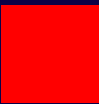# IoT Based Access Control

Its benefits, uses & applications

ACCESS CONTROL SYSTEM

Physical Access Control/Attendance System in todays context means opening an Electric/Electronic Lock to provide access to an armed location. The traditional configuration of such systems are done using manufacturer Client Software.

Essentially based on identification technologies like Card Reader, Finger Print Reader etc., it is more relevant to deploy newer technologies like Face Recognition devices & QR Code Readers etc., after the Virus threat. The Vendor specific Access Management Software(mostly based on Client Server technology) has limitation due to technologies upgrade & tightly built architecture.

Access is given based on RF Card or Biometric based on Gate & Time Zone. Such system are having its limitation of granting permanent access, until it is recalled.

Traditional Access Control System

- It is permanent, until recalled.

- The logic cannot be changed based on the Customer's dynamic requirement.

- The added cost of manual intervention and manpower training needs to be incurred.

Traditional v/s Modern
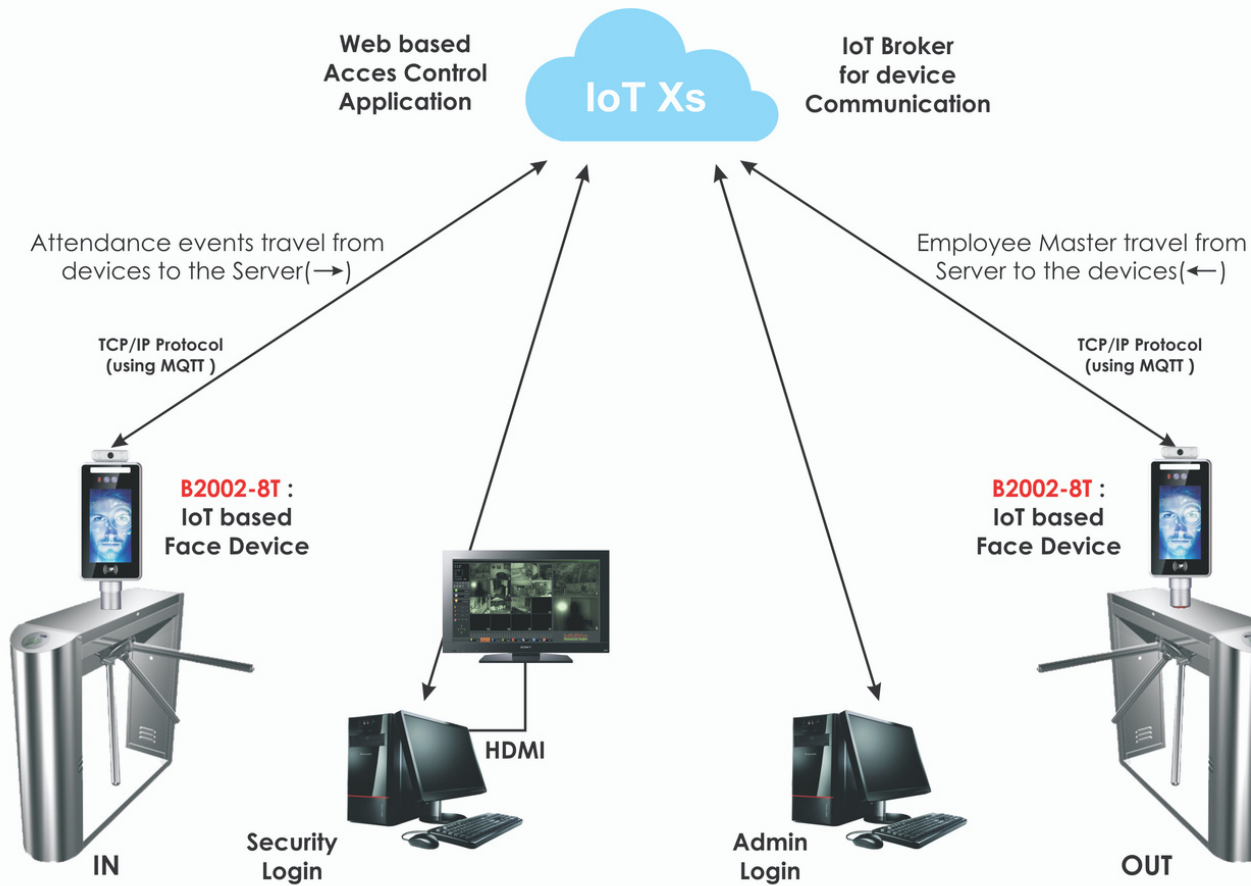
Our Modern Solution requires:
- Flexible,
- Allows the user to define access rights based on-the-fly requirement
- Requires no overhead costs

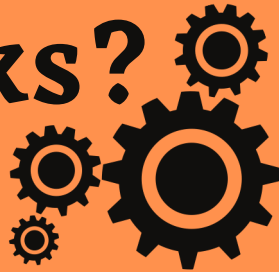**Fortuna's IoT Based Access Control System**

ON THE CLOUD!

Network Diagram - Multi Location

Web based Acces Control Application

IoT Xs

IoT Broker for device Communication

Attendance events travel from devices to the Server(→)

Employee Master travel from Server to the devices(←)

TCP/IP Protocol (using MQTT)

TCP/IP Protocol (using MQTT)

B2002-8T : IoT based Face Device

B2002-8T : IoT based Face Device

HDMI

IN

Security Login

Admin Login

OUT

How it works?

- The user shows his QR Code on a QR Reader attached to Panel for requesting Attendance/access to the controlled Door.
- The Code, as being read & is verified from a dynamic user database in online mode using IoT Protocol.
- The management software verifies the QR Code for the validity of the user attendance/access to this location, at this point-in-time, based on one or more of following:

  - Validity date for subscription based Access/Attendance
  - Condition based like forbidden for a period(like repair/maintenance/suspended)
  - Occupancy based(like limiting user count in an area/for a project)
  - Granting access based on demand(Security, Visitor or New User Access)
  - Time of day (like night) or day of week(like Weekly off) Validation

- The door may be opened dynamically upon verification of in online mode, based on conditional Access.
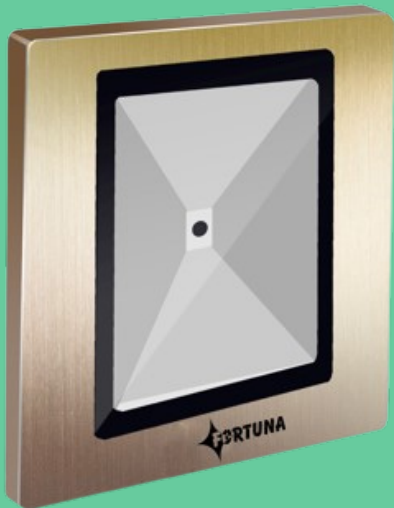
IoT Based Access Control System

- Fortuna's QR Code Based Cloud Enabled Access Control System is a Wi-Fi enabled\which is configured to communicate online/ Cloud Server.
- Access to the premises may dynamically be given based on logic & condition as defined in the Application backend database, which is otherwise difficult to manage in a traditional system.
- Users QR Code may be verified online for accessing the gate.
- It enables you to provide or revoke user Access, in real-time.

SUPPORTED INTERFACE

- QR Code Reader Interface(RS232C): 2 Port
- Weigand Reader Interface : 2 Ports
- Door Open Output Relay : 2 Nos
- Request-to-Exit Input : 2 Nos
- Door Open Sensor Input : 2 Nos
- Access Denied Indication : 2 Nos
- Emergency Door Open Input : 1 No
- Auxiliary Input : 2 Nos
- Auxiliary Output : 2 Nos

DEVICES THAT CAN BE CONNECTED with IOT based Access Control System

Dual Reader(Can Read both Prox. & Mifare Smart Card

QR Code Reader

Face Based Attendance Devices

ADVANTAGE OF AN IoT BASED ACCESS CONTROL SYSTEM

Fortuna offers smart door access system with latest IoT

based technology harnessing the power of Internet, to

bring online preciseness for Access Control.

- No need to provide credentials like RF Card or biometric

- No need to define the Access to a credential which is (sort of) permanent

- Online view of Attendance, Access to an area or Door status

- It can be Scaled up without any latency delay, as the Application talks to database for granting access

ADVANTAGES OF A CLOUD-BASED SYSTEM

- Web based, user-friendly, and highly secured online system.
  - Web based Application, independent of any OS & Browser
  - No infrastructure is required at individual location.
  - No involvement of specialize man power required
  - Multi location solution can be accessed from anywhere anytime
  - Centralize maintenance and control of visitor database, across all the Locations.
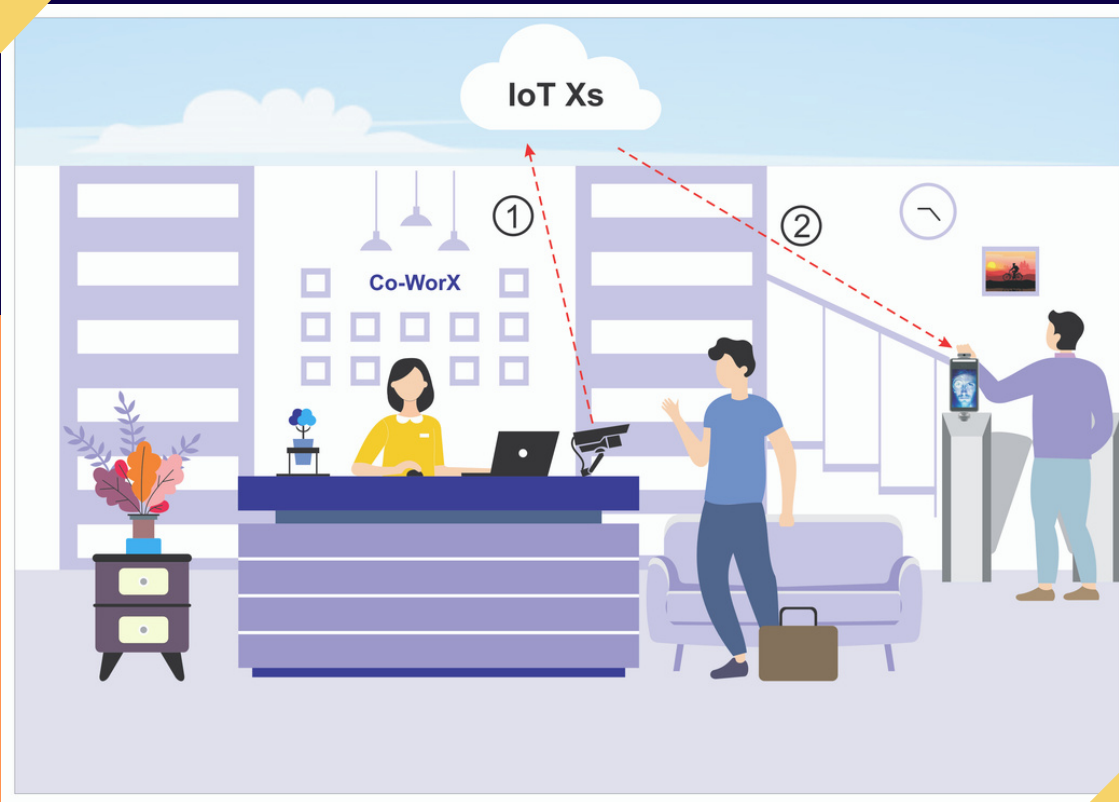 - The system can be operated from any device and platform e.g. Web, Android, iOS, Win Mobile etc.

Use Cases

- Offices
- Gym
- Club
- Shared Work space
- Lounges / Conference Room
- Process Rooms in Pharmaceutical Industry

CO-WORKING & CO-LIVING SPACES

- Customers pay for and subscribe to Co-Working and Co-Living Spaces as per their requirements.
- The period to which each customer should be provided access differs based on the number of months that particular customer has paid for.
- Such subscription & payments are managed by the Companies running the facility, in their own system.
- The Co-Working or Co-Living company may use QR code based access for such cases.

End User Experience

- The QR Code for each customer may be generated based on the Unique ID given by such companies. These QR Codes will be read by the QR Code reader connected to the Cloud based Access Controller & may be posted to Fortuna Broker.

- The co-working & Co-living Software Application will get the QR code from the Broker(using API or direct MQTT integration) for validation at their database end.

- The Co-Worx Application will consume 'Allowed' or 'Denied' API or post the JSON on MQTT Broker directly, to manage the physical Access of the door.

GYMS IN MULTIPLE LOCATIONS

- Customers pay for and subscribe to Gym memberships as per their requirements.
- If gyms have branches in multiple cities and allow customers to avail their services in any city
- Memberships may also be given to customers based on time slots
- Gyms may have dedicated hours for women only.
- The period to which each customer should be provided access differs based on the kind of pack they have paid for.
- Such subscription & payments are managed by the Companies running the facility, in their own system.
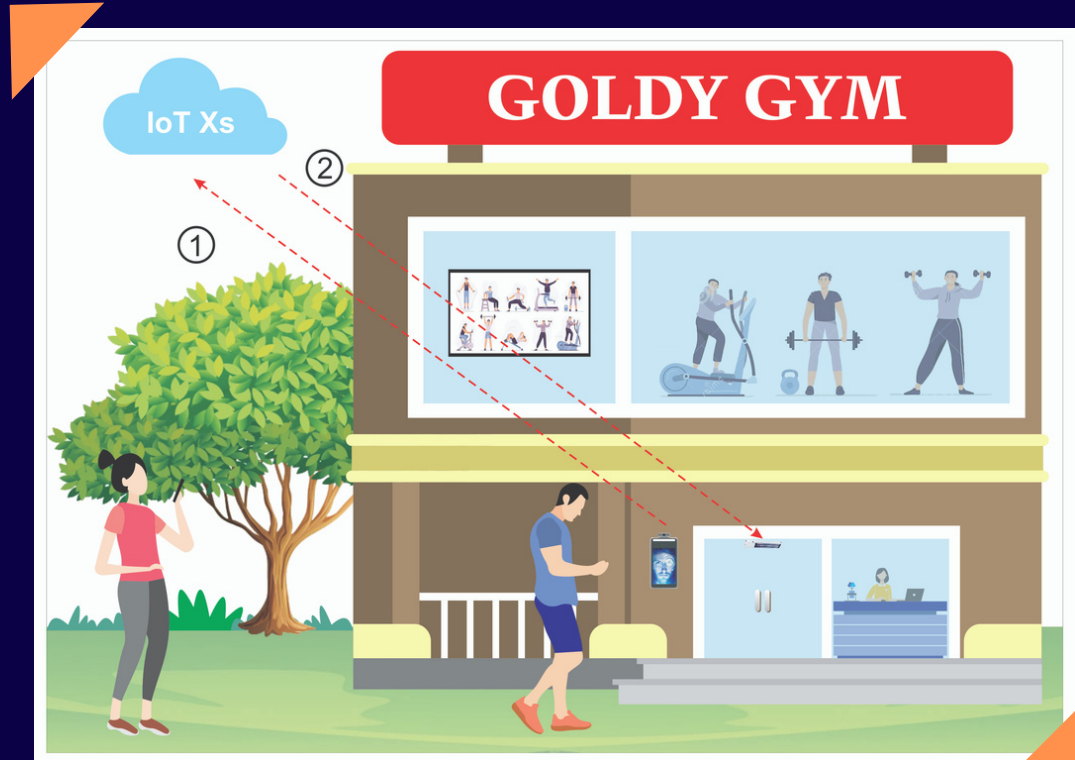
End User Experience

- Members of the gym get their face enrolled using a photo.

- The Face data related to the customers membership will be passed on to Fortuna's Face Device on MQTT protocol to onboard the member to manage the usage (like Access to other city gyms, etc).

- When a member walks towards a gate, the Face machine does a liveliness/spoof detection, and identifies the Member with ID.

- The ID is posted to Fortuna Broker on Cloud. The Gym Company Software subscribes to this & get the ID number for validation.

- It Grants/Denies access based on the information mapped to his profile. If a member's subscription is not paid for, it may prohibit the access.

- This may be extended at will, to manage member access in an automated manner. The access control system panels will work with the gym management software as a single system.

GYM
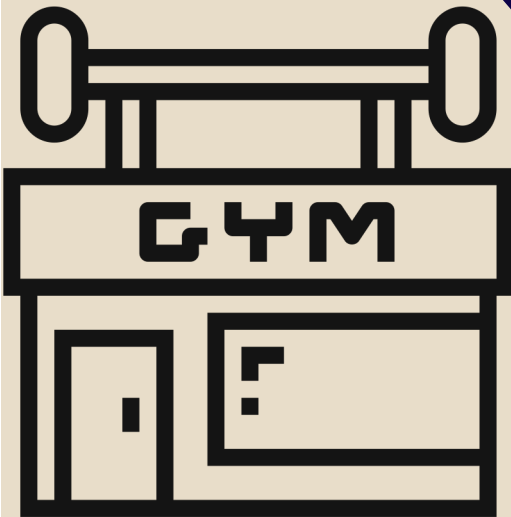
CLUBS WITH MULTIPLE FACILITY MANAGEMENT

People may take subscriptions for clubs may be based on the following:

- Monthly or Half yearly scheme
- Type of facility to be availed
- Preferred time for doing the activity
- Facility in only one city or in multiple cities (in partner clubs)

- Face based machines or QR Code readers are installed, at suitable entrances to manage & control the Access.

- When the customer takes the subscription for the club, his face is captured as part of the onboarding process for the member.

- The data related to the customers membership details will be passed on to Fortuna's Access Control System through exposed APIs to manage the usage (like Validity, Facility, Access to other associate clubs).

- Each Access attempt is pushed to IoT XS Cloud, for online validation, and the user is allowed or denied Access based on current status. There is no need to download/manage the Data or complex logic at the local level.
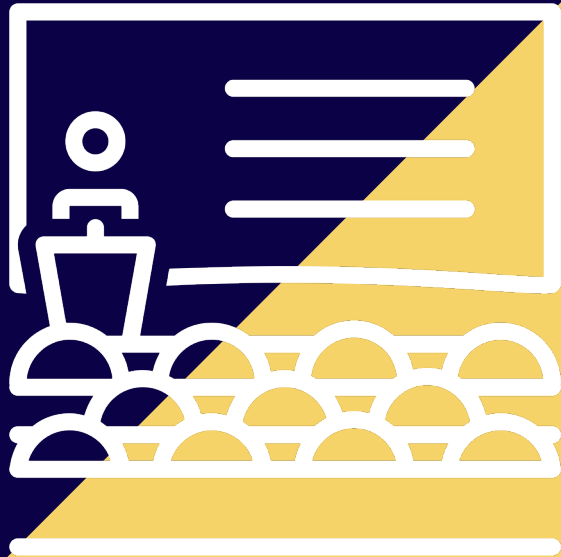
End User Experience

CLASSROOMS/ COACHING CENTERS

Students may enroll themselves only for certain courses – certain students may enroll only for Engineering coaching, some students may only opt for Medical coaching, etc.

The education software manages all student records in their database:
- The courses opted for by each student
- Timetables of each student
- If fee is paid or not
- The lecture halls in which they have his classes

End User Experience

- Each student is either given a RFID or QR Code, or has his face enrolled into the system.

- Upon reaching the classroom/lecture hall, the student scans his Card or Face, for getting Entry. The Student ID against this credential is pushed to Cloud(Broker) instantaneously.

- The Application software subscribes to this information from the broker to get the ID for immediate validation. If the student is found to be valid for that Course, based on the Time Table/Lecture Hall allocation, he is allowed Access, to open the door. Else, his access is denied.

- Student access may be denied even if he has not paid the fees for his tutorials based on similar logic.

- All transaction & occupancy data is posted for audit & Attendance purposes.

QR CODE BASED LAUNDRY CLOTH COLLECTION

The Laundry bags will be affixed with a unique QR Code against students to whom the same is issued.

End User Experience

- The Student will come to the collection point, where his QR Code stuck to their Laundry bag will be scanned using Flat bed/Panel Mounted scanner.

- The QR Code will be Pushed(Published) on cloud to the Broker on the Internet using WiFi, with the Device ID, QR Code, Date & Time, in JSON Format.

- The Application to be developed by Loundry Company, will be a subscriber to the Device ID Topic(for each Device) on MQTT, such that the QR Code will be available instantaneously.

- The QR Code will be checked in the back-end by Application for its acceptance based on the logic/calculation etc.. Software application will publish the 'Allowed' or 'Denied' JSON to the Device ID Topic.

- The Device will be subscriber to its own Device ID topic & will get the JSON having the 'Allowed' or 'Denied' info. This will be decoded by the controller & in turn will light a 'Green' or 'Red' LED mounted suitably.

- This workflow will be running from various Collection Points where there will be a separate Checkmate IoT Controller (with unique Device ID) will publish the data to the same broker, to which topic your application will be subscriber.

UN-MANNED HOUSE

- Owners sometimes do not stay in the flats/bungalows they own.
- Access to the flat is required to be given for entry, based on demand for the following purposes:
  - Cleaning
  - Society side repair work
 - Maintenance
  - Miscellaneous
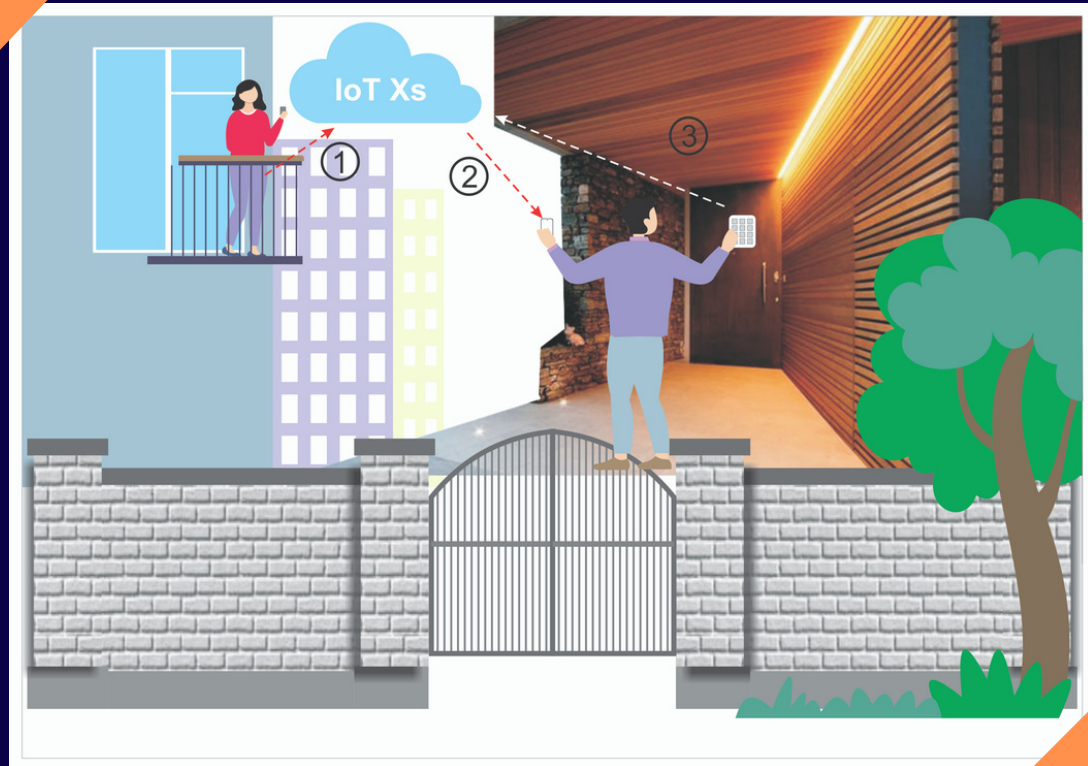
- Whenever the person looking for access reaches the flat/bungalow, they scan the QR code displayed on the main door for reading the door/station ID.

- This request from visitor with info & credentials(with Mobile Number) is posted on our Broker. This is posted to the Flat owner App based on the Station ID, for approval.

- Against Approval from the owner, a time based OTP is generated & texted to the Visitor mobile number & Access Control device in online mode.

- The OTP entered from the Key-pad Access Device installed at the Gate, is entered by the visitor for getting the access(within OTP specified time).

- The doors are monitored for being kept open or closed. This may be further integrated to IP Camera to monitor the movement of the visitor inside the unmanned site/flat.

End User Experience

ACCESS MANAGEMENT INSIDE CALL CENTRE/BPO WITH MULTI-DOORS WITH GLOBAL ANTI-PASS BACK
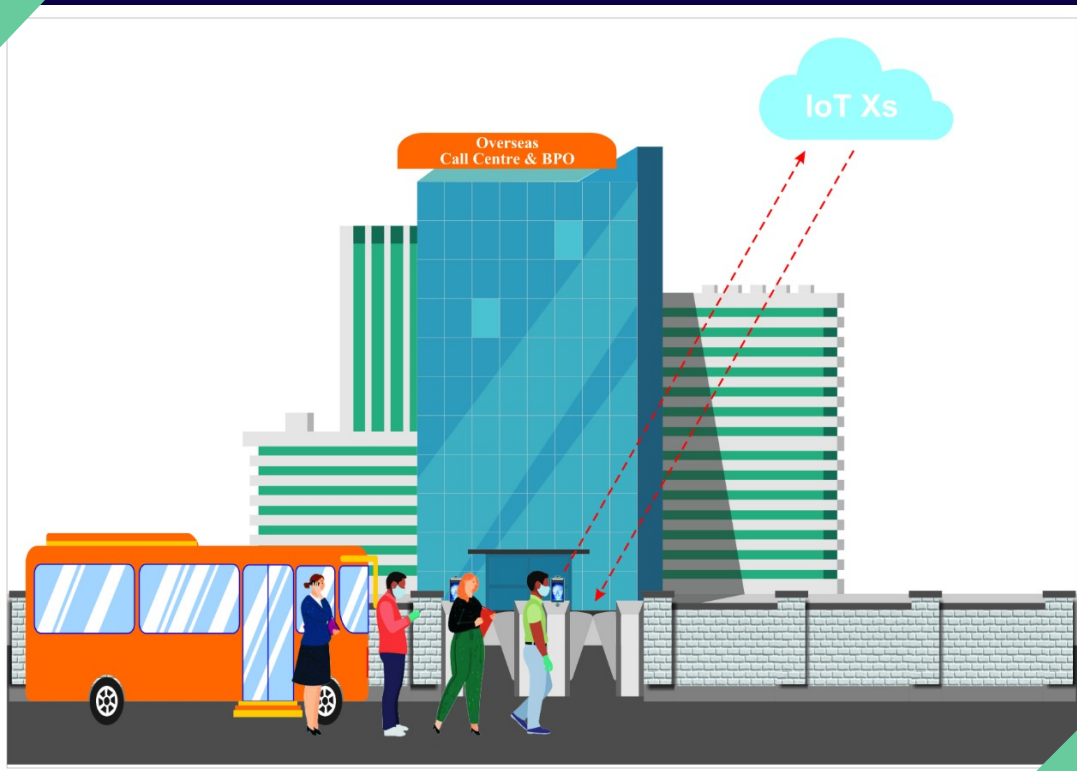
- Modern ITeS offices are having Access Control Systems on Doors. The teams working in each area shall be given access based on
  - Customer Contract Validity period
  - Shift pattern & Man-power allocation based on international client time Zone
  - No. of PAX allocated for the project, in each shift
  - Other complex logic, which may be running on the call center (like absconding logic)
  - Global Anti-pass back logic violation to avoid tail-gating

- To manage the dynamic nature of Access using traditional access control means configuring & downloading the information on periodic manner using Vendor software & managing parallel system which needs training & constant maintenance.

- Customers want an integrated system to manage the Access Control system which may directly piggy-back on their database to provide the Access to each employee, based on the current Access snapshots and logics.
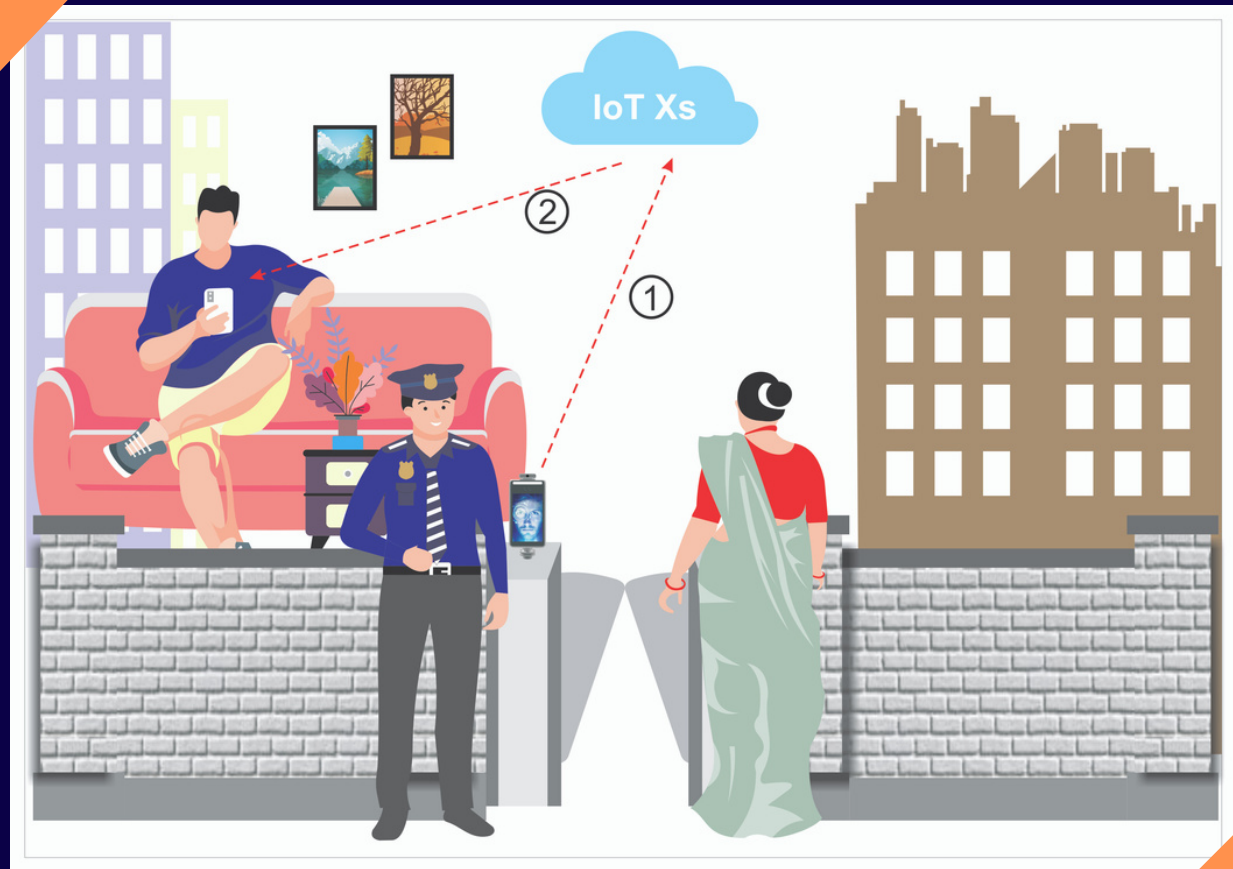
End User Experience

- The Employee reaches the building, they scan their Face on the main door for getting Access.

- This request from employee (with ID Number) is posted on our IoT Broker. This is subscribed by the BPO software for validation.

- The BPO Software checks the ID for its Customer Contract Validity ,Shift Validity, No. of PAX already reported etc., from back-end for granting Access. The decision is taken on the current instance & published on the Device.

- The Access to subsequent doors installed inside depends on the action area, such that one gets access in his allocated space only.

- Global Anti-pass back is needed to ensure that the tail-gating is not done & all access transactions are logged for audit purpose.

- This may be further integrated to IP Camera to monitor the movement of the visitor inside.

DAILY HELP/VISITOR MANAGEMENT FOR GATED SOCIETIES

- The Multi-storied complex access is managed in soft form by products like **MyGate, NoBrokerhood etc.**. This gives a security threat in City like large complexes, with large number of Visitor & Daily help visiting.

- There are further Towers within the Complex where the Access is to be controlled by Security Guards based on their intelligence & manual method to confirm the Access based on telephonic calls.

End User Experience

- Gated society Management will benefit by automating the process such that it works in conjunction with or independently of existing systems to provide access using Flap barrier/turnstile to such visitors, removing all manual systems.

- Fortuna's Access Management using QR Code based controller or Face device may be used for controlling the dynamic access in this use case.

- The Access to elevator(like Owners/Service Lift) may also be controlled using QR Code provided to all, which will enable the Push switch based on QR code validity which may be authenticated in online mode from Cloud.
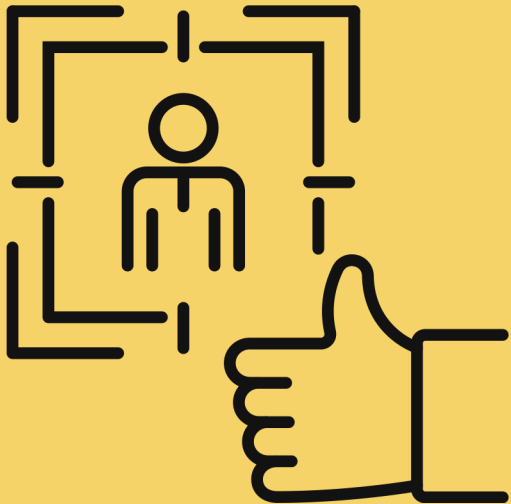
CONTRACT AND COMPLIANCE MANAGEMENT

IoT Xs
① ②

- Contract Workers in any industry are to be provided access based on Compliance (like PF, Labour License etc.). Apart from this, there are other labour laws like rest day after 6 days of work, 48 Hours of Work per week etc., which are very difficult to manage.

- Aside, there are other rules like allowing fixed number of persons based on maximum limit for each contractors. This just speaks about dynamic access control connected to CLMS systems being managed by various Industries.

- This would mean that the Face Machines deployed for Attendance marking shall have to talk to the CLMS software to provide or debar access based on dynamic info, as mentioned above.

End User Experience

- The Face for each Contract employee will be read by the Face Recognition terminals connected to the Access Control(Flap/Boom Barrier).

- The ID number of the contract employee will be posted to CLMS for validating him from their database, based on various check-list.

- In case of debarring access suitable message shall be shown on the Face machine display such that the Contract employee may understand the reason for denied access, for info & action.

- The Attendance data shall be available online to CLMS from the Cloud based Access Control for Salary & MIS purpose.

- This may be achieved using the IoT XS solution in the back-end with API integration for the Face machine or may be achieved directly by PUB/SUB based JSON protocol, as well.

# OCCUPANCY MANAGEMENT INSIDE SECURE PREMISES TO LIMIT THE NUMBER OF PAX
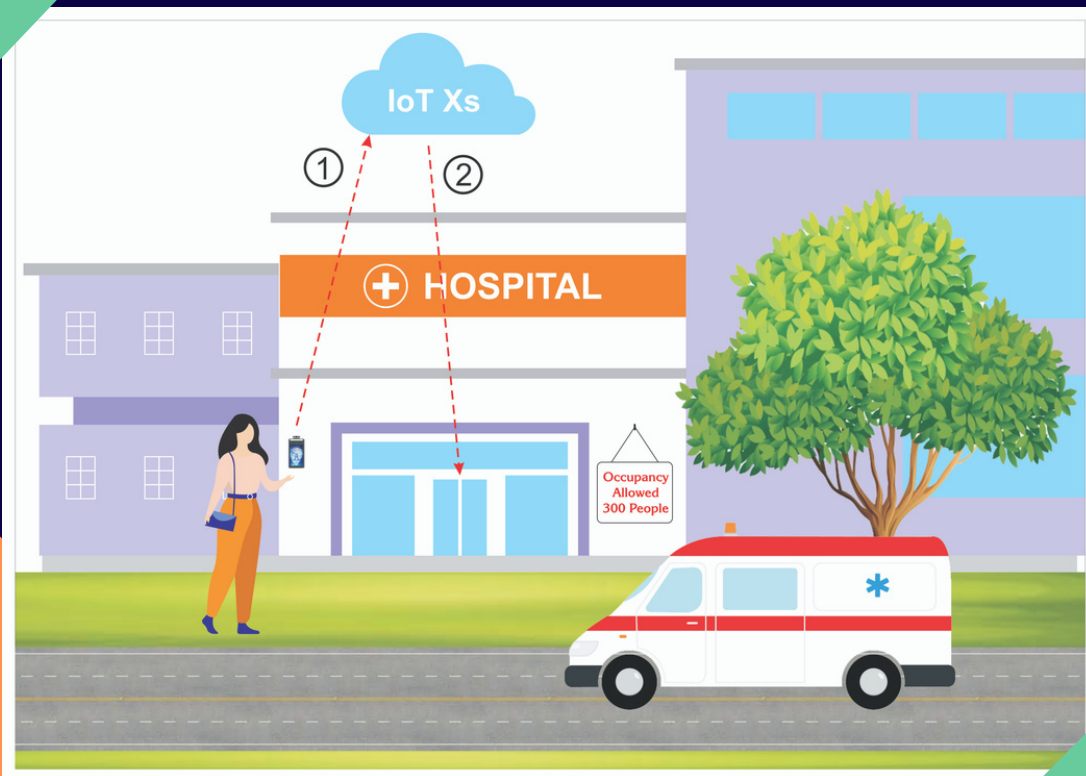
- This may be deployed in Hospitals for Patient Party/Visitor Access, during the meeting time.

- IN & OUT Face machine are needed for this use case, to monitor & control the occupancy status inside.

- Build the online logic on the Server side to keep track of the Maximum limit of people entry inside premises. The Gate will open only till the limit is not reached(including the Visitor).

- The dynamic occupancy number may be shown with IN & OUT on the dash-board, for view of PAX in each Access Controlled area.

- In case of Fire or drill, if the information need to be given to all inside, it may be given from the system.

VISITOR MANAGEMENT

- Visitor Management will work on Cloud mode. The Visitor Face will be captured with picture, alongside other demographic details. Visitor will be allowed inside the access controlled gate, after due authorisation from the person they want to meet, using soft URL link with QR Code, which will only become active, once the visitor has reported.

- The Access to reach the door, where the meeting officer sits, will be auto-downloaded, as part of visitor onboarding. If internal doors are having face device, the visitor Face may be downloaded on those door Face machine, with face identification.

- The Soft URL Link, having the Access QR Code will automatically become invalid after the Visitor check-out.

- Face machine with Temperature sensor may also be integrated in case it is required to log the temperature of the visitor, while they enter the premises, for compliance.

Live Experience follows...
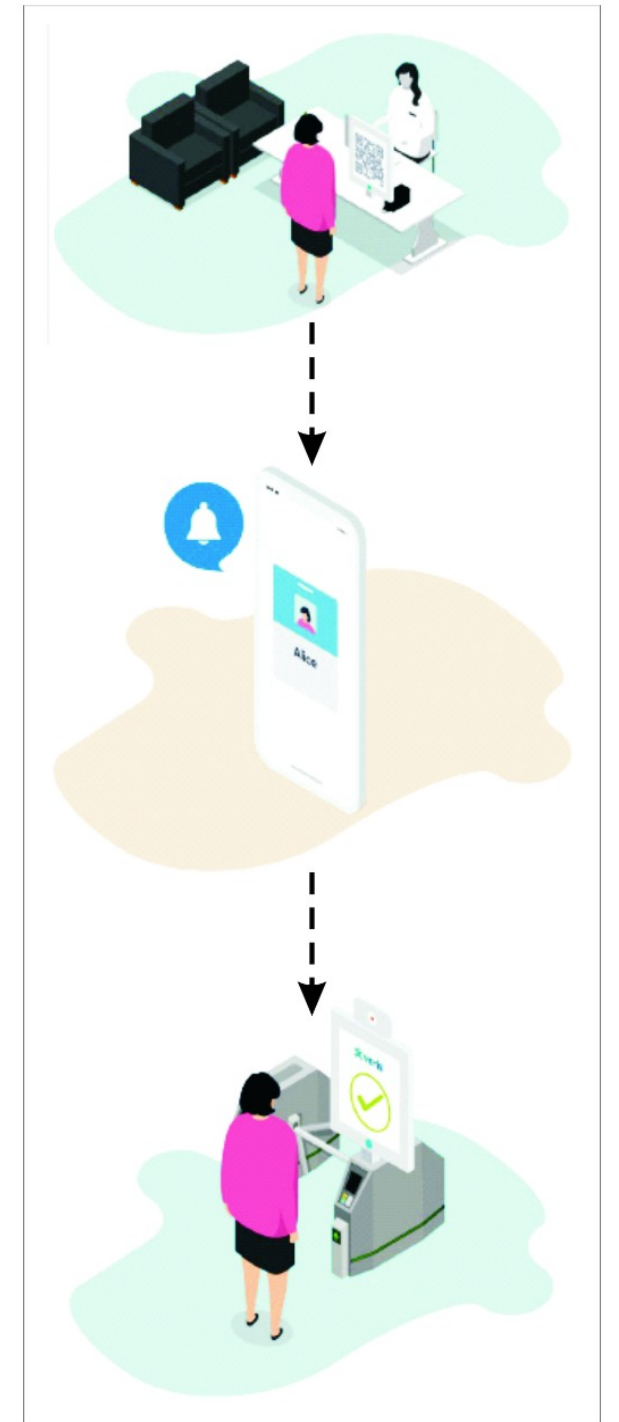
Have we created a hurly-burly(खलबली) in your mind !!

It is more relevant to deploy newer technologies like Face Recognition devices & QR Code Readers etc., after the Virus threat with newer Cloud/IoT based technologies

It is required to have the Access Management system Push technologies, online with dash-board, IoT protocol with Cloud enablement, possibility to integrate it other applications such as intelligent Visitor Management, Video Surveillance etc.

Access management decision are based on data being maintained in parallel systems & it is required to validate the access to the organisation using Complex logic based on dynamic data such as subscription, Compliance, Occupancy etc..

New emerging market is created with a lot of business opportunities for the experienced SI's

Customer has a need in mind & we will provide them the Solution…

Thank You!