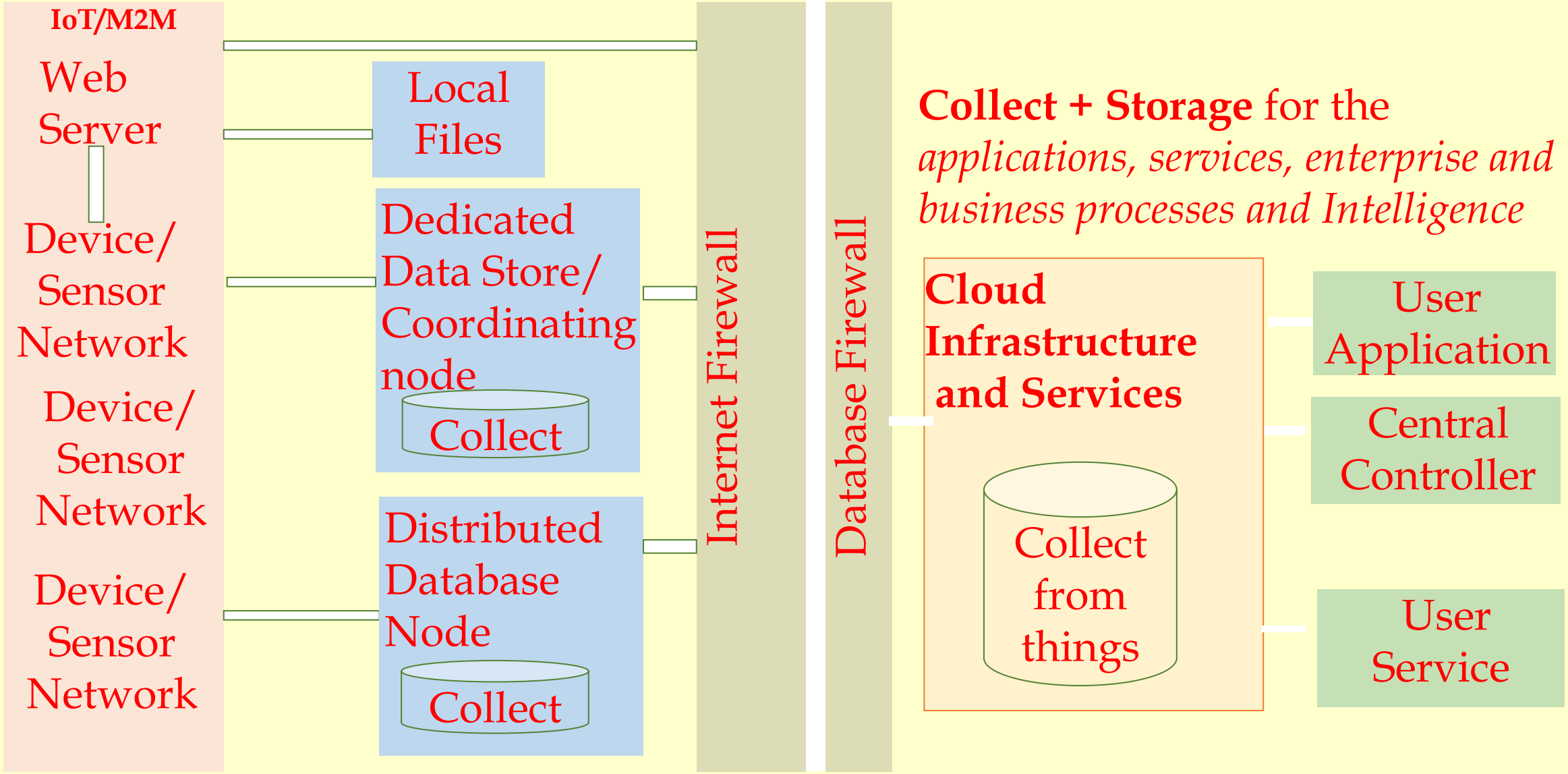
Lesson 5
Nimbits

Cloud IoT cloud-based Service Using Server at the Edges

- A server can be deployed at the edges (device nodes) which communicates the feeds to the cloud service.
- The server also provisions for the generation and communication of alerts, triggers and feeds to the cloud service
- Server can be mirror server for the cloud server

Cloud IoT cloud-based
Service To User Applications and Services

- User applications or services use the collected data at the cloud infrastructure



Devices/Sensor Networks Data Collection at the Devices-network Web Server and at the Cloud infrastructure

Nimbits

- Enables IoT on an open source distributed cloud
- Nimbits cloud PaaS deploys an instance of Nimbits Server at the device nodes
- Functions as M2M system data store, data collector and logger and access to historical data.
- Architecture a cloud-based Google App Engine

Nimbits Server

- A class hierarchy com.nimbits.server.system.ServerInfo of the java.lang.Object

Nimbits Features

- Edge computing locally on embedded systems, built up of local applications.
- Runs the rules and pushes important data up to the cloud running when connected over Internet and
- An instance of Nimbits Server hosts at the device nodes which is when enabled

Rule Engine

- For connecting sensors, persons and software to the cloud and one another
- Rules can be for calculations, statistics, email alerts, xmpp messages, push notifications and more.

Nimbits Support

- Multiple programming languages, including Arduino, new Arduino Library
- Push functions from Arduino cloud, JavaScript, HTML or the Nimbits.io Java library.
- Nimbits server functions as a backend platform

Nimbits Support

- Data point can relay data between the software systems, or hardware devices such as Arduino, using the cloud as a backend.
- An Open Source Java Library nimbits.io enables easy development of JAVA, Web and Android solutions (Nimbits data, alerts, messages on mobile).

Nimbits Features

- Provides a data logging service and access and stores the historical data points and data objects.
- Storage in any format that can be serialised into a string, for example, JSON or XML.
- Filters the noise and important changes sent to another larger central instance.

Nimbits

- Processes a specific type of data and can store it.
- Time- or geo-stamping of the data.
- Nimbits clients provide over Internet, data collection in real-time, charts, chart and graphical plots of collected data and data entry.

Nimbits Features

- Data visualisation for data of connected sensors to IoT devices
- Supports the alerts subscription, generation and sending in real time over Internet
- Creates streams of data objects, and stores them in a data point series

Nimbits Features

- Data accessibility and monitoring from anywhere, and is used to shape the behaviour of connected devices and software
- Supports the mbed, Arduino, Raspberry Pi based and other hardware platform based IoT devices.

Nimbits Features

- Web service APIs are easy to implement on device hardware acting as clients to
- Nimbits web services, and connect to the web service and send data.
- Deploys software on Google App Engine, any J2EE server on Amazon EC2 or on a Raspberry Pi.

Data Generation and Store Architecture

- A NimbitsServerL which deploys at each device
- Node
- The server at device node is an instance of the NimbitsSeverS at the cloud
- Each NimbitsServerL of the device node generates the calculation objects for device nodes

Data Generation and Architecture

- Each node also hosts an XMPPServerL, an instance of the XMPPSeverC at the cloud.
- XMPPServerL deploys at each device node and generates the data feed channels for the
- XMPP messages and alerts.Each XMPPServerL sends feeds to XMPPSeverC.

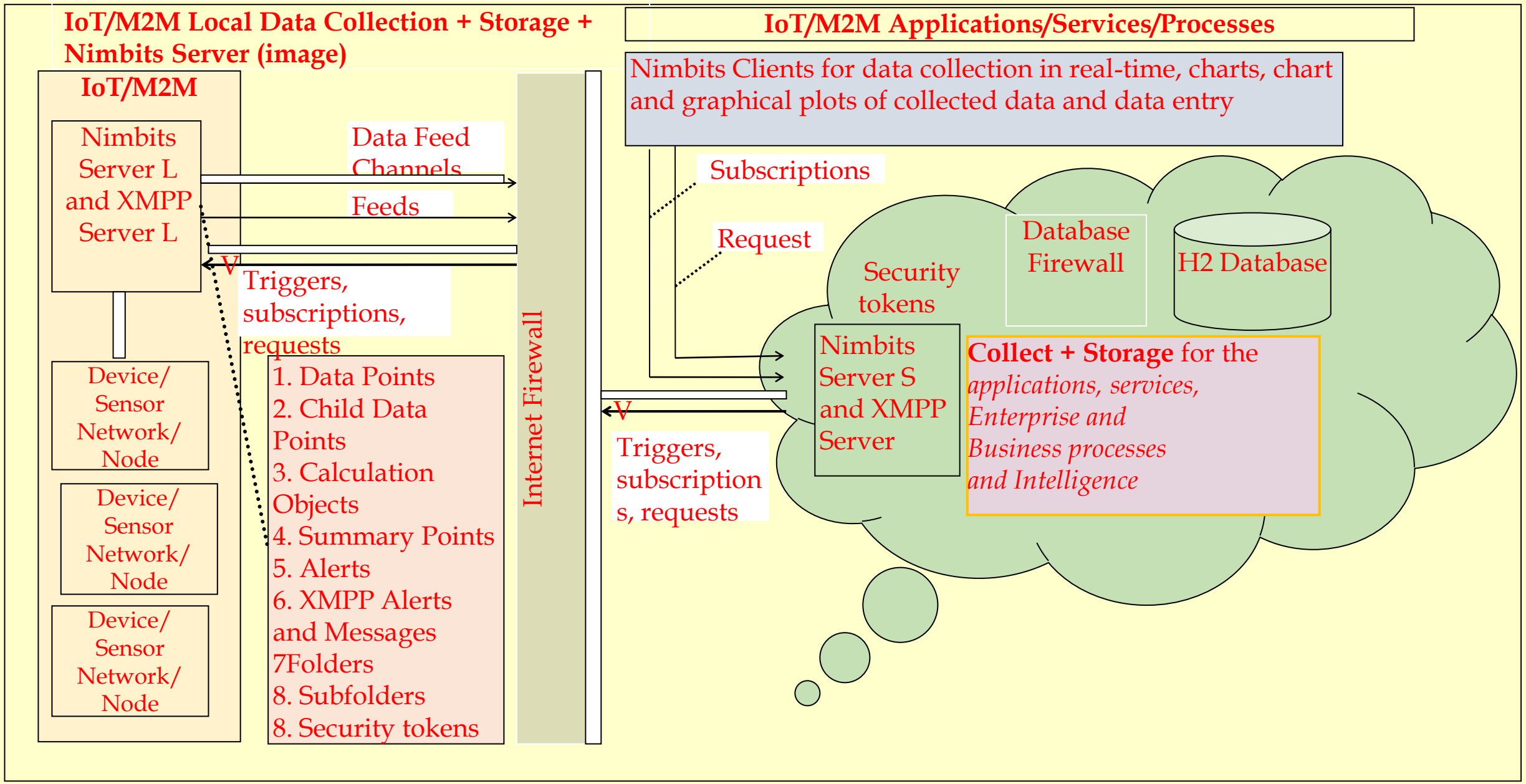


Fig. 6.3 connected devices/Sensor Networks data points, Nimbits server, deployment at the device network nodes, and networked with the Nimbits Server (PaaS/SaaS/IaaS services) at cloud for Applications/Services/Processes

Data Point and its Child Points

- A data point means a collected value of a sensor in a group of sensors.
- Data points organise the data in a number of ways.
- For example, points can have child points.
- Child points mean sub-points, for example, if light level is a data point then light on or off is a child point and light level above or below the threshold can be another child point.)

Folders and Subfolders

- Points can be in the folders
- The folders can go as deep as like in a tree.
- Tree means a folder having several subfolders, a subfolder having several subfolders, till the leaf sub
- Folder.

Subscription data feed

- A subscription data feed is a special point for each user that logs system messages, events, alerts from other points which are subscribed by a service and more.

Data Channels

- A user can create a data-feed channel which shows the system events and messages that also shows data alerts which are subscribed to show up in the feed

Data Channels

- The user subscribing to the data point of other users also, and configure the subscription(s) to send messages to the feed
- The user observing the idle, high or low alerts here in real time. The user data feed is just another Nimbits data point.

Nimbits Advanced Features

- H2 database engine
- H2, a Java SQL database.
- APIs in pure Java and Very fast, open source, JDBC API

Nimbits Advanced Features

- Encrypted database
- ODBC driver
- Full text search
- Multi version concurrency
- Browser based console application
- Small footprint

Nimbits Advanced Features

- Security features
- Breakthrough performance
- Alerts
- Jabbing

Nimbits Subscriptions Features

- A user creating many subscriptions for a single point.
- May subscribe to one of the points, other user, or anyone’s public point to get the alerts
- Alerts when the point goes into an alarm state, or receives new data.
- Alarm state, reaching preset value.

Nimbits Advanced Features

- Summary Points
- Calculation Objects

Summary

We learnt

- Nimbits Cloud PaaS service deploys an instance of Nimbits server at Arduino, Raspberry Pi or other
- IoT sensor nodes platforms that provides for real-time data collection, store at an H2 Database.

Summary

We learnt

- Edge computing
- Nimbits data, alerts, messages, application programmed to get alerts (XMPP, Twitter, Email or other)
- Rule engine
- Alerts and feeds on subscriptions
- Triggers and requests.

Summary

We learnt

- Data visualisation
- Analytics
- Calculation objects
- Summary points

End of Lesson 5 on Nimbits