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B.B.S

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Darek
 Signature of Invigilator

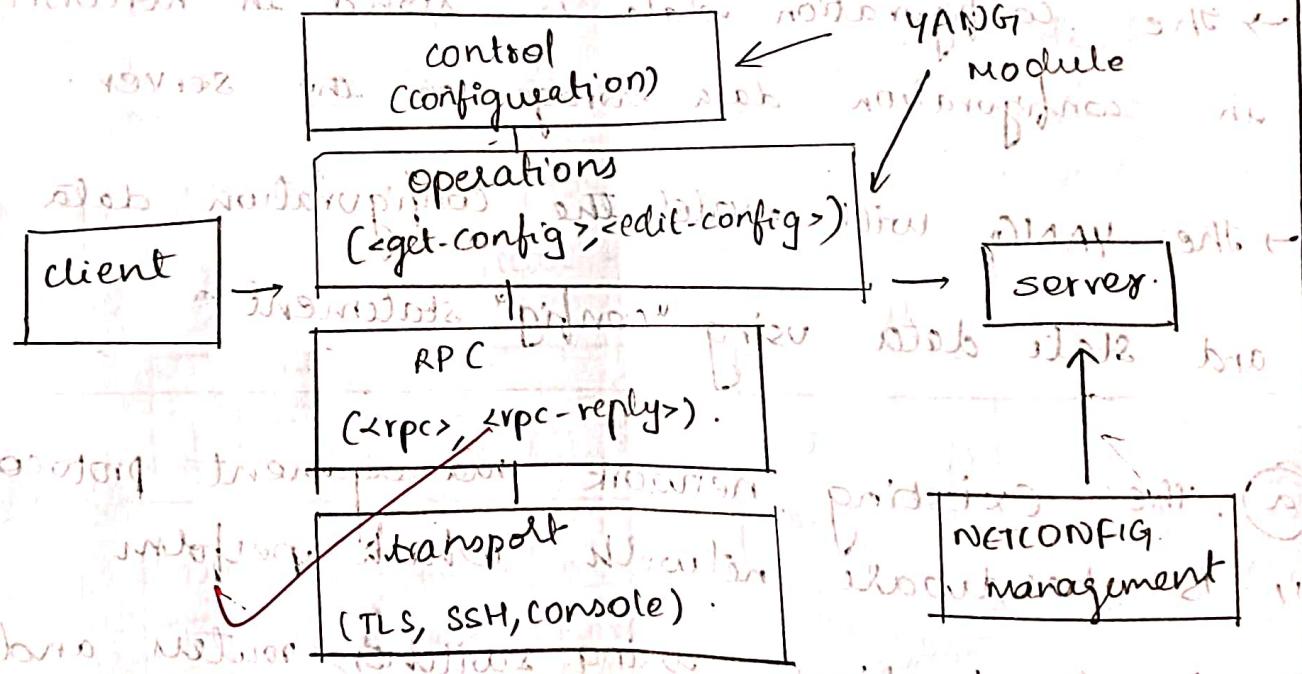
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a																				
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Begin Answering Here

Part-B

- ③ NETCONF protocol layers.



In the transport layer, the process to process communication will take place. Relying the packets will be done accurately.

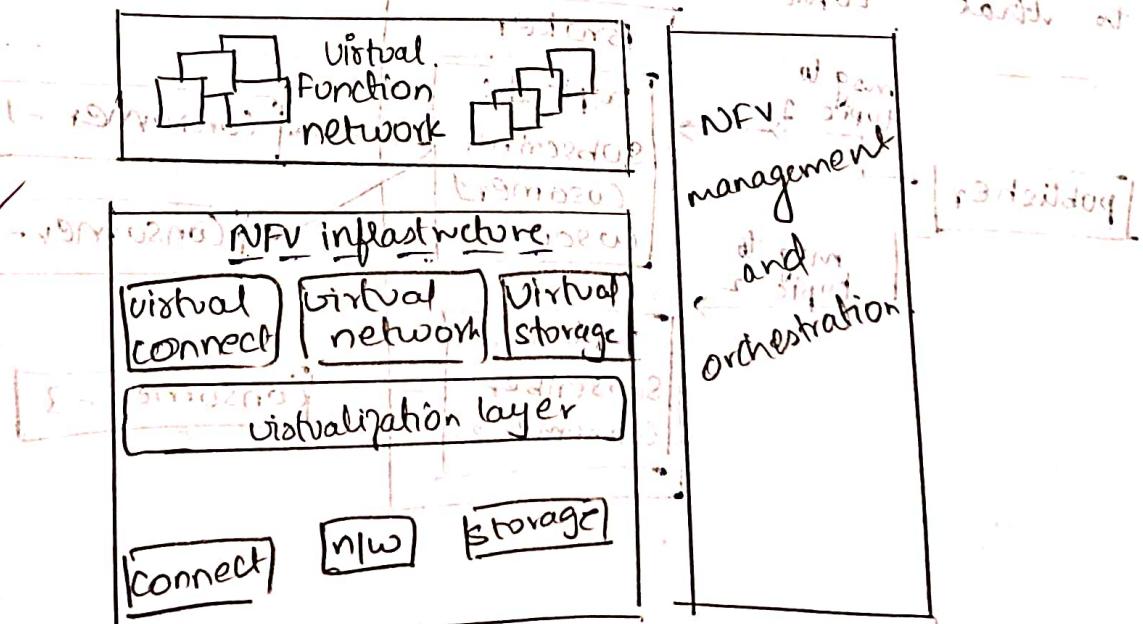
- RPC is → responsible for independent transaction
- NETCONF uses RPC-based communication to support request and response between the client and server.
- the control layer is responsible for configuring the network and to access the network and do some operations we have few operations to perform on config.
- the operations that we can perform on config are <get-config> and <edit-config>.
- NETCONF will store the configuration data and state data in data modelling language called YANG.
- the configuration data is stored in NETCONF in configuration data storage on the server.
- the YANG will model the configuration data and state data using "config" statement.

- a) the existing network management protocol is hardware network which performs network functions using switches, routers and firewalls.
- b) So the traditional hardware's implementation

limitations such as

- 1) cost → very expensive
- 2) the space occupied by the hardware network
- 3) power consumed by hardware network
- 4) and cooling system requirement

- To avoid these "Network functions" virtualization came into picture. It virtualizes the network functions that were traditionally performed on hardware.
- These are now implemented on software via virtual machines.
- The demand for virtual network functions increased because of its flexibility, agility and configurability.
- The main feature is "virtualization" which provides virtual environment where all networks can use same physical infrastructure.



11) $\frac{1}{2}$



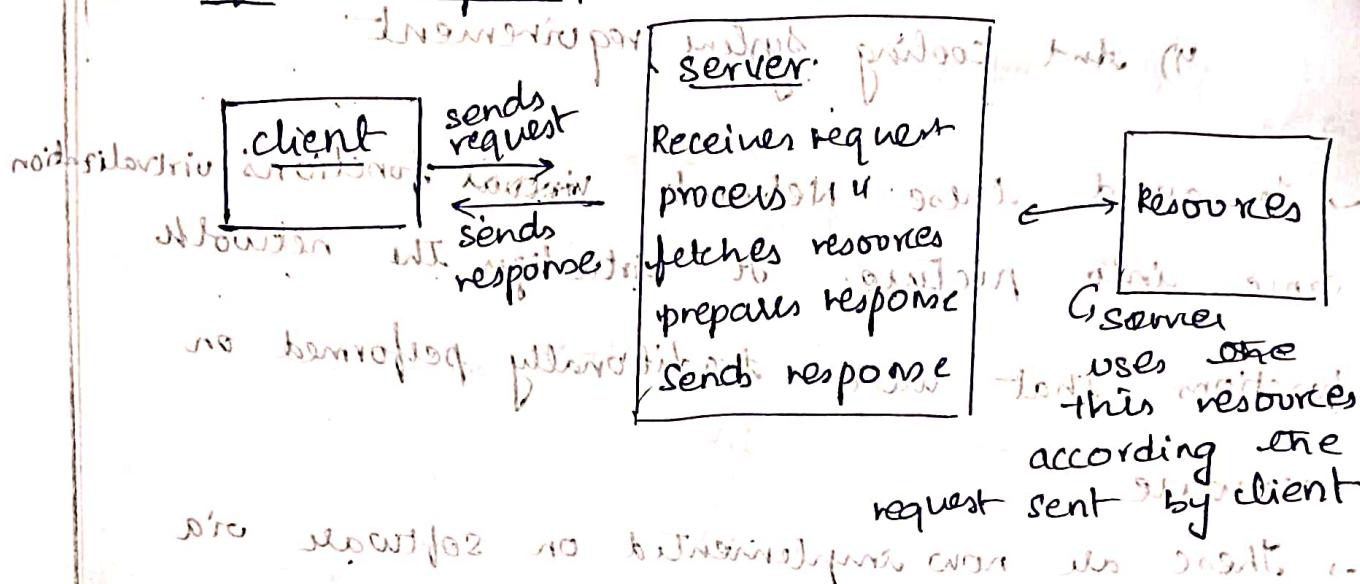
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Communication models of IOT

- ① Firstly there are 4 communication models

Abdullah *denominations* *in* *Kenya* *now* (6)

④ Request- Response.

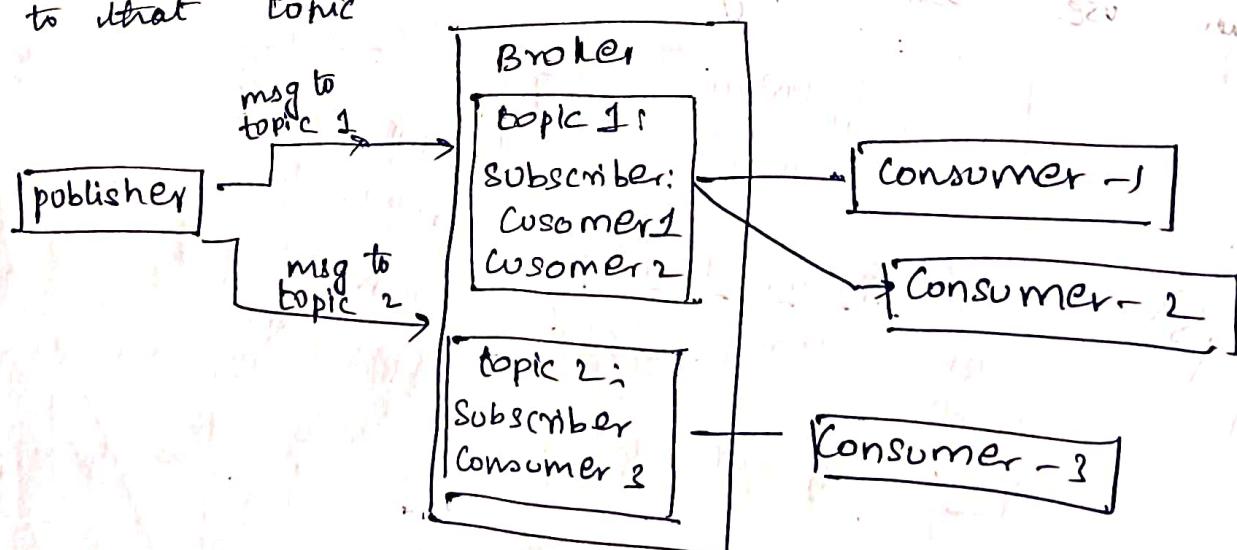


II publish - subscribe

- ~~① publisher:- sends data to broker
broker manages the topic.
publisher has no idea of consumer~~

~~② consumer:- subscribes to the topics managed by broker~~

~~③ broker:- when the data is given to the topic
broker will send it to the subscribed customer~~



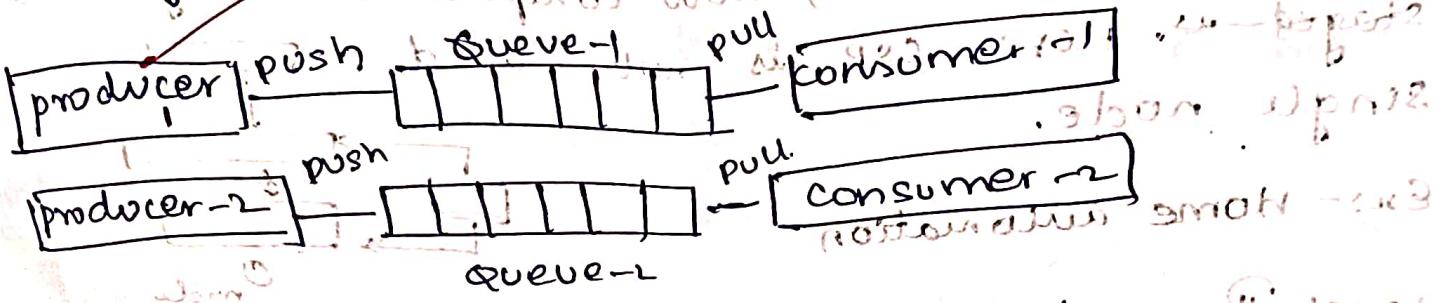
SASTRA

producer-consumer) / push-pull

producer:- Has no idea consumer exists
pushes the data into the queue.

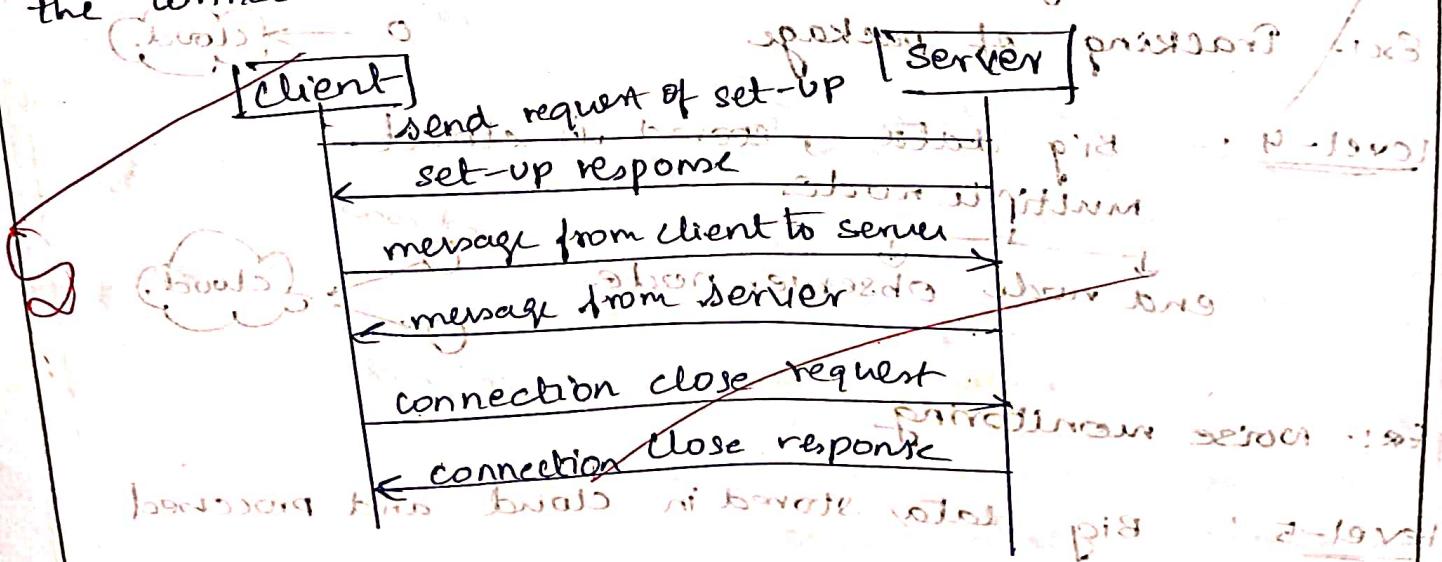
consumer:- Buffered, it will decouple the messages
between producer and consumer

It helps when mismatching of data rate is
occurring while pushing and pulling



exclusive -pair:- Bidirectional communication

This belongs to bidirectional communication.
Fully duplex mode. Both parties share the connection.
→ Here client will send request to open the connection.
→ Once connection is established/setup, both client and server can exchange messages.
→ Only when client sends request to close connection,
the connection will close.



The communication model can be



Request-Response model, which uses

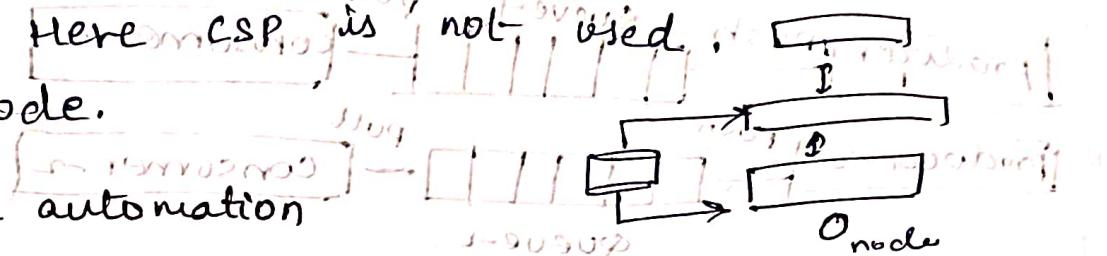
Used by REST API for services in the cloud.

b) There are total 6 levels in IoT.

level-I → OS. for presentation, network, application etc.

data: low-cost data, low complex (not big data)

Ex:- Home automation



level-II no other resources, long distance, using wireless

Big data, single mode, stored in cloud and analysed in cloud, used CSP (Cloud Service Provider).

Ex:- Smart irrigation

level-III Describes specific nodes in a place.

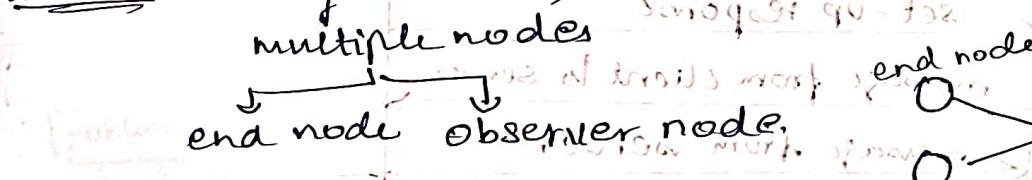
Big data, single mode, processed in cloud.

Ex:- tracking of package



level-IV :- Big data, stored in cloud.

multiple nodes

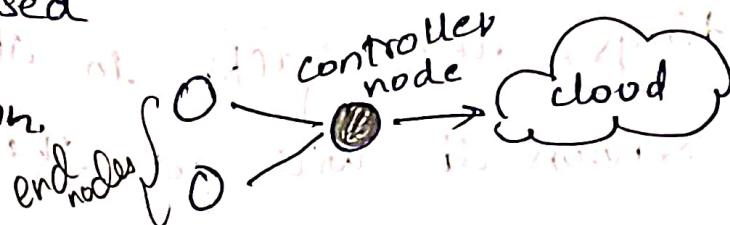


Ex:- noise monitoring

level-5 :- Big data stored in cloud and processed in multiple nodes.

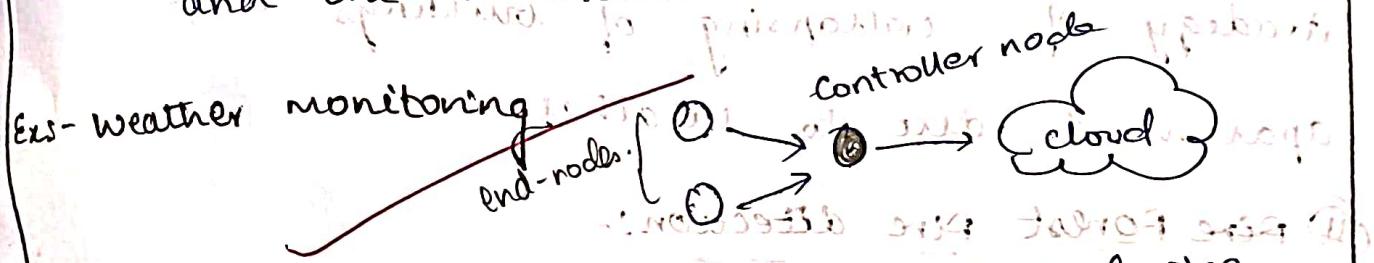
end nodes and controller node. SASTRA

here IoT devices are placed in event locations. The nodes will send data to cloud, CSP is used.



Level-6 :- Big data, data is stored in clouds, CSP

multiple nodes → 2 end nodes which are independent,
and one is controller node.



\therefore the most suitable level for 15 IOT devices

is from level-2 to level-6, as the devices

should in real time and the data is in cloud.

Therefore, the level - G is suitable, closest.

(12) the SOT based environment monitoring :-
→ There are various range of SOT applications which are used for monitoring the environment's health, quality, and status.

→ To discuss the brief for based application
that are based on environment monitoring,
First one that comes is monitoring of Apartments



Buildings, complexes and other constructions.

SAC

(i) Building construction monitoring:

→ this is tells us, the life span of the buildings, the cracks in it and using sensors it will get the information on the sensors.

effect on climate and weather on the

building and apartments.

→ Because of this warnings, we can escape from tragedy of collapsing of buildings and apartments due to weather.

(ii) Forest fire detection:-

→ Here, in the IoT based monitoring different sensors were used to get information on CO₂ levels, humidity and temperature of areas.

→ all this data is passed to cloud to process it. If the output of sensor is varying differently, from traditional ones, ie. will turn on the 'siren' and let people/ officers know the situation of forest. Thereby the officers will come to rescue.

Because of this well-being of environment is done.

weather and noise monitoring

This IoT based monitoring in the weather will help the environment by letting the weather department know if there is any disaster, tsunami, natural calamity will occur or not. By knowing the weather daily, the environment's well-being is also calculated.

If the noise received by the sensor's are more than usual on any particular day, we can analyse the reports and data and can prevent it or can take measures so that again it does not happen.

(iv) Traffic control: - This IoT device will let us know through emails, sms / message if the traffic is high / not or congestion is present. due to this, people can know which route to take, without waiting on the road by releasing the smoke from vehicles which harms the environment and health.

These are some of the helpful things done by IoT-based environmental monitoring and its contribution to its well-being.



TOT devices are dynamic and self-adapting.

Example:- The camera which is surveilling

should work ~~the same~~ even ~~when the~~

location of camera changes. that is when

the light in room is dim / not sufficient or

if the weather is hot & if the light is

too bright in the room, the camera should

adapt to its environment and works dynamically

without changing in its functionalities

2A) parameters that differentiate wire & wireless

~~wired~~

~~wireless~~

① The relocation capability is hard. remote working can't be there

① can move easily anywhere without being stuck in the position

② except LAN, while using this it should be connected to our device through cable.

② no need for physical connection. wireless LAN, satellite - way

③ ethernet which are connected to CPU's. conventionally

③ WiFi can be connected to any device directly

④ maintenance is complex

④ no maintenance needed

⑤ power consumed will be high

⑤ power consumption is comparatively low.

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Embedded Systems :- which contains both

hardware and software.

→ This is IoT enabling technology because this will connect the people, cloud and software through internet.

Ex:- personal computer. RAM, cache, keyboard,

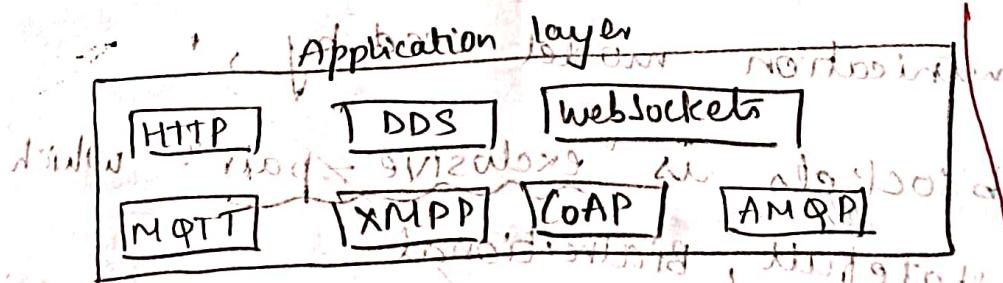
monitor, screen, CPU, interface, cloud

accesses.

→ embedded systems allows any device for connection of other devices.

IoT application layer protocols

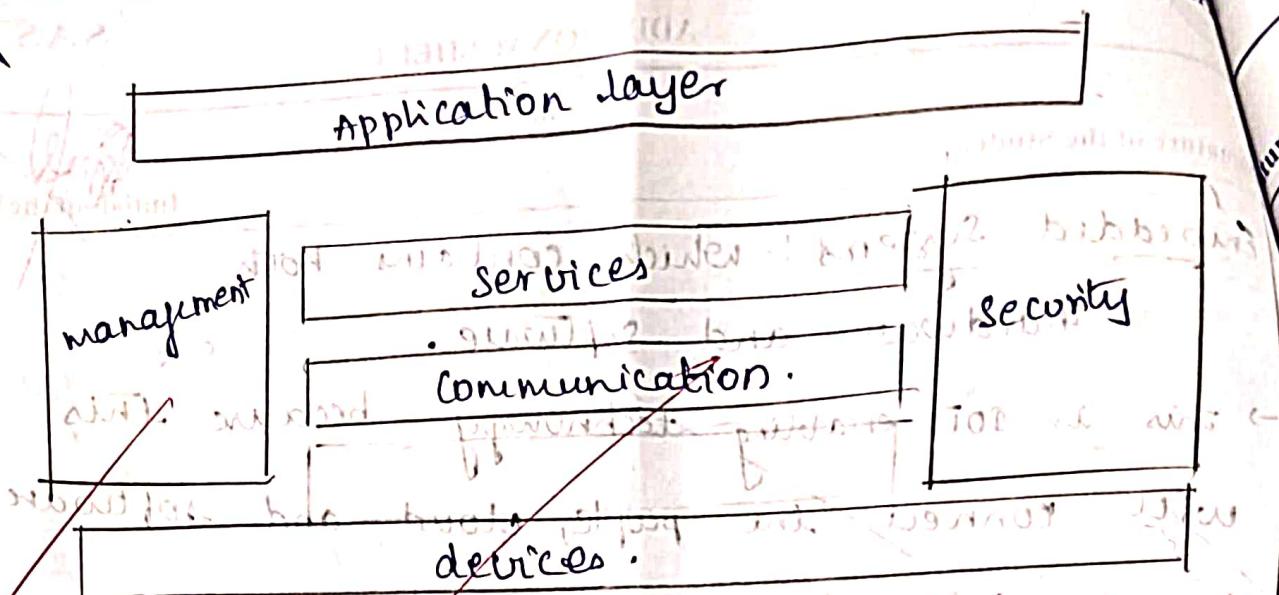
- (1) MQTT → publish-subscribe comm. model uses it
- (2) HTTP, XMPP
- (3) websockets
- (4) DDS
- (5) XMPP
- (6) CoAP



mainly MQTT protocol follows them publishing and receiving communication model like also REST subscribe API.

IOT functional block.

SASTRA



Functional block contains:-

- ① Application layer
- ② services
- ③ communication
- ④ devices
- ⑤ security
- ⑥ management

- ⑥ @the interface between SDN controller and SDN application is "North bound open API".
 @ the interface between SDN controller & SDN network devices is "South bound open API, (open flow)" sdn protocol.

⑦ the communication model used by ,

- 1) web sockets is "exclusive - pair" which is statefull, Bidirectional

- 2) REST API's is "request - response" communication model which is stateless, unidirectional.

ADDITIONAL SHEET

of the Student

Session Code :

Initials of the invigilator

IOTProtocols:-
HTTP, MQTT,
CoAP, WebsocketInfo:- IOT network
has more
emphasis on
softwareM2MZigbee, bluetooth,
M-bus, M-bus wirelessM2M network have
more emphasis on
~~hardware with~~
~~embedded system~~.

a) SNMP is unsuitable for configuration management

because,

- 1) It can't differentiate the configuration data and state data in MIB.
- 2) we can't get the current location configuration and its address using SNMP (Simple n/w management protocol).

b) The two RPC methods used in NETCONF for manipulating the configuration data are

1) <get-config>

2) <edit-config>

3) <rpc>

4) <rpc-reply>