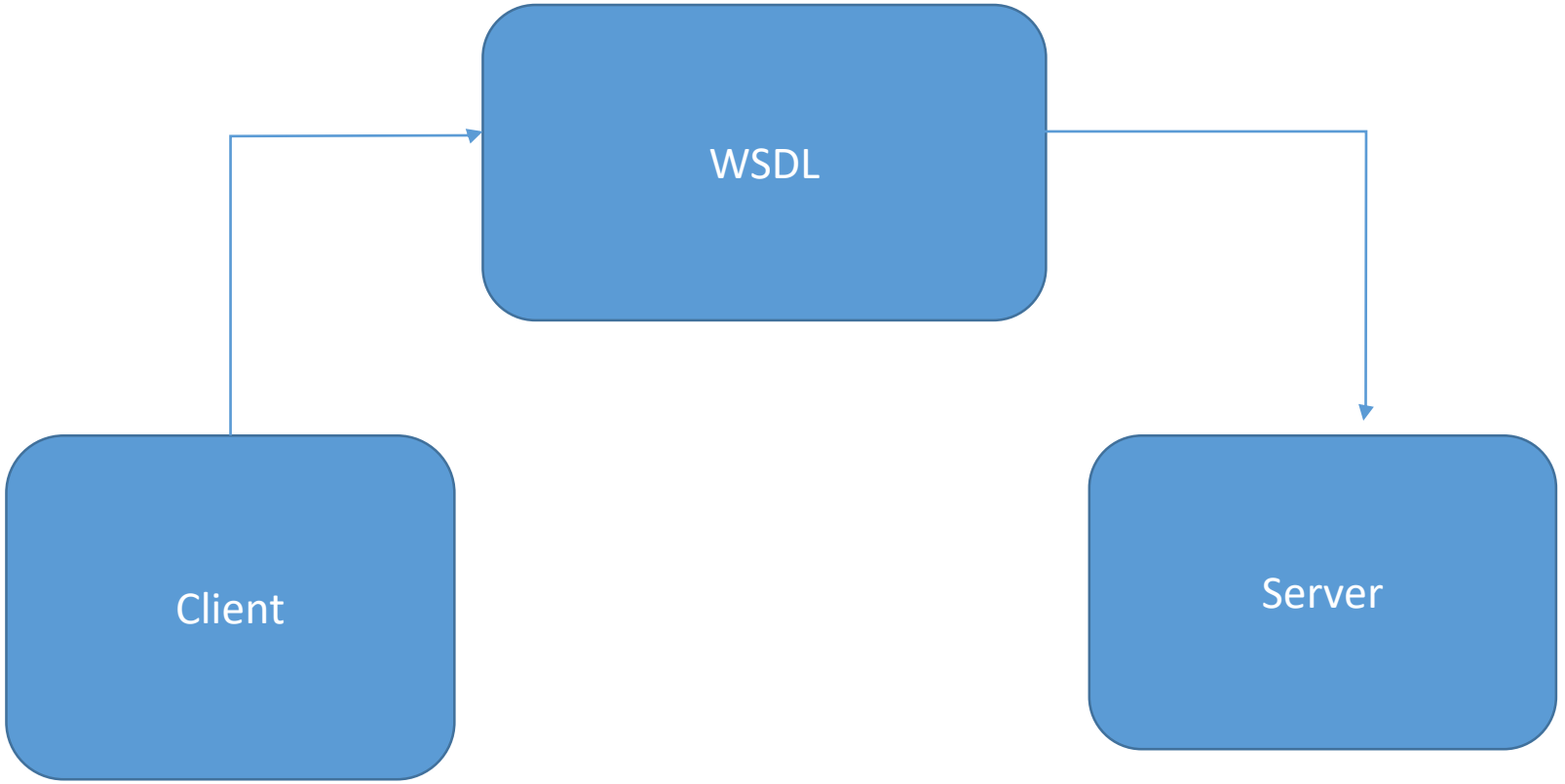
- REST(Representational State Transfer):- Where Medium→ HTTP(GET, POST,PUT,DELETE, etc.) and FORMAT→XML/JSON/TEXT etc.

As a service consumer, you must know about the webservice you are going to use. Like what the webservice does, what are the request and response parameters and how to call and consume the Webservice? Therefore, for this we need to learn some important things:-

1. WSDL:- It stands for Web Service Description Language.
2. UDDI:- It stands for Universal Description, Discovery and Integration.
3. SOAP:- It stands for Simple Object Access Protocol
4. REST:- It stands for REpresentational State Transfer.

WSDL: - WSDL stands for Web Services Description Language. It is the standard format for describing a web service. Microsoft and IBM developed WSDL jointly.

- Features of WSDL
  - WSDL is an XML-based protocol for information exchange in decentralized and distributed environments.
  - WSDL definitions describe how to access a web service and what operations it will perform.
  - WSDL is a language for describing how to interface with XML-based services.
  - WSDL is an integral part of Universal Description, Discovery, and Integration (UDDI), an XML-based worldwide business registry.
  - WSDL is the language that UDDI uses.
  - WSDL is pronounced as 'wiz-dull' and spelled out as 'W-S-D-L'.


WSDL
Client
Server

Now the question is how a service consumer can get the WSDL from a Service provider.

- The Answer is - Either the service provider can directly share the WSDL with the consumer or A webservice provider published his webservice on an online directory from where consumer can query and search the webservices. This online registry or directory is known as UDDI.

- UDDI: - Universal Description, Discovery and Integration is an XML based standard for publishing and finding web services.

SOAP

- What is SOAP webservice: - A webservice, which complies with the SOAP Web Service Specification, is a SOAP Webservice.

However, the question is what are these specification /standards? Moreover, who defines these standards?

So here is the Answer:-

- Who defines:- W3C (World Wide Web Consortium)
- What are those specification:- A SOAP webservice must compile with following specs:-
  - SOAP
  - WSDL
  - UDDI

Now what are SOAP specs:-

- All information exchange should happen over a common format: XML
- XML must have a defined structure : SOAP Message
- SOAP Message consists of :
  - Envelope − Defines the start and the end of the message. It is a mandatory element.
  - Header − Contains any optional attributes of the message used in processing the message, either at an intermediary point or at the ultimate end-point. It is an optional element.
  - Body − Contains the XML data comprising the message being sent. It is a mandatory element.
  - Fault – An optional Fault element that provides information about errors that occur while processing the message.

REST

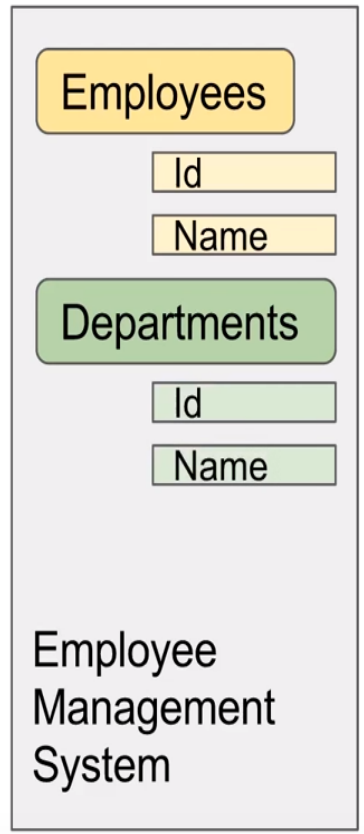
- What is REST:- A Webservice that exchange information/message between two application using REST architecture/principles is called a RESTful WebService.
  - REST defines set of principles to follow for a webservice to exchange data.
  - When these principles are followed while implementing a webservice we get RESTful webservice.
  - Like SOAP there is no central body which is controlling the specification.

  - Here in case of REST the medium is HTTP(Get, Post, PUT,DELETE, etc)
  - And the common format is Json/XML.

Basic constraints of REST

- Uniform Interface
  - Resource- Everything is resource
  - URI-any data can be accessed by URI
  - HTTP-HTTP methods are used
- Stateless-All client-server communication are stateless
- Cacheable-It happens at client side.
- Layered System-Multiple layer can exist between client and server like proxies, gateway etc.
- Code on Demand-It is an optional constraint. It is an ability to execute code at client side.

1. Resource : everything is a resource



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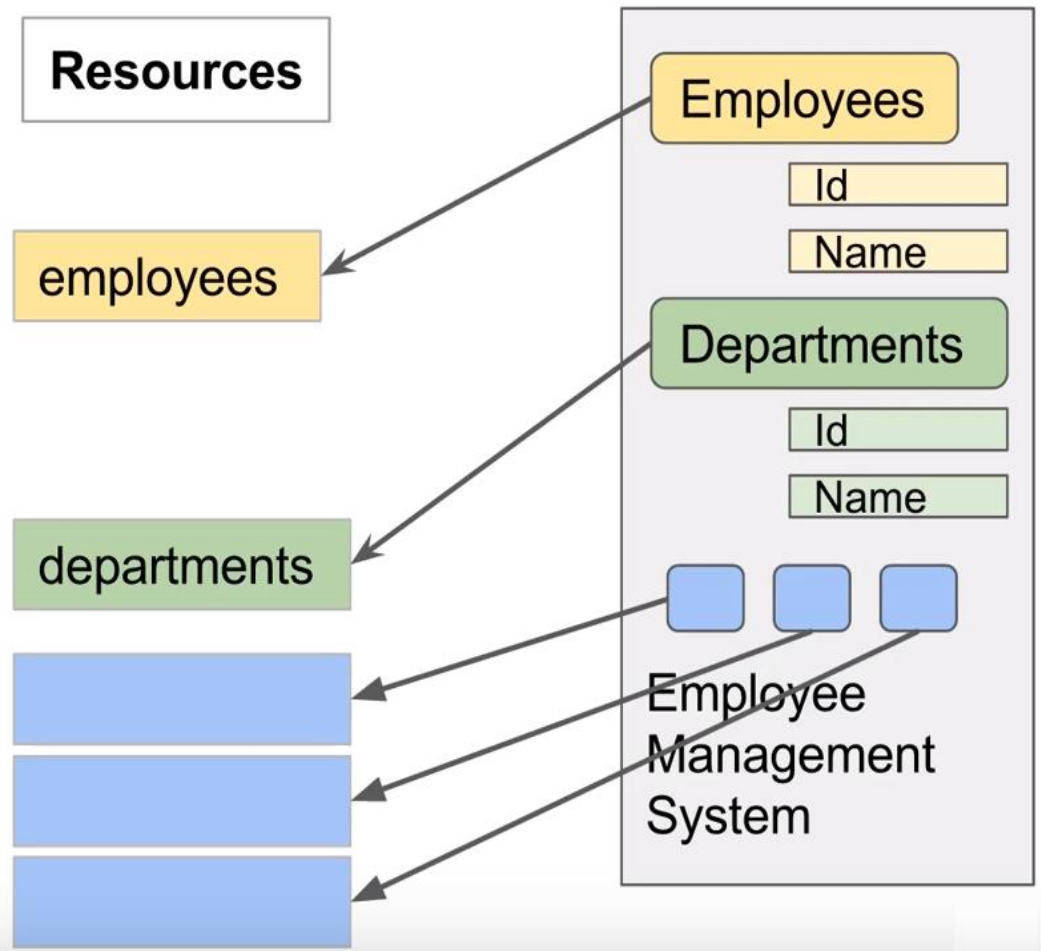

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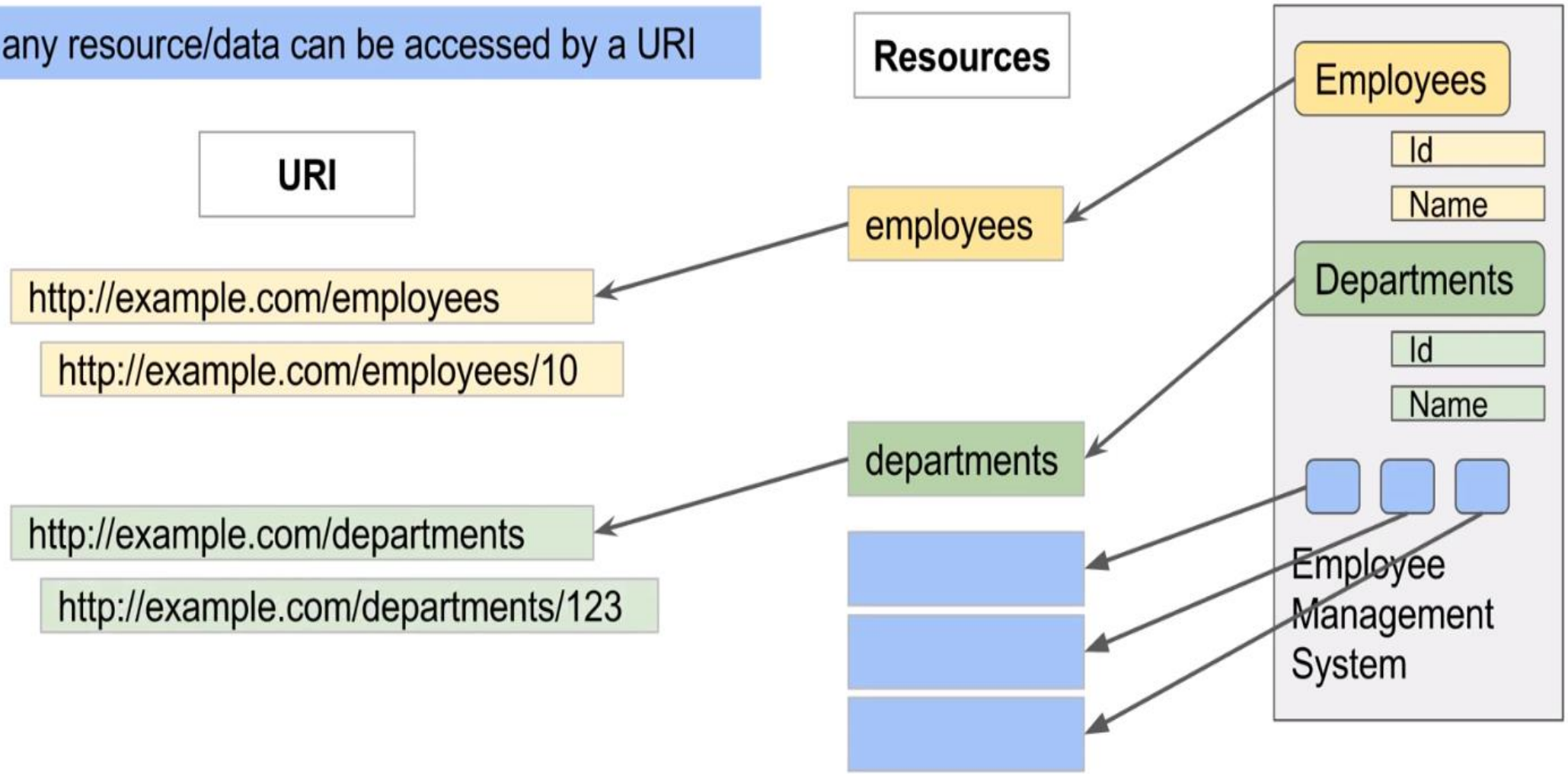
2. URI : any resource/data can be accessed by a URI



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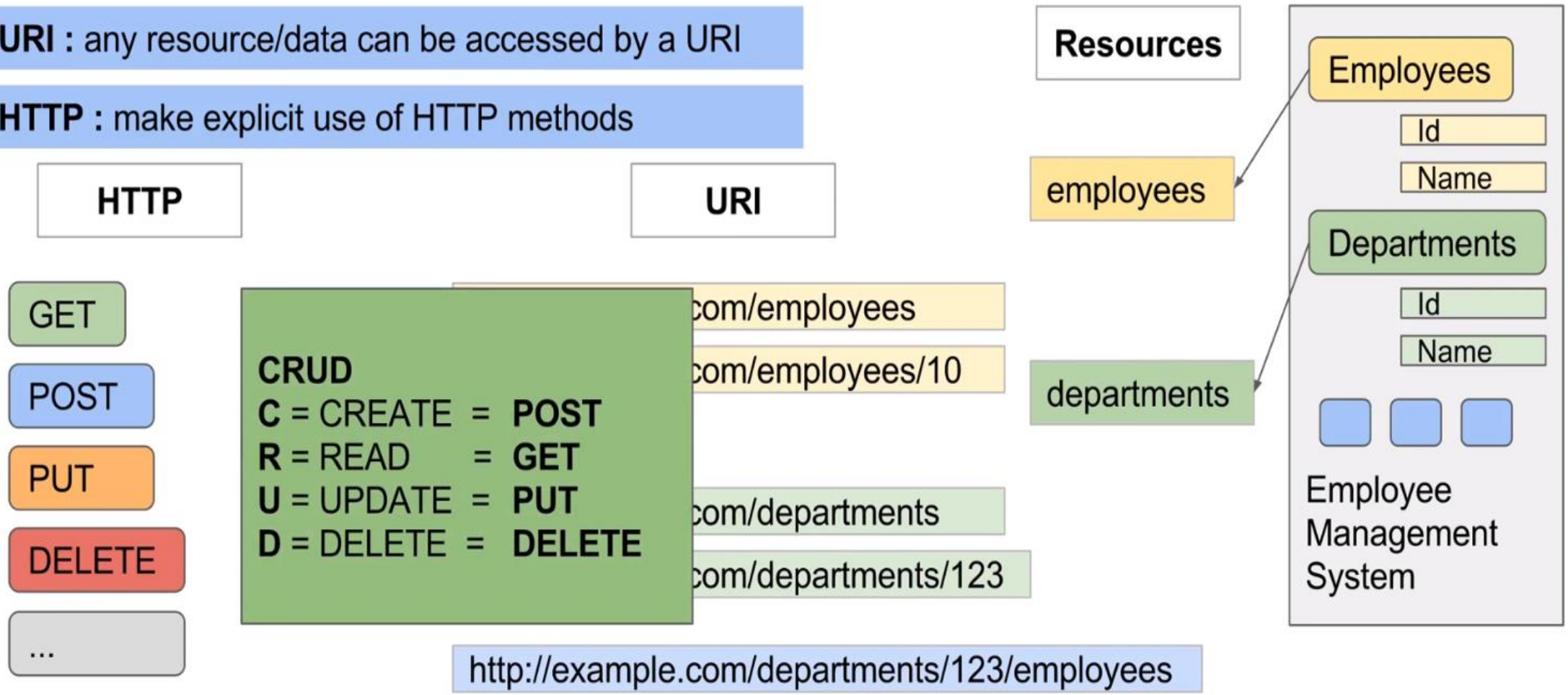
3. HTTP : make explicit use of HTTP methods



http://example.com/departments/123/employees

Using HTTP Methods along with URI, we can access/modify any resource or resource information.

REQUEST		**RESPONSE**
GET -	http://example.com/employees	list of employees
GET -	http://example.com/employees/10	details of employee with id=10
DELETE -	http://example.com/employees/10	deletes employee with id=10
POST -	http://example.com/employees + Data of new employee	id of new employee
PUT -	http://example.com/employees/10 + Data to be changed	modifies data for employe 10