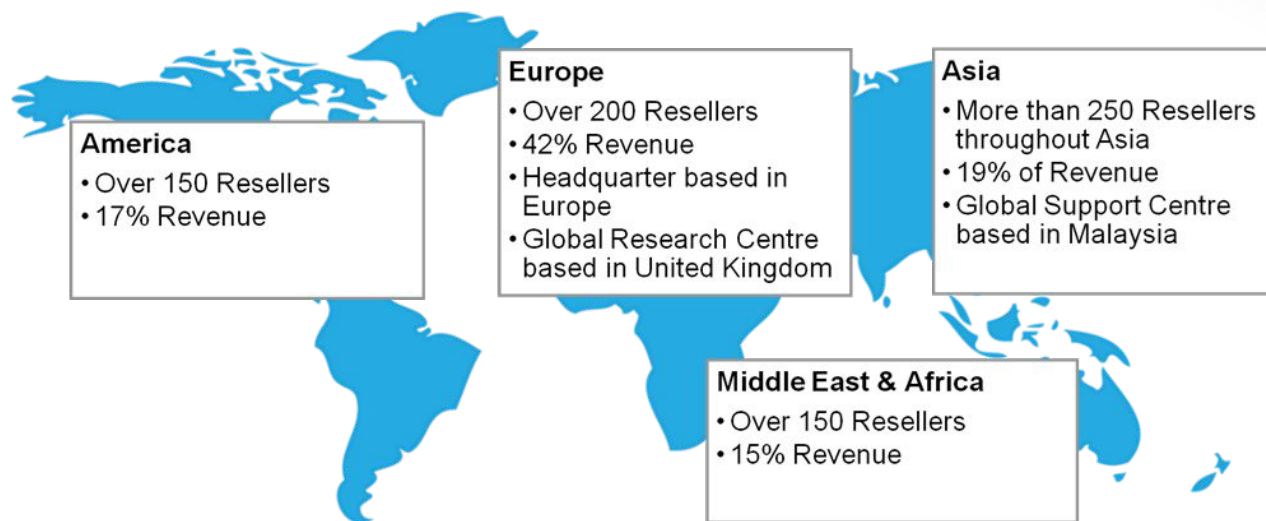# FootfallCam People Counter

People Counting Solutions for Shopping Malls

FootfallCam™

About FootfallCam™ 🇬🇧

Global Leader in People Counting System

Headquartered in the **United Kingdom**, FootfallCam started with a team of experienced engineers with the vision of creating the most advanced people counting system in the market. We are the **manufacturer** of both hardware and software; all the design and development are 100% in-house made.

America
- Over 150 Resellers
- 17% Revenue

Europe
- Over 200 Resellers
- 42% Revenue
- Headquarter based in Europe
- Global Research Centre based in United Kingdom

Asia
- More than 250 Resellers throughout Asia
- 19% of Revenue
- Global Support Centre based in Malaysia

Middle East & Africa
- Over 150 Resellers
- 15% Revenue

- Continuously reinvesting more than 24% revenue into research and development
- **In-house R&D team** dedicated to the development of both hardware and software platform
- Combined **over 100 years industry experiences** in developing people counting solution
- **Serving multiple sectors** varying from retail, fast food, restaurants, museums to smart buildings and airports.

FootfallCam™

Challenges

Challenges	Solutions
"Want better understanding of our shoppers. Who are they? Where did they go? Are they happy?"	FootfallCam people counting and demographics solutions would help malls to count the number of shoppers in each areas and their demographics.
"What is the demographics of the catchment areas? What are our missed opportunities?"	FootfallCam population density and demographics map could help you to identity your potential market size and your relative market positioning.
"Are our marketing spends having the expected ROI, for short term and long terms?"	FootfallCam can help you to track your ROI for each event.
"We are making upgrades and changing the store locations. Do they yield positive results?"	FootfallCam can help you to track the long term trends of your shopper behaviours, so you could quantity the effectiveness of your initiatives.
"Need to ensure we have the right level of staff for the shoppers coming in."	FootfallCam washroom app and facility management dashboard could help you to minimise your operational cost at the agreed SLA.

End Results: FootfallCam people counting system would help your shopping malls to understand your shoppers and track the ROI of your initiatives.
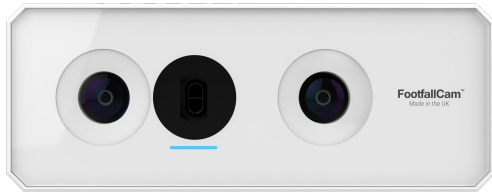
FootfallCam™

Products

Products Overview

FootfallCam has a range of devices to cater for different office use cases. Each counting technology has its pros and cons. Combining all of them would give you the granularity and flexibility at the most cost effective way.

3D Pro2™

3D Stereo Vision People Counting
Datasheet

Centroid™

AI Video Analytics
Datasheet

FaceCam™
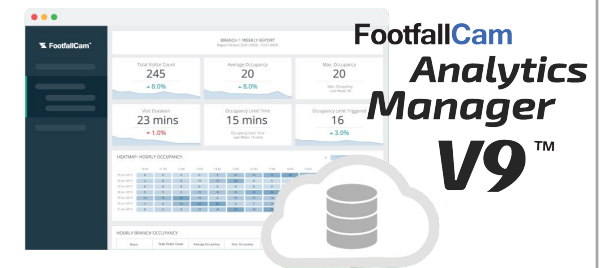
Facial Detection + Recognition
Datasheet

3D Mini™

Time-of-Flight (ToF) Technology
Datasheet

Mesh Hub™

IoT Networking Device
Datasheet

Analytics Manager V9™

Cloud-based Analytics Platform
Datasheet

FootfallCam™

3D Pro2

By installing FootfallCam 3D Pro2™ at the mall entrance, the number of shoppers who visit the shopping mall can be counted, with live occupancy dashboard.

3D Stereo Camera

Human

- **3D Stereo Vision** Technology

- Wide coverage: 105°
- GDPR compliant - no video recorded
- 99% accuracy

- Suitable for mall entrances, escalator and elevator areas.

FootfallCam 3D Pro2™
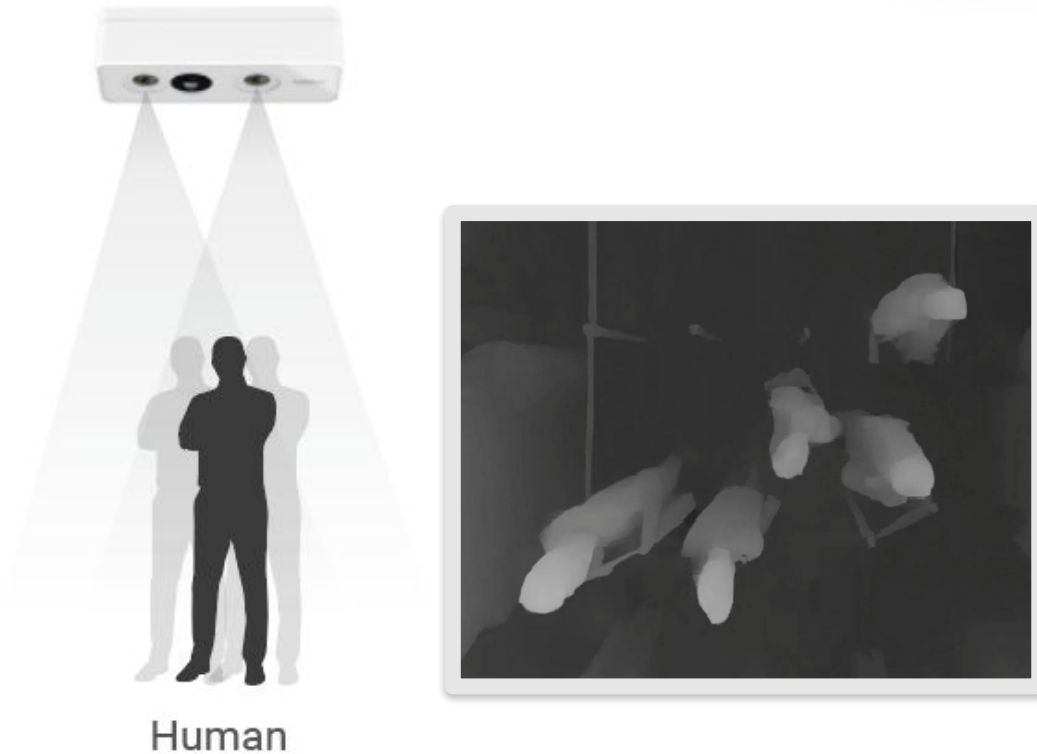
User Guide	FootfallCam 3D Pro2 Datasheet	Document
Video	FootfallCam 3D Pro2 Video	Video Link
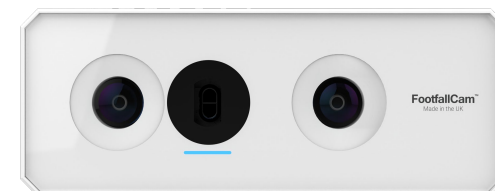
FootfallCam™

FootfallCam Centroid™

FootfallCam Centroid leverages your existing CCTV camera system for area and crowd counting via AI Video Analytics.
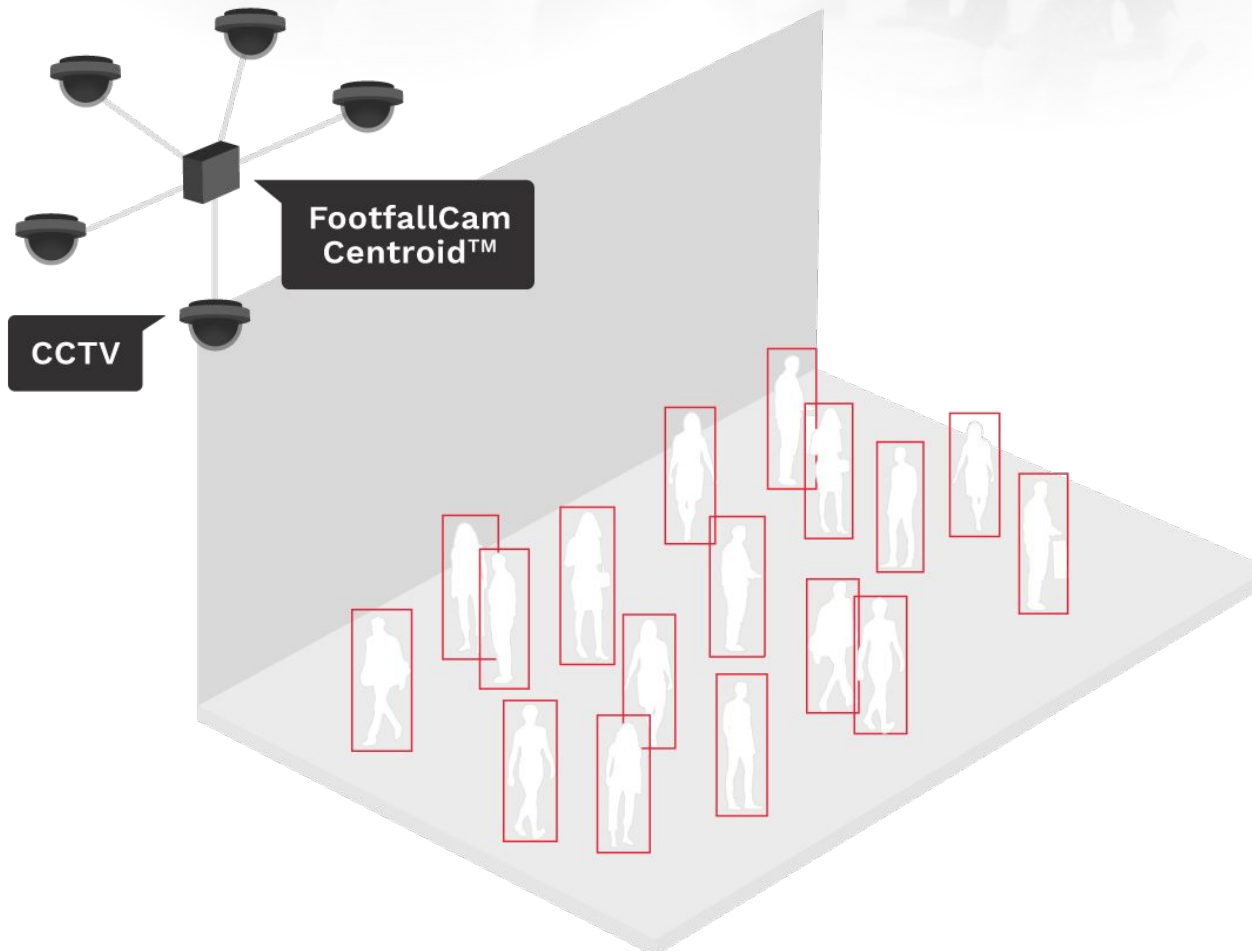
- **AI Video Analytics** - Nvidia Deepstream®

- **Reuse** your existing surveillance CCTV IP cameras

- Can connect up to **8x CCTV cameras.**

- 90% accuracy

- Suitable for **aisles** and **crowd counting**

FootfallCam Centroid™

User Guide	FootfallCam Centroid Datasheet	Document
Video	AI Video Analytics - Crowd Counting	Video Link

FootfallCam™

FaceCam

Utilising AI Video Analytics, FootfallCam FaceCam™ is capable of detecting and capturing the facial attributes of a shopper - Gender, Age, Facial Expression *etc*.

- AI Image Analytics - Microsoft AI
- Gender, Mood, Age recognition

- Cost Effective
- Small Size
- GDPR compliant

- Suitable for demographics analysis.

FootfallCam FaceCam™

FootfallCam FaceCam™

User Guide	FootfallCam FaceCam Datasheet	Document

FootfallCam™

3D Mini

By installing FootfallCam 3D Mini™ at the entrance of each washrooms, the number of people using the washrooms can be counted, thereby generate generate task alerts for cleaners to clean the washroom on-demand.

ToF Sensor

Signal out

Reflected signal

Human
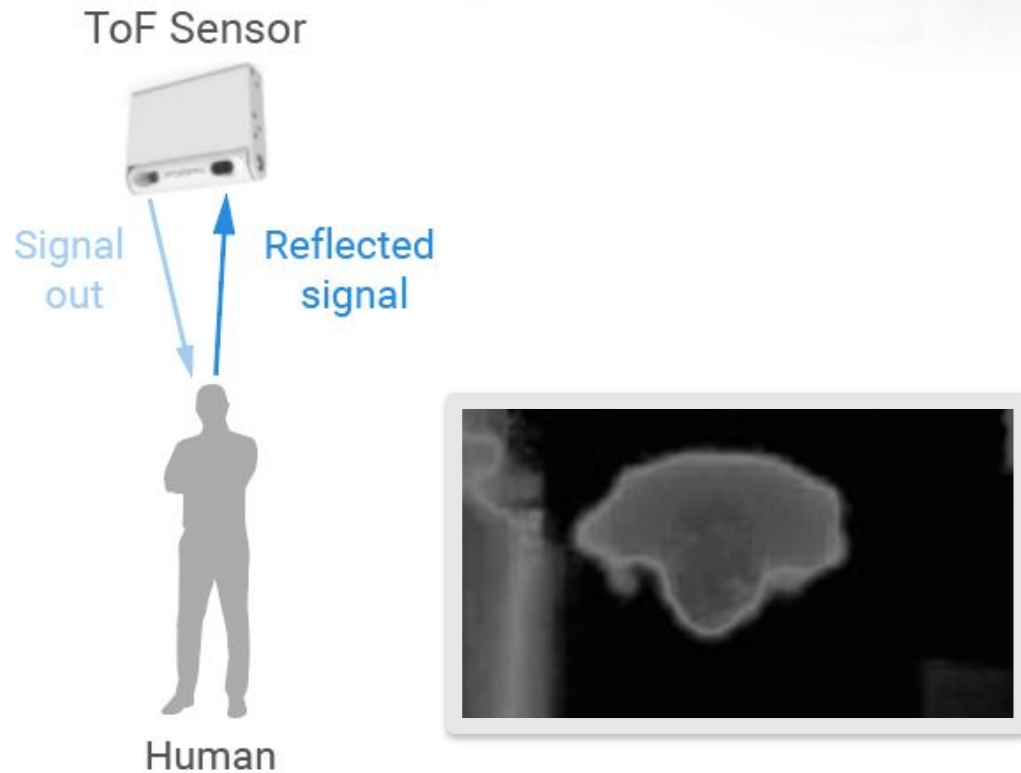
- **Time of Flight** technology

- Narrow coverage: 85°
- Mounting height < 2.7m
- Cost effective
- **Anonymous** - no camera

- Suitable for **washroom** usage counting

FootfallCam 3D Mini™

Datasheet	FootfallCam 3D Mini Datasheet	Document
Video	Demand Based Washroom Management	Video Link

FootfallCam™

Mesh Hub

Mesh Hub™ is an IoT networking standard that unifies all IoT devices including FootfallCam 3D Mini in a standalone network layer, which does not require to piggyback on corporate LAN or WiFi network.
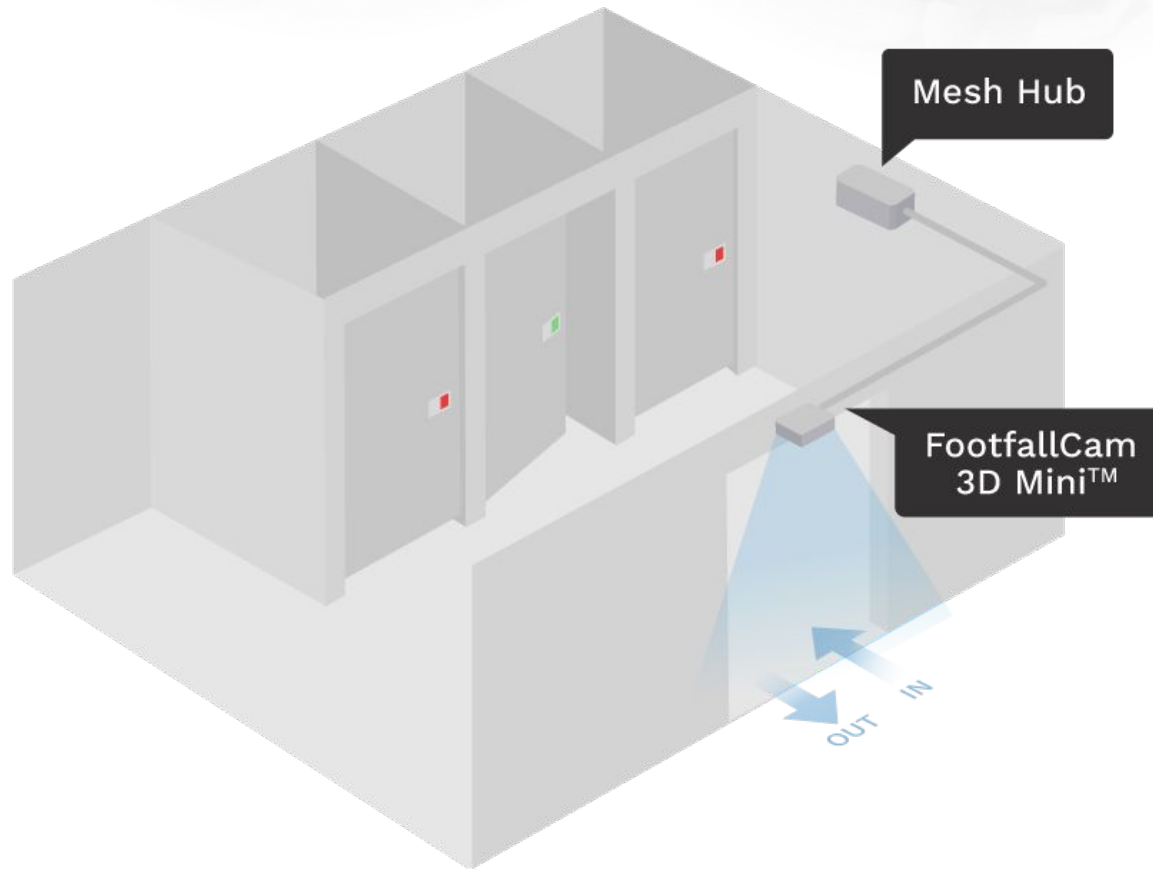
- Can be daisy chained using RS485

- Can support up to 200x IoT devices

- A separate network - not compromise the corporate security

- Works with all FootfallCam IoT devices and other 3rd party IoT devices

FootfallCam Mesh Hub™

Datasheet	FootfallCam Mesh Hub Datasheet	Document

Key Metrics

Primary Metrics

- Visitor Count (In & out)
- Occupancy
- Dwell Time
- Outside Traffics
- Group Counting

Secondary Metrics

- Predicted Footfall
- Shopper Profiles
- Recommended Staff ratio
- Promotions ROI

Use Cases

Use Cases Overview
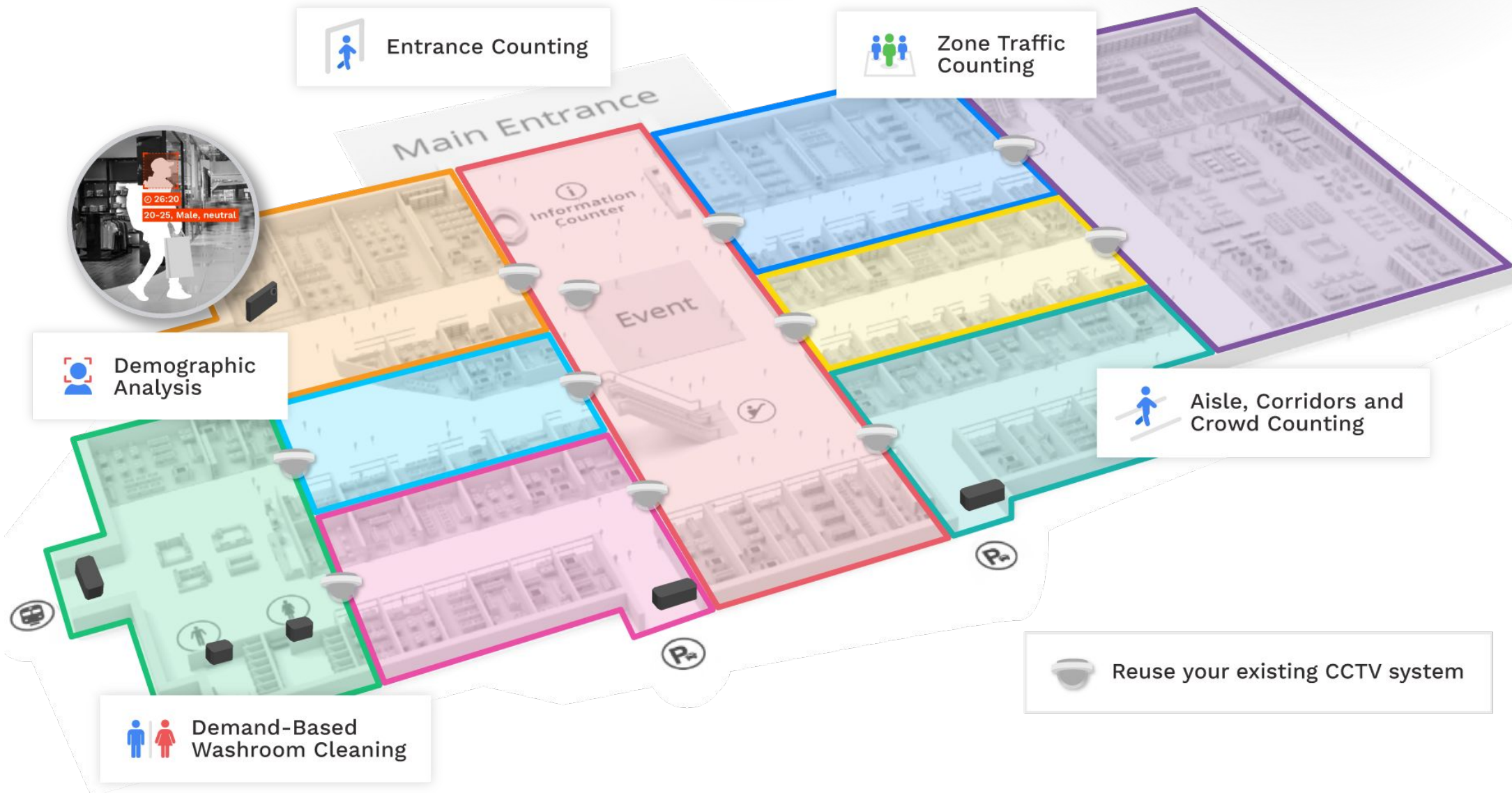
Entrance Counting

Zone Traffic Counting

Demographic Analysis
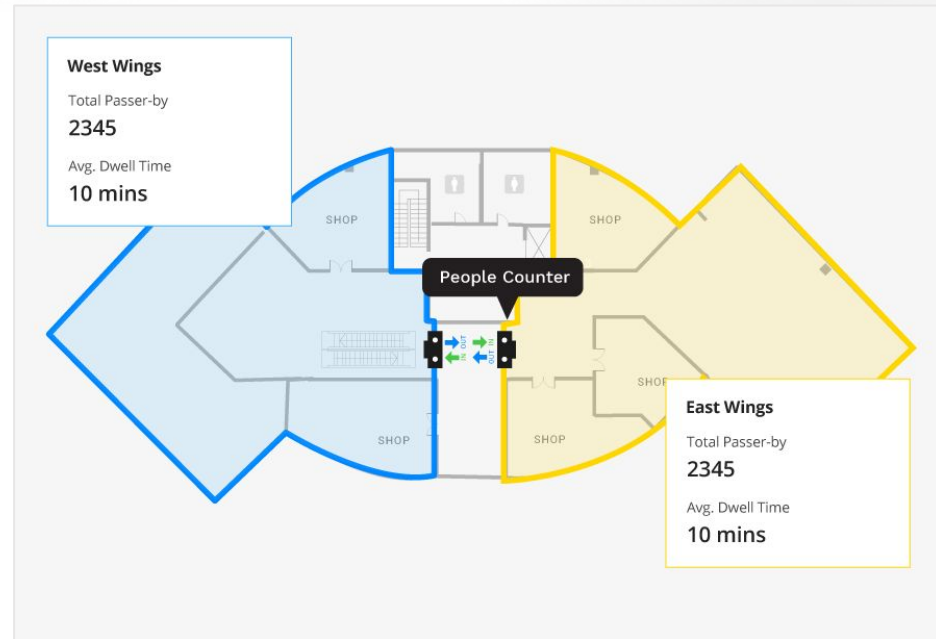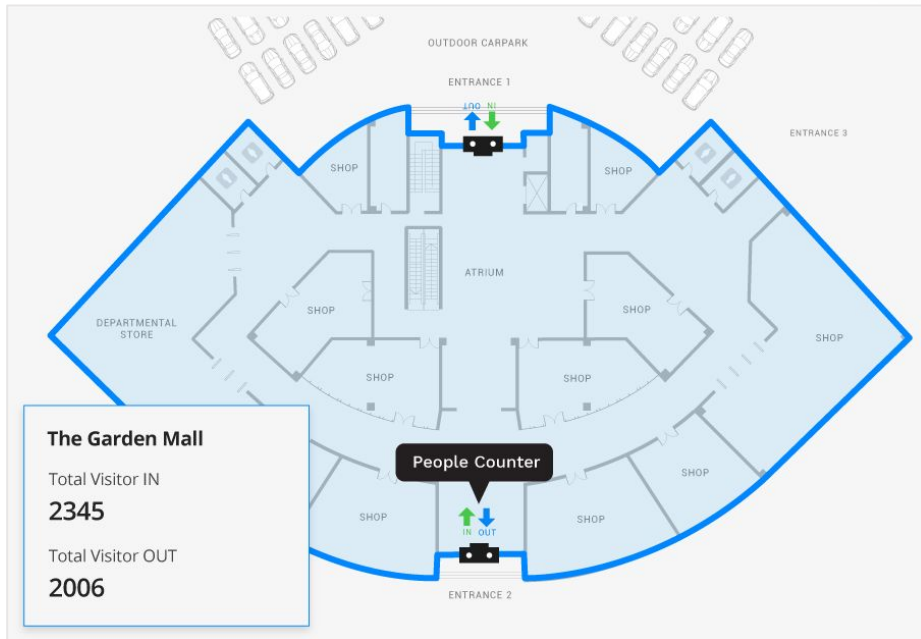
Aisle, Corridors and Crowd Counting
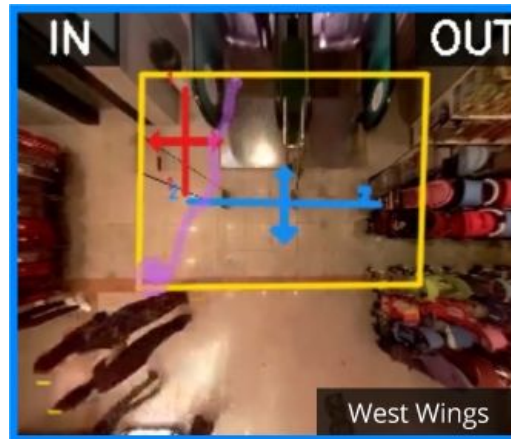
Demand-Based Washroom Cleaning

Reuse your existing CCTV system

26:20
20-25, Male, neutral

Main Entrance

Information Counter

Event

FootfallCam™

How does People Counting work?

The Garden Mall

Total Visitor IN
2345

Total Visitor OUT
2006

People Counter

OUTDOOR CARPARK

ENTRANCE 1

ENTRANCE 3

ENTRANCE 2

SHOP
ATRIUM
DEPARTMENTAL STORE

West Wings

Total Passer-by
2345

Avg. Dwell Time
10 mins

People Counter

East Wings

Total Passer-by
2345

Avg. Dwell Time
10 mins

IN | OUT
Entrance 1

Entrance Counting - Video

IN | OUT
West Wings

Escalator Counting - Video

IN +38 | OUT +1
East Wings

Entrance Counting - Video

FootfallCam

How does Demographic Analysis work?

FootfallCam FaceCam™ captures the facial attributes of the shoppers which helps shopping mall operators to have better understanding on the demographic profiling of their shoppers.
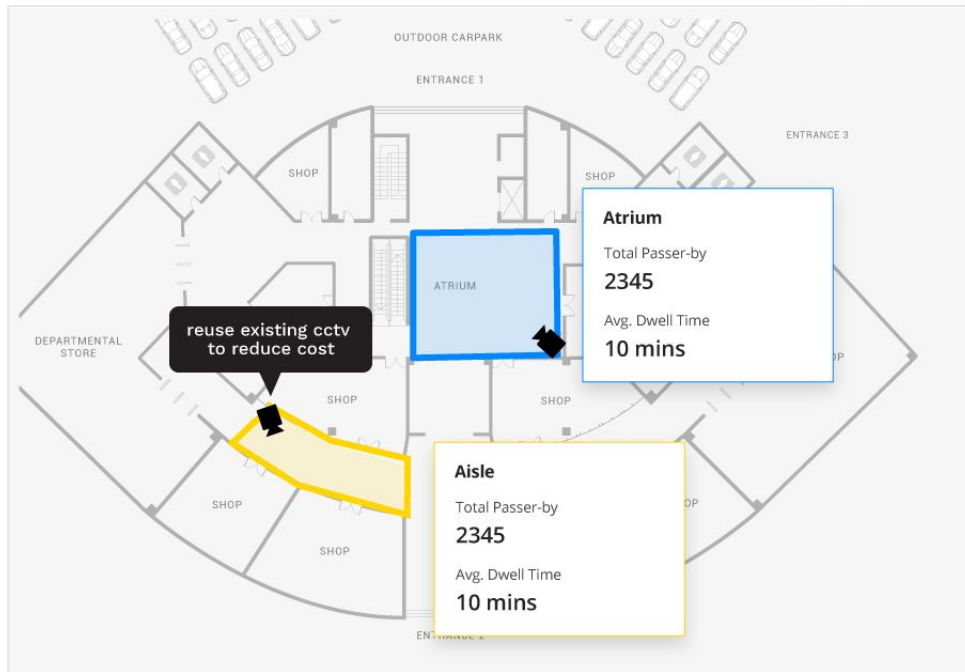

- AI Video Analytics

- Categorise your shoppers based on demographic profiling:

  - Gender

  - Age Group

  - Emotion

- Customise targeted marketing strategy

FootfallCam FaceCam™

Video	Demographic Analysis	Video Link

FootfallCam™

Using (existing) CCTV camera for Counting

- Suitable for zone counting

- Can be used in outdoor, large spaces, wide corridors or spaces with high ceilings.

- Re-using existing CCTV would help to lower the cable infrastructure cost.

FootfallCam Centroid™

Video	Area Counting for Shopping Mall	Video
Video	Crowd Counting for Shopping Mall	Video

FootfallCam™

Demand-Based Washroom Cleaning

FootfallCam 3D Mini™ is ideal for measuring the number of people entering and exiting the washroom, send cleaning requests wirelessly to cleaners via Washroom Management App.
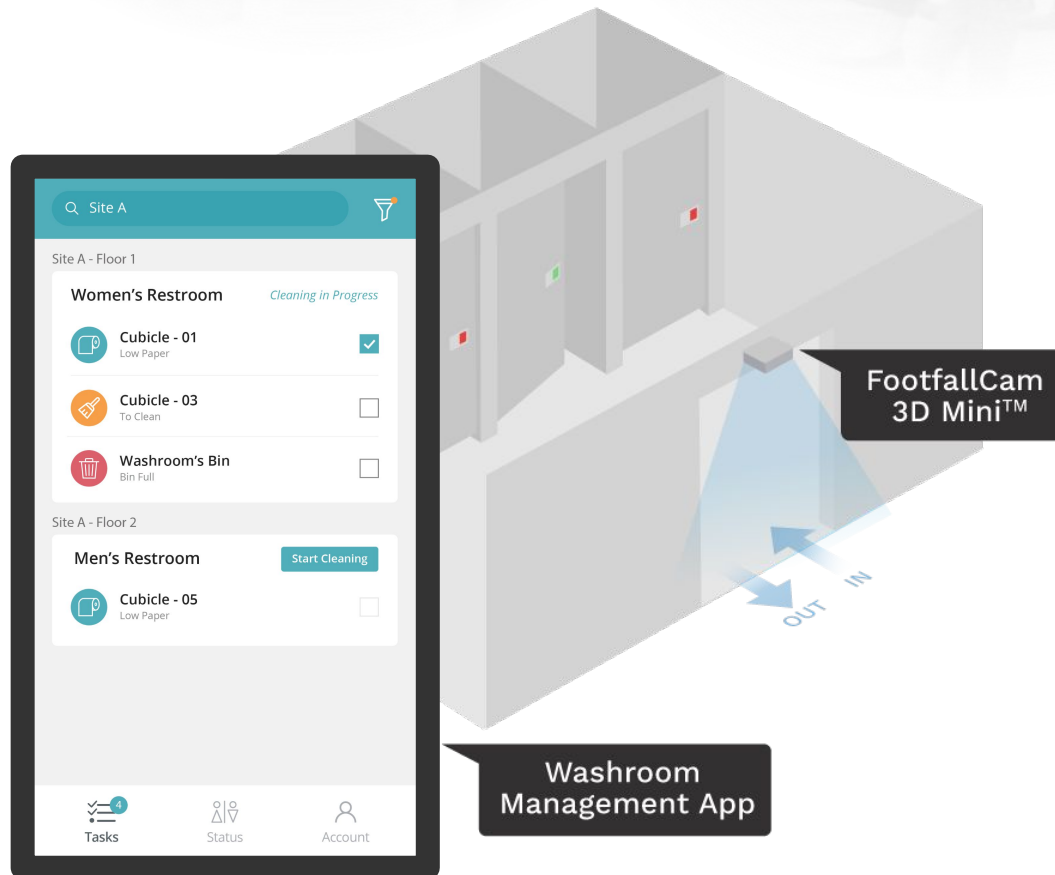
Demand-based Cleaning

Crews get accurate information about cleaning needs via wireless cleaning notification alert which can lead to improve the efficiency for janitorial services.

Measure SLA and Auditable Cleaning Fee

Identify the cleaning service KPI with over-cleaned or under-cleaned which able to optimize the cost of maintenance.

Improve User Experience

A reliably serviced building is a far more welcoming place for its occupants.

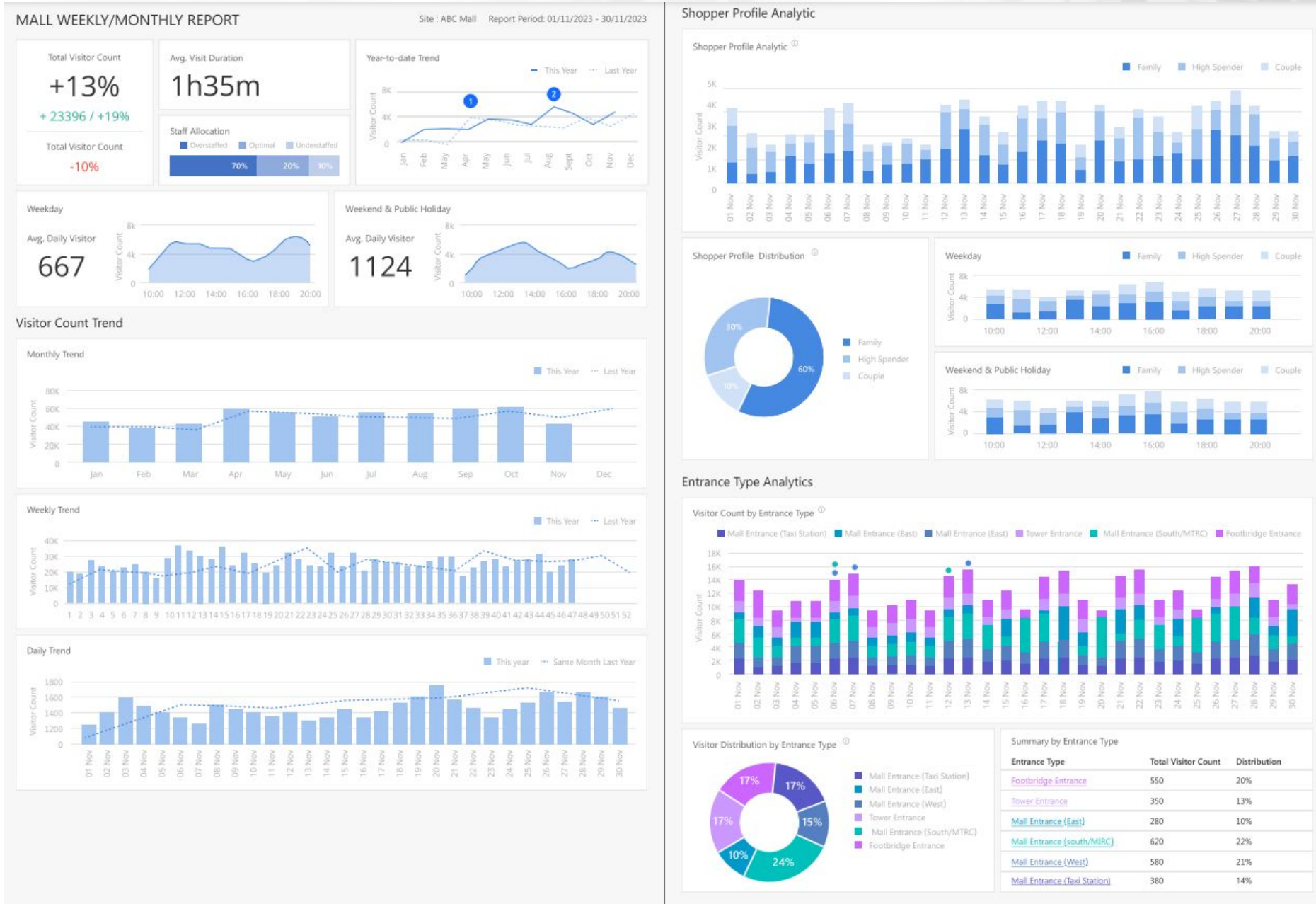| Video	Demand-Based Washroom Management	Video Link

FootfallCam™

Analytics

Live Data for Operation- "*Are shoppers getting the right level of services?*"

- Ⓐ *Measure* the *live* usage of mall facilities

- Ⓑ *Alerts* : Real-time task alerts when SLA is breached

- Ⓒ *Action*: Resources re-allocation and tracking
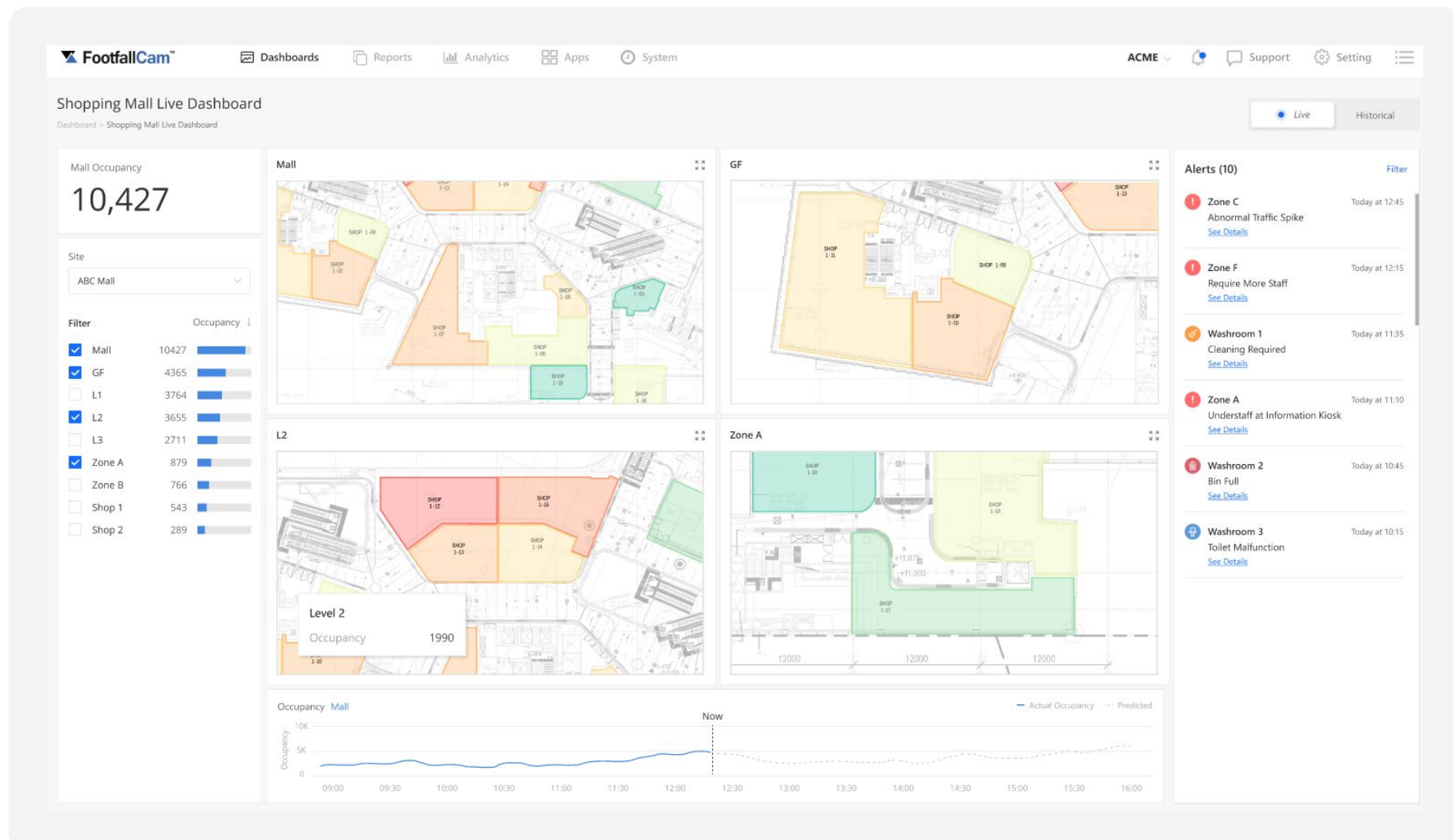
Trend Analysis and Reporting

FootfallCam™

Event Performance Tracker

"What is the ROI of our events and promotions?"

- Ⓐ *Measure* the increased number of shoppers during the Evaluation period (*compared to predicted when no event*).

- Ⓑ *Quantify* the demographic groups, dwell time and spends versus the event investments.

- Ⓒ *Compare* the ROI of different events. Learn the pattern. Predict the likely outcome of upcoming events
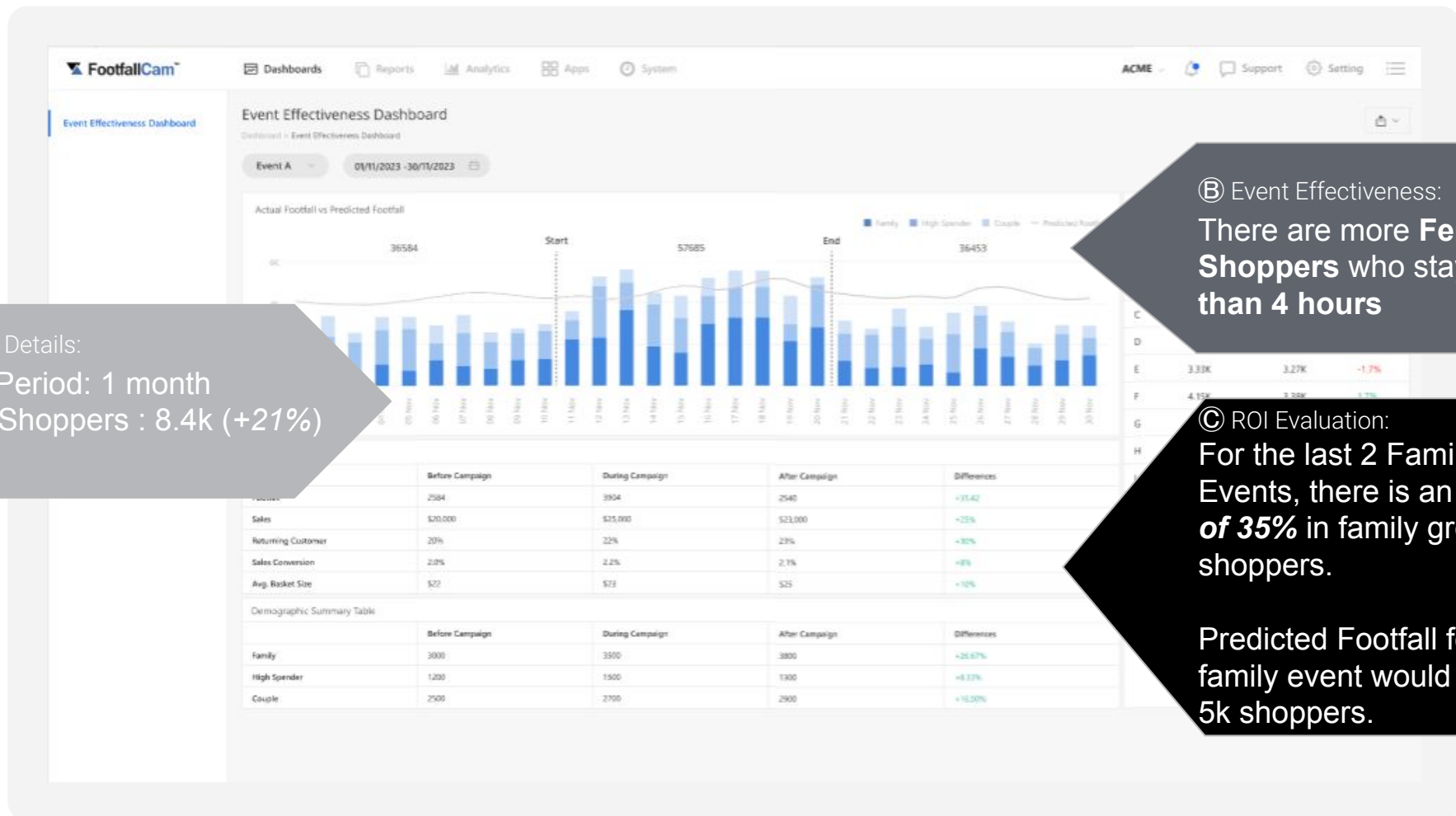
Ⓐ Event Details:
Event Period: 1 month
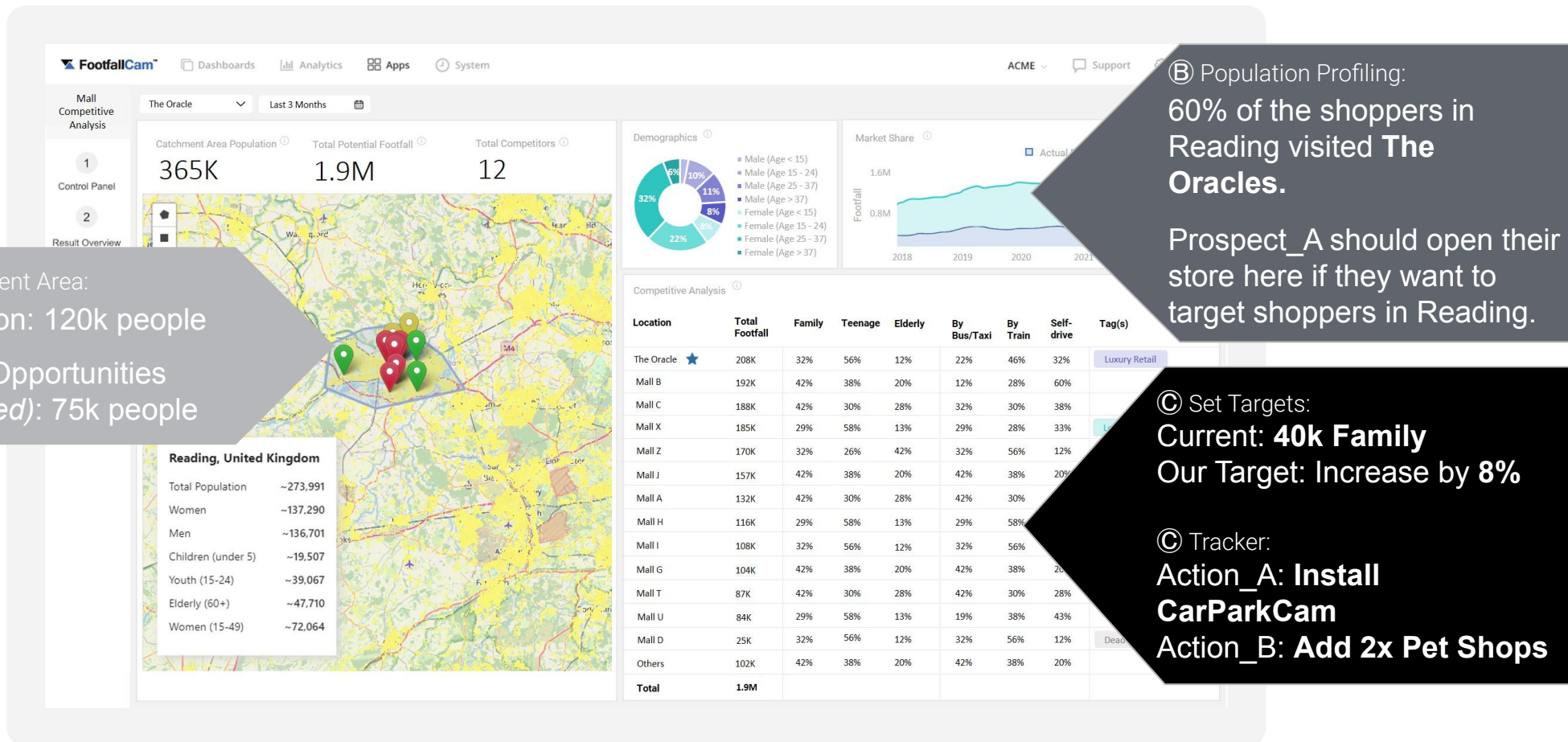**No. of Shoppers : 8.4k (*+21%*)**

Ⓑ Event Effectiveness:
There are more **Female Shoppers** who stay **more than 4 hours**

Ⓒ ROI Evaluation:
For the last 2 Family Type Events, there is an *increase of 35%* in family group shoppers.

Predicted Footfall for the next family event would have extra 5k shoppers.

Marketing Events Evaluation Dashboard - View

FootfallCam

"What is our Market Share in the Catchment area?"

- Ⓐ *Estimate* the market shares of our competitors in the catchment area

- Ⓑ *Profile* of the Demographics: categorise shoppers into family group, teenage group, transportation mode *etc*.

- Ⓒ *Competitive Analysis:* the 'Missed Opportunities" and *track* the progress of the action plan.

Ⓐ Catchment Area:
Population: 120k people

Missed Opportunities
(estimated): 75k people

Ⓑ Population Profiling:
60% of the shoppers in Reading visited **The Oracles.**

Prospect_A should open their store here if they want to target shoppers in Reading.

Ⓒ Set Targets:
Current: **40k Family**
Our Target: Increase by **8%**

Ⓒ Tracker:
Action_A: **Install CarParkCam**
Action_B: **Add 2x Pet Shops**

Capture the *"Missed Opportunities"* with Mall Location Analysis Dashboard - View

"*Who are my shoppers?*"

- Ⓐ *Measure* the number of shoppers, *Compare* Current Footfall vs Previous Period, vs Predicted Footfall

- Ⓑ *Profile* of my shoppers between Weekdays and Weekends: Footfall, Demographics and Dwell Time.

- Ⓒ *Track* progress against targets - versus particular demographic groups
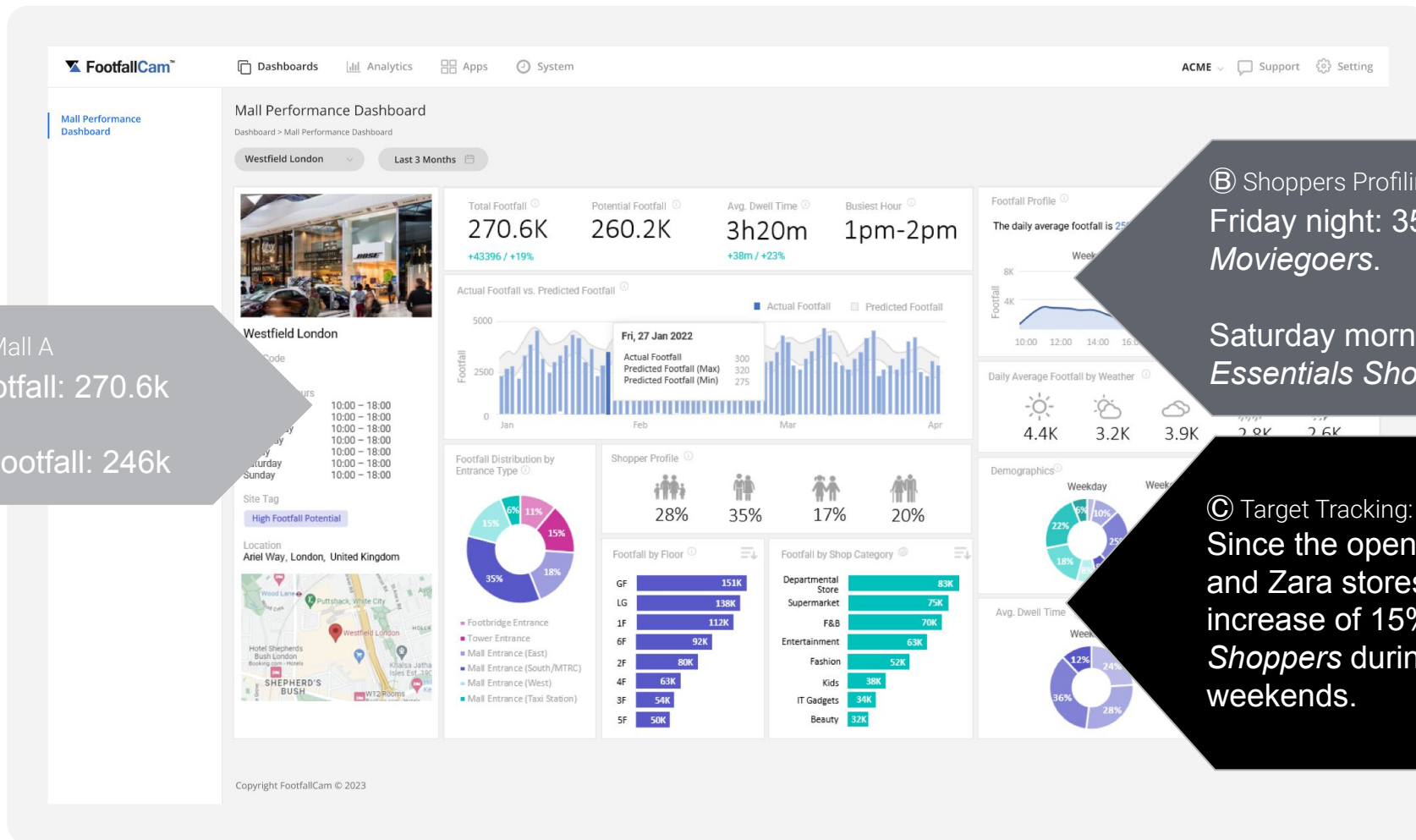
Ⓐ: Shopping Mall A
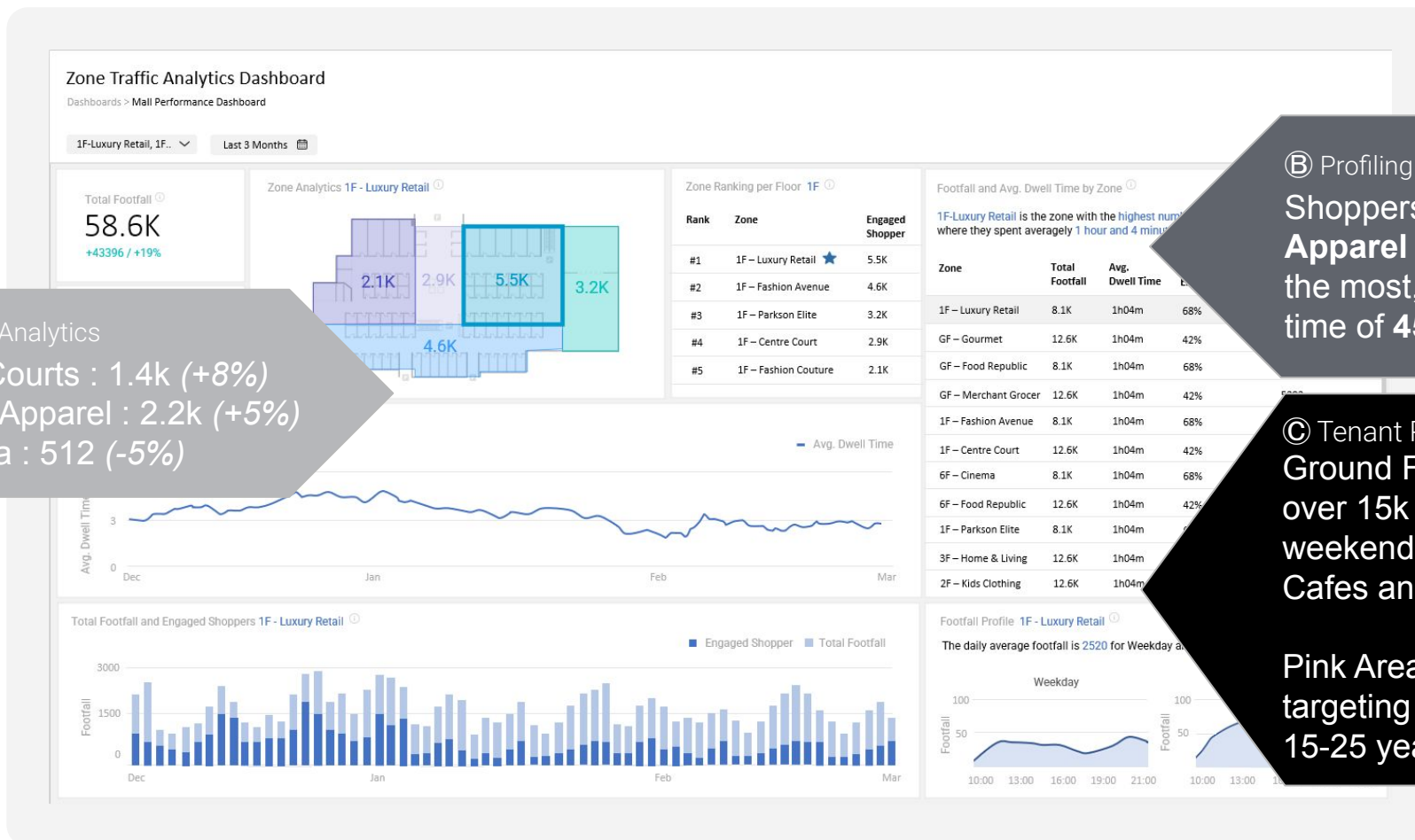Current Footfall: 270.6k
(+10%)
Predicted Footfall: 246k

Ⓑ Shoppers Profiling:
Friday night: 35% are *Moviegoers*.

Saturday morning: 40% of are *Essentials Shoppers*.

Ⓒ Target Tracking:
Since the opening of H&M and Zara stores, there is an increase of 15% of *Teenager Shoppers* during the weekends.

Mall Performance Dashboard - View

"Where do my shoppers go? What do they do?"

- Ⓐ *Measure* the number of passerby and dwell time each area

- Ⓑ *Profile* of the shopping activities: No. of shoppers visited food courts, young apparel area, cinema, anchor stores, luxurious fashion *etc*

- Ⓒ *Action:* Justify tenant rental rate. Store location and refurbishment planning.

Ⓑ Profiling of Shopping Activities:
Shoppers visited the **Young Apparel Area** at Ground Floor the most, with average dwell time of **45 minutes**.

Ⓐ Zone Analytics
Food Courts : 1.4k *(+8%)*
Young Apparel : 2.2k *(+5%)*
Cinema : 512 *(-5%)*

Ⓒ Tenant Rental Justification:
Ground Floor Lobby Area has over 15k passerbys each weekend morning, suitable for Cafes and Cosmetic Stores.

Pink Area suitable for Stores targeting teenagers between 15-25 years old.

Zone Traffic Analysis Dashboard - View

FootfallCam™

Staff Roster Planning

- Ⓐ Matching *Staff planning* based on *predicted footfall* in the coming weeks.

- Ⓑ *Track* work progress using App
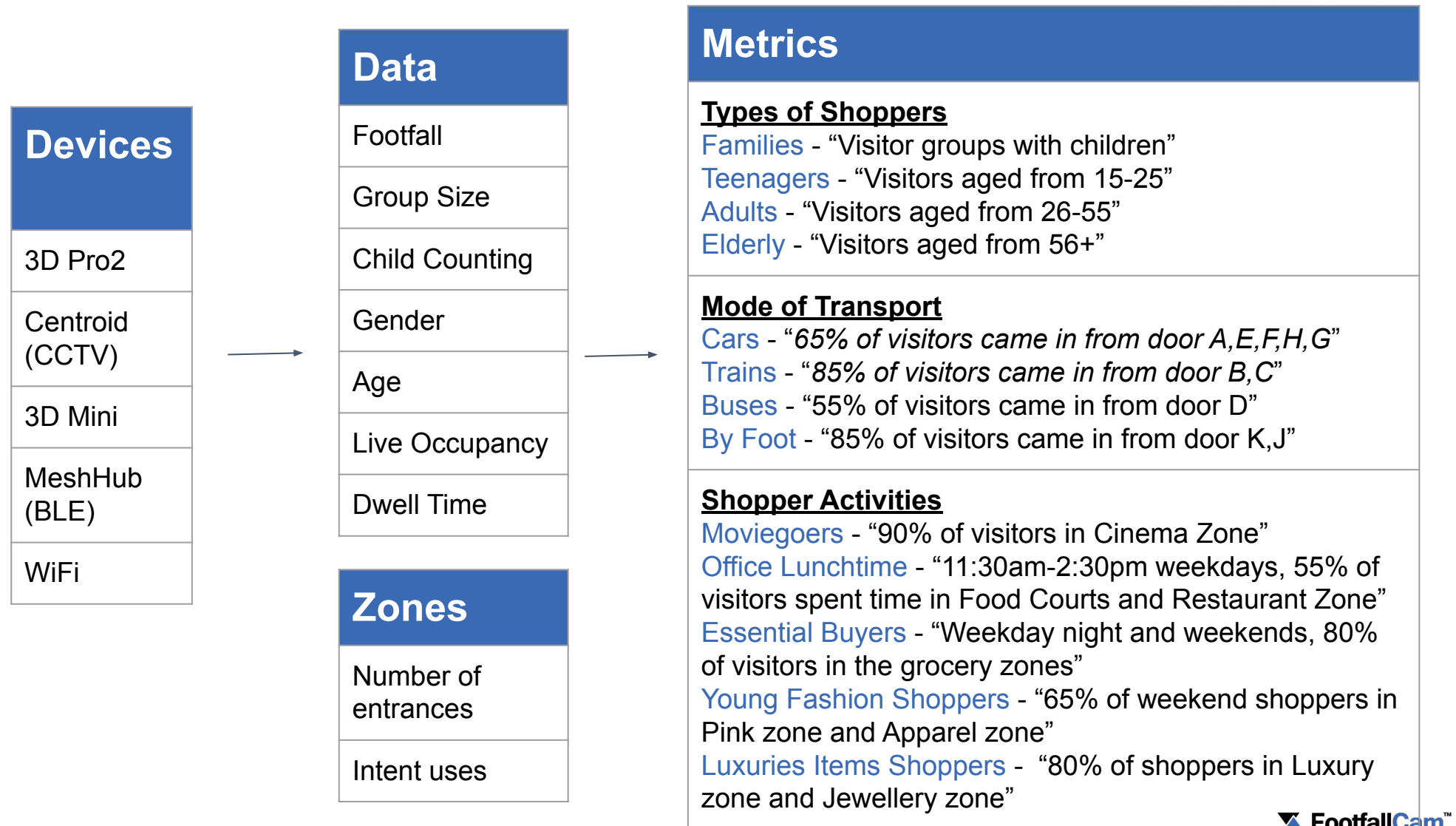
- Ⓒ *Review* if the service provided meets the SLA agreed
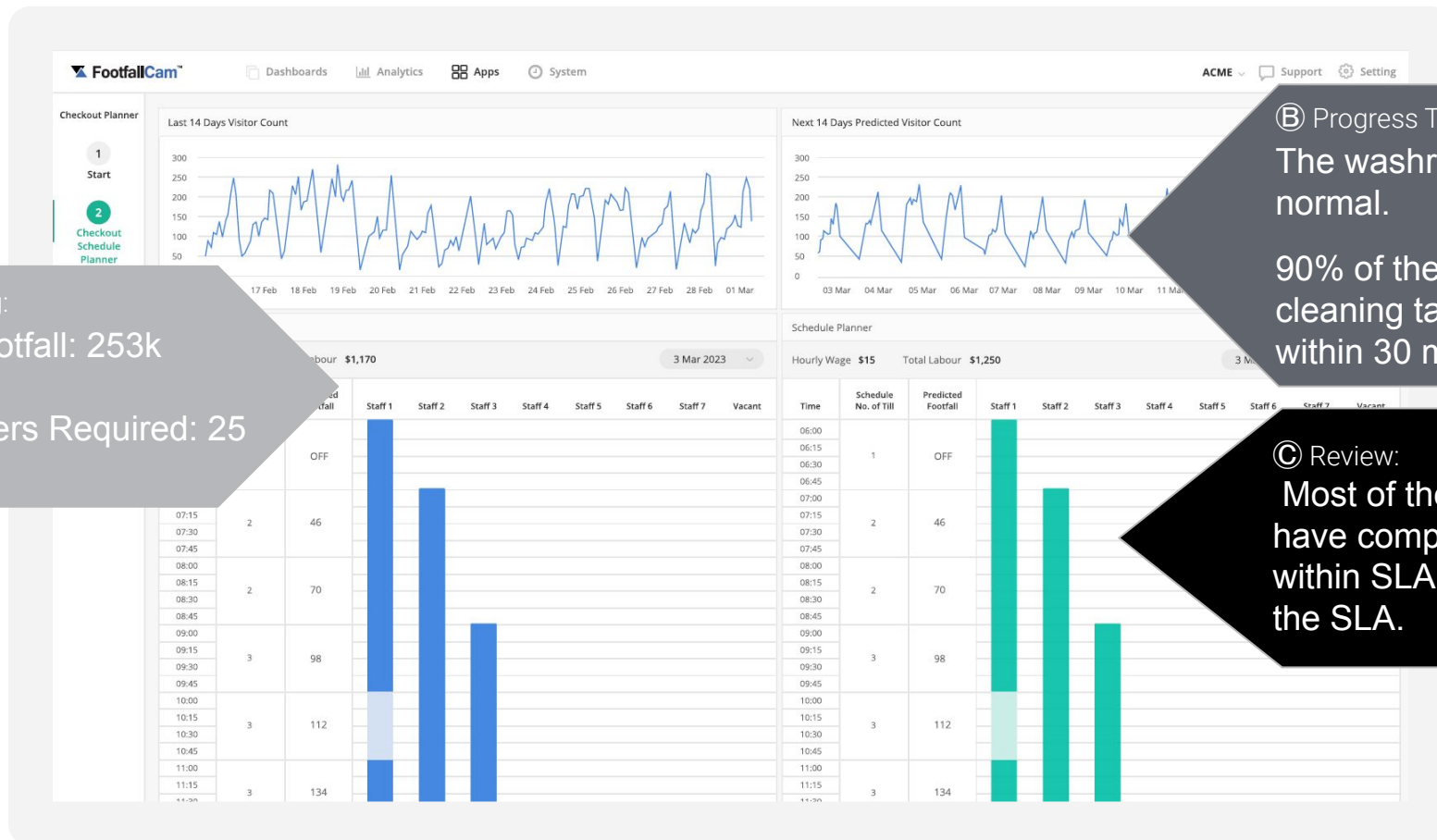
Ⓐ Staff Planning:
Predicted Footfall: 253k *(+21%)*
No. of Cleaners Required: 25 *(+5)*

Ⓑ Progress Tracking:
The washroom usage is normal.

90% of the washroom cleaning tasks are completed within 30 minutes.

Ⓒ Review:
Most of the cleaners (95%) have completed their tasks within SLA, 5% are breaching the SLA.

Staff Roster Planning Workspace - View

Data Modeling

Combining different data from various devices and zone configurations, your business could *model* "meaningful" metrics which would help to gauge the states of the business and track its progression.

Devices

Devices
3D Pro2
Centroid (CCTV)
3D Mini
MeshHub (BLE)
WiFi

Data

Data
Footfall
Group Size
Child Counting
Gender
Age
Live Occupancy
Dwell Time

Zones

Zones
Number of entrances
Intent uses

Metrics

Types of Shoppers
Families - "Visitor groups with children"
Teenagers - "Visitors aged from 15-25"
Adults - "Visitors aged from 26-55"
Elderly - "Visitors aged from 56+"

Mode of Transport
Cars - *"65% of visitors came in from door A,E,F,H,G"*
Trains - *"85% of visitors came in from door B,C"*
Buses - "55% of visitors came in from door D"
By Foot - "85% of visitors came in from door K,J"

Shopper Activities
Moviegoers - "90% of visitors in Cinema Zone"
Office Lunchtime - "11:30am-2:30pm weekdays, 55% of visitors spent time in Food Courts and Restaurant Zone"
Essential Buyers - "Weekday night and weekends, 80% of visitors in the grocery zones"
Young Fashion Shoppers - "65% of weekend shoppers in Pink zone and Apparel zone"
Luxuries Items Shoppers - "80% of shoppers in Luxury zone and Jewellery zone"

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AI Data Modeling

Combining different data from various devices and zone configurations, your business could *model* "meaningful" metrics which would help to gauge the states of the business and track its progression.

Tagging by AI	
Data Tagging	Spike in the Footfall, Reduced in the footfall, Family group data increased
Store Profile Tag	Restaurant, Jewelry, High Income spending shops
Time Tagging	Holiday, Lunch hour, After work
Other source	Rainy, Sunny, Economic crisis, inflation

Aggregated Profiling
Example Lunch time on Sunday has increased the proportion of family group visiting Restaurant… . . Compare the aggregated profiling with 3 other malls

FootfallCam™

Reports

Management Reports
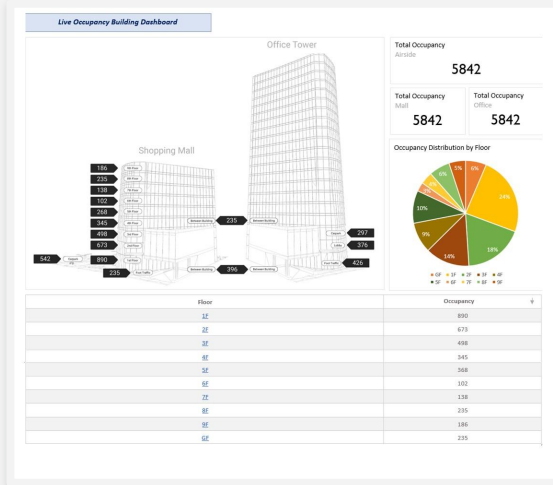
Building Level Occupancy [PDF, 2 pages]
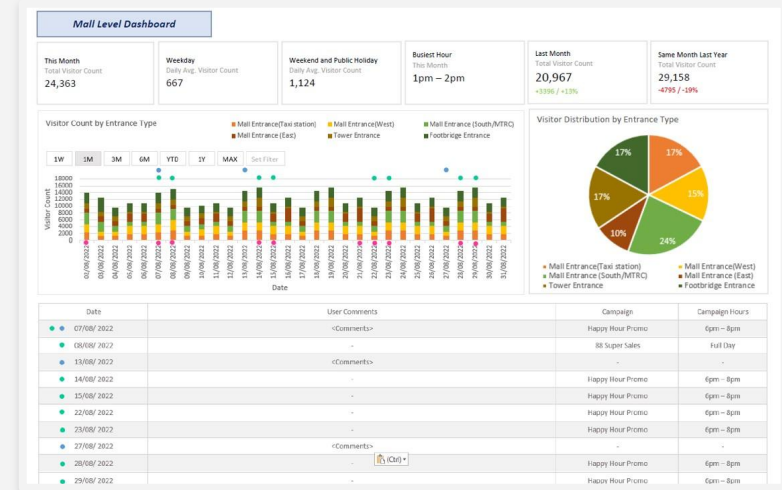
Mall Level Visitor Count [PDF, 4 pages]
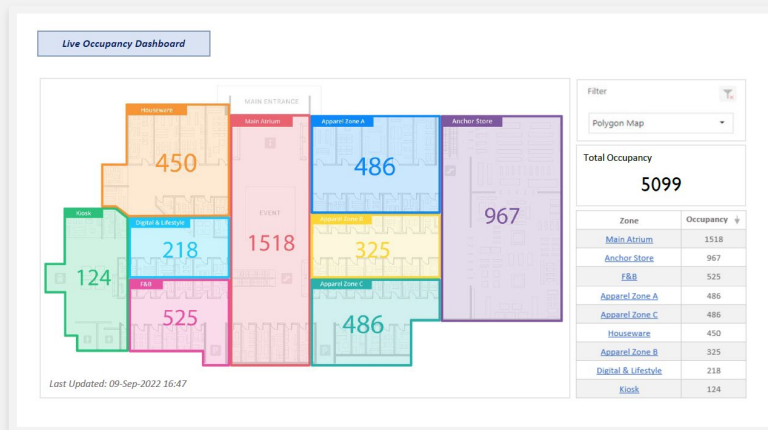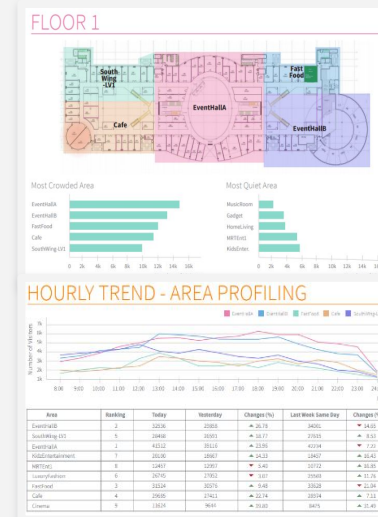

Zone Level Analytics [PDF, 1 page]
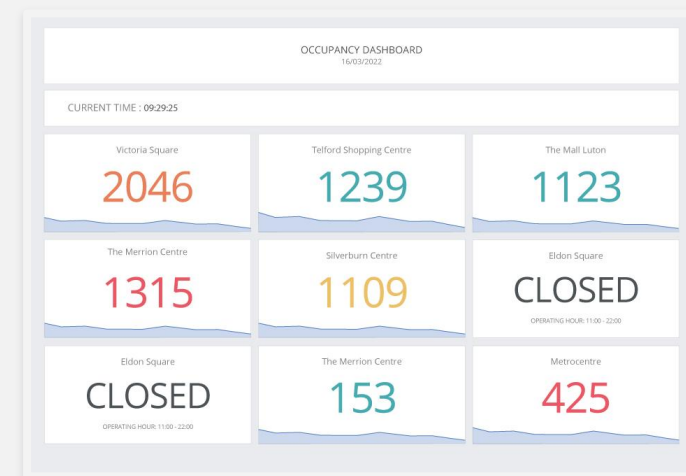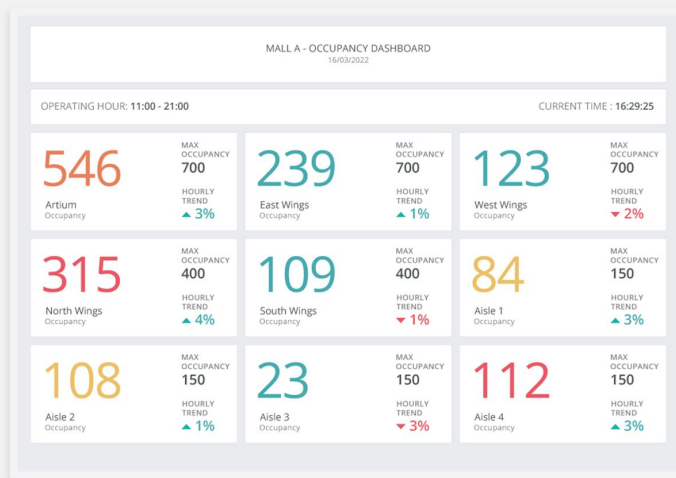

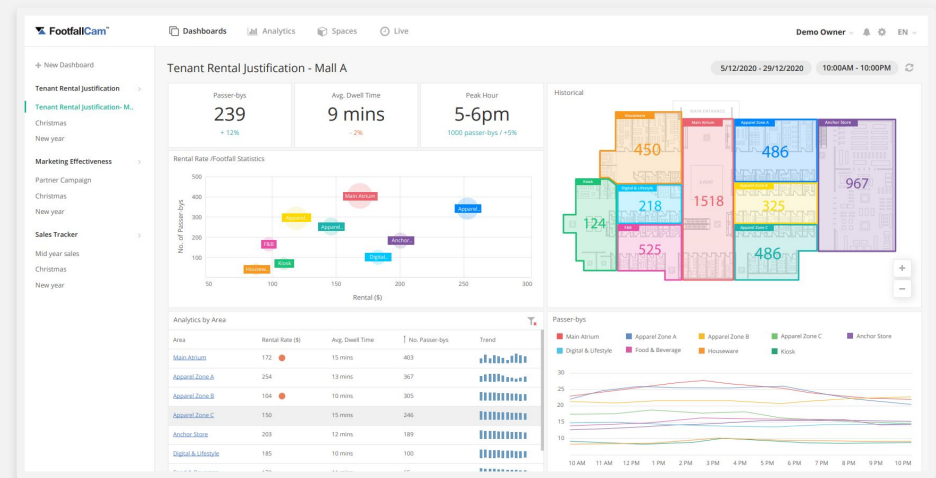**Shopping Malls Overview** [PDF, 1 page]

FootfallCam™

Management Reports

Mall Daily Report [PDF, 1 page]

Area Profiling [PDF, 2 pages]

Area Live Occupancy [JPG, 1 page]

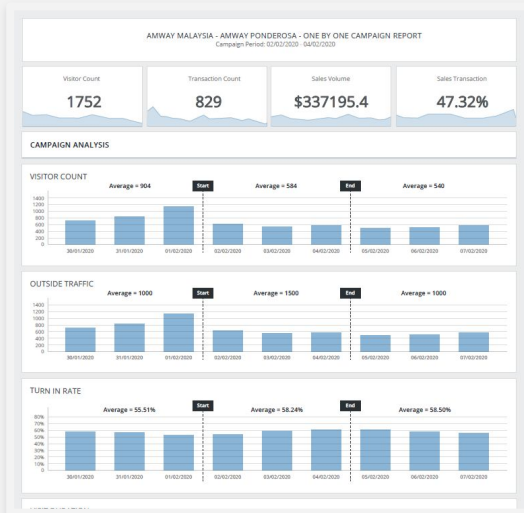**Tenant Rental Evaluation [PDF, 1 page]**
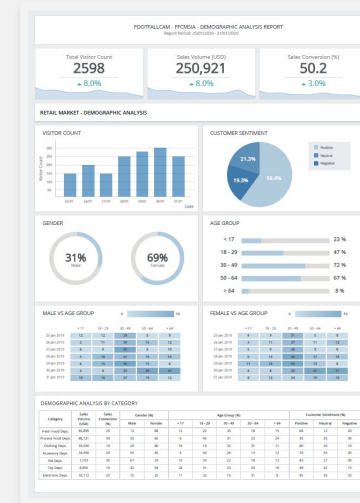
FootfallCam

Management Reports
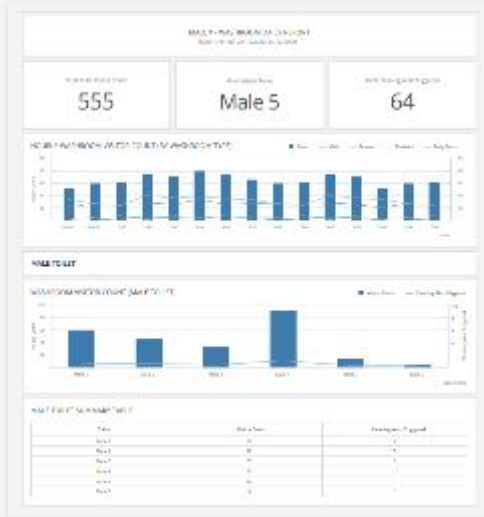
Washroom Usage Report [PDF, 1 page]
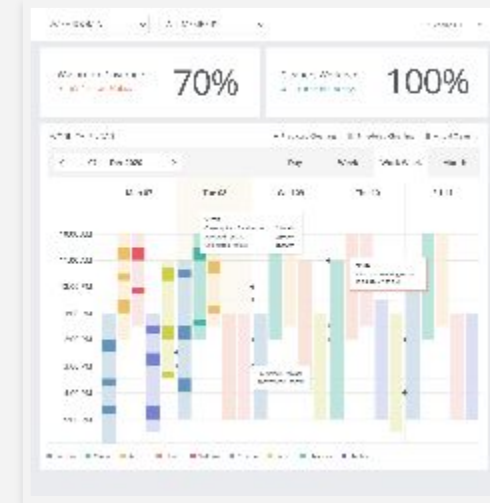
Cleaning Scheduling Management [PDF, 1 page]

Marketing Effectiveness [PDF, 3 pages]

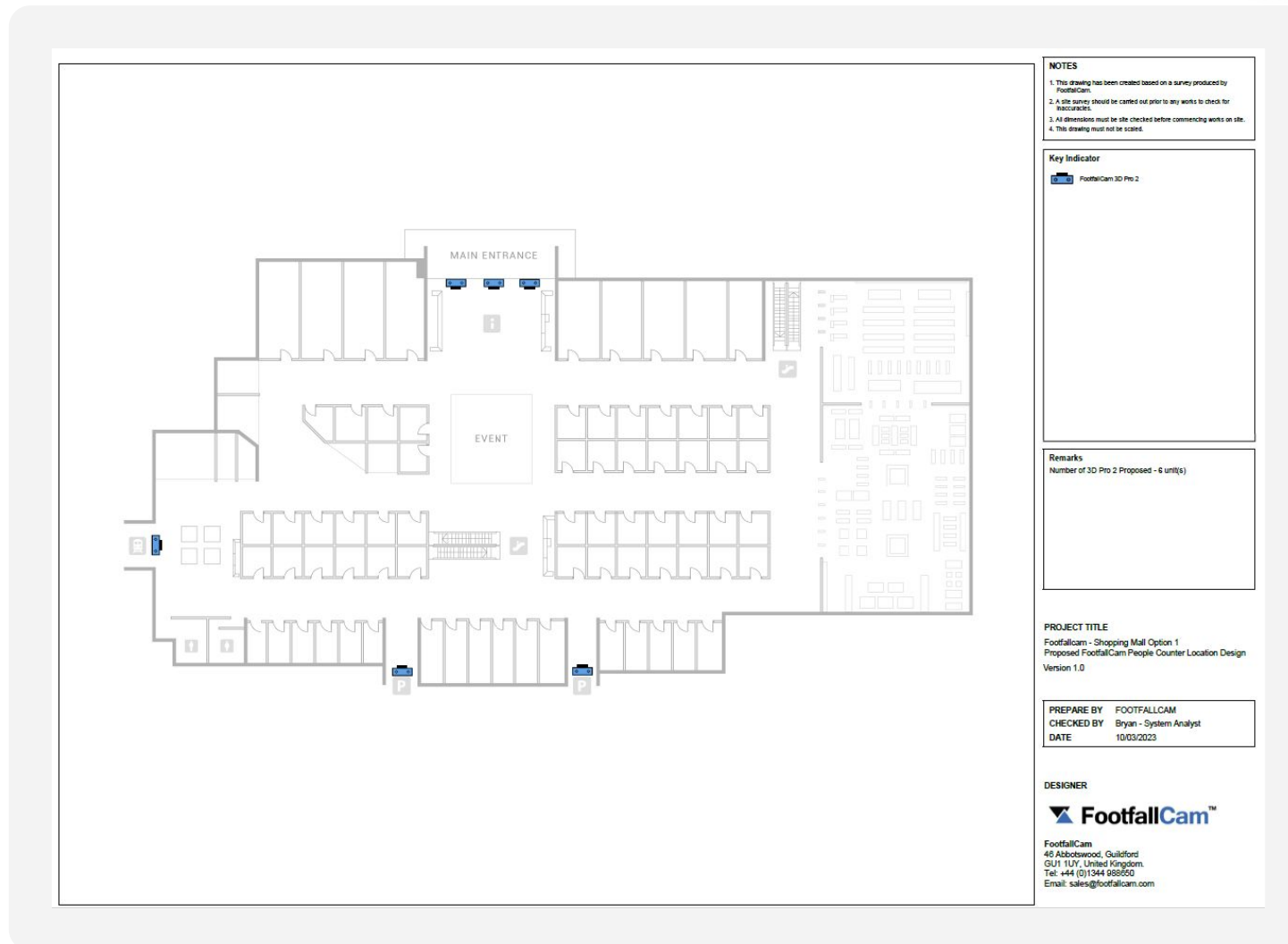**Demographic Analysis** [PDF, 1 page]

FootfallCam™

Deployment
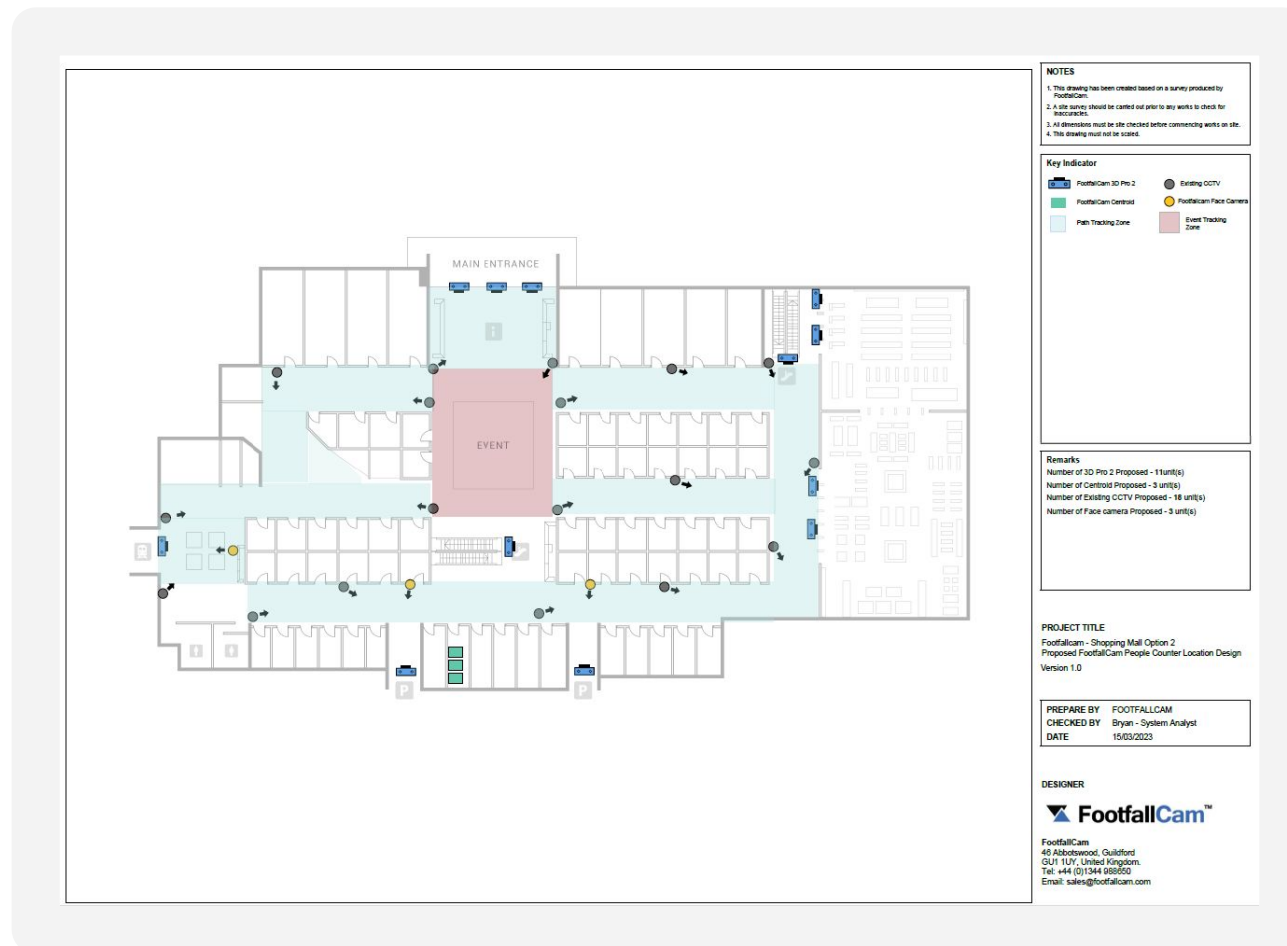
Plan #1: People Counting System - Essential

- **3D Pro2** people counters installed at the entrances. Cost Effective.

- Can monitor the number of shoppers visited the mall.

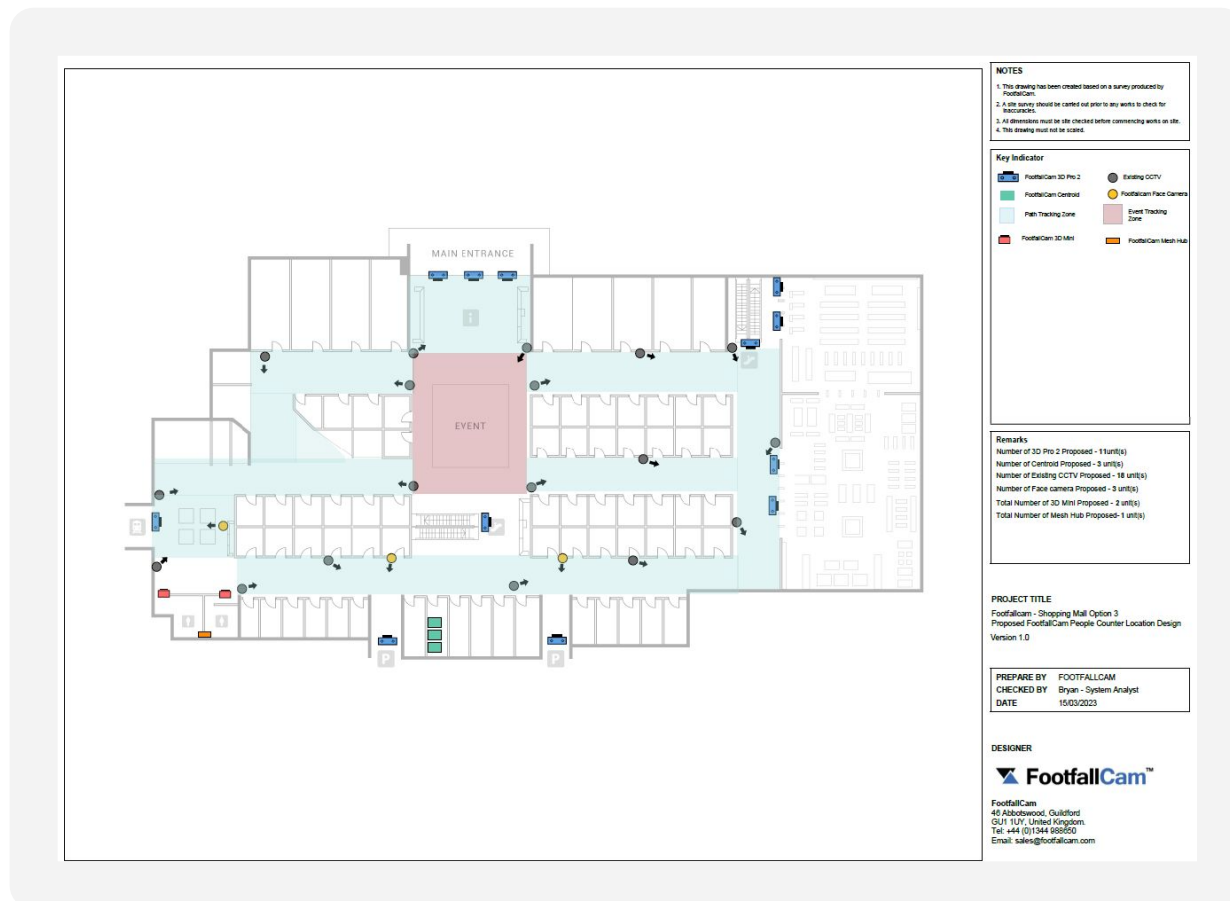Floor Plan Design - View

Plan #2: People Counting System - Standard

- **3D Pro2** people counters installed at the entrances - Monitor the number of shoppers visited the mall.

- Reuse existing CCTV cameras with **Centroid** - Monitor the number of shoppers at the key areas of mall - aisles, corridors, event concourse *etc*.

- **FaceCam** at key entrances - Capture demographic attributes of the shoppers


Floor Plan Design - View

Plan #3: People Counting System - Enterprise

- **3D Pro2** people counters installed at the entrances - Monitor the number of shoppers visited the mall.

- Reuse existing CCTV cameras with **Centroid** - Monitor the number of shoppers at the key areas of mall - aisles, corridors, event concourse *etc*.

- **FaceCam** at key entrances - Capture demographic attributes of the shoppers

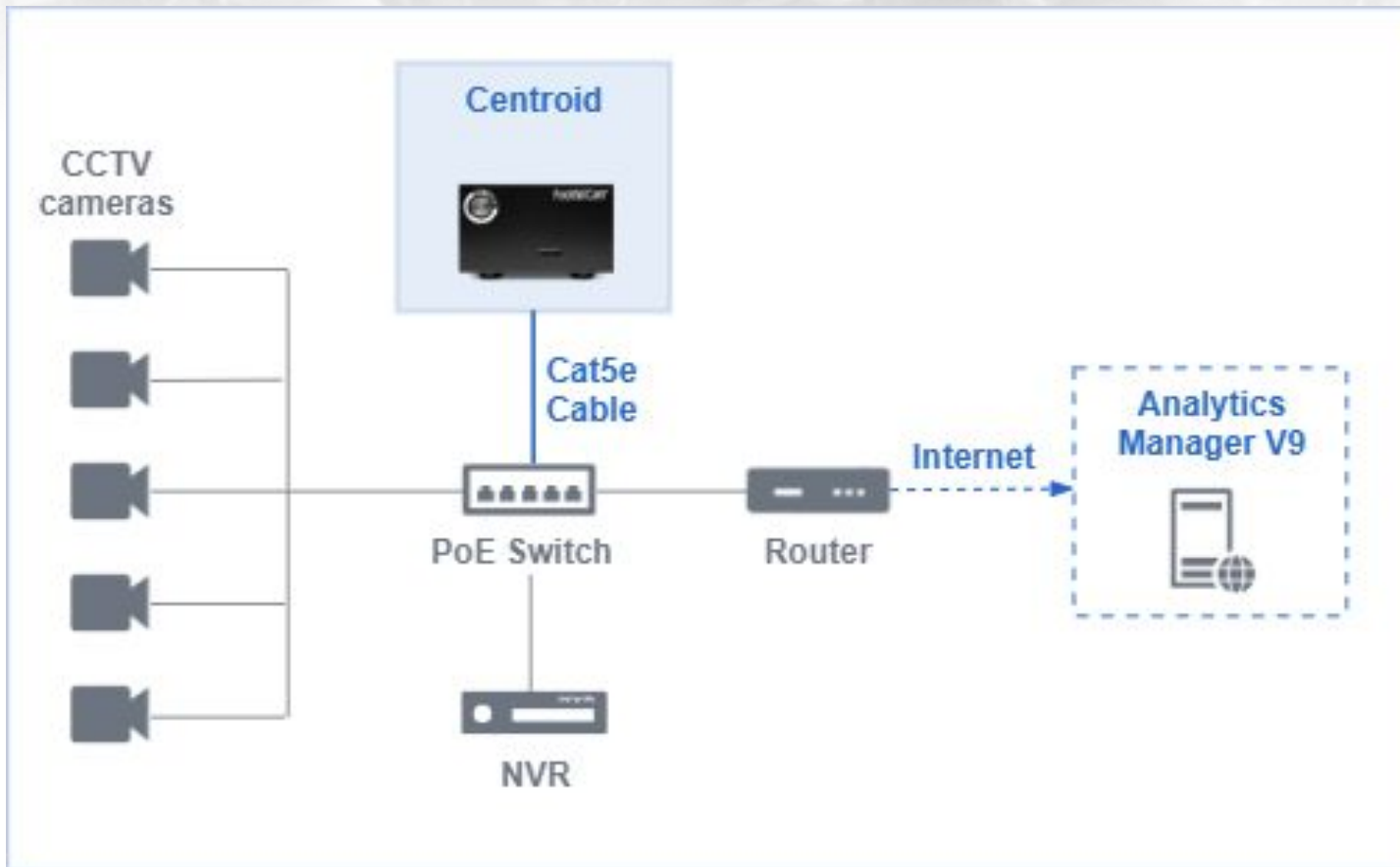- **3D Mini** and **Mesh Hub** at washrooms - Monitor facility usage and cleaning management

Floor Plan Design - View

3D Pro2 - Cabling Diagram
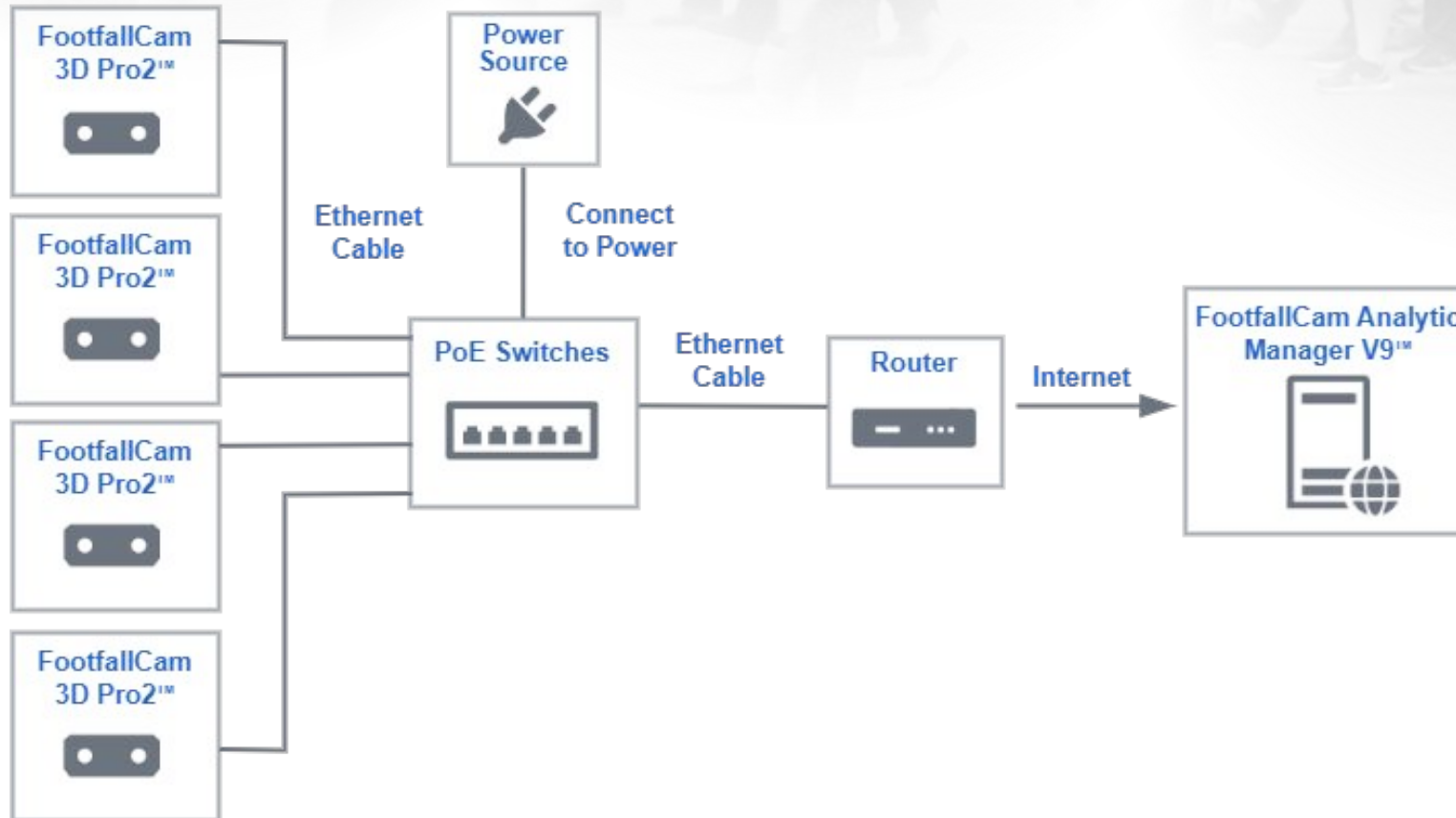
- Pro2 connects a network switch via Cat5e cable.

- Only counting data is transmitted (<50 kB per hour)

- Pro2 is a PoE device. It gets its power from the PoE switch or a PoE injector

Centroid - Cabling Diagram

- **Easy to deploy**: Connect the Centroid to a network switch
  - Use 1x Network Port only
  - Can re-use existing LAN network (*optional*).
- One Centroid can support up to 8x IP CCTV cameras
  - Can re-use any existing CCTV IP cameras (*optional*)
- **Works in tandem with NVR** - most IP cameras can support up to 5 concurrent video streams

FootfallCam™

IoT devices - Cabling Diagram
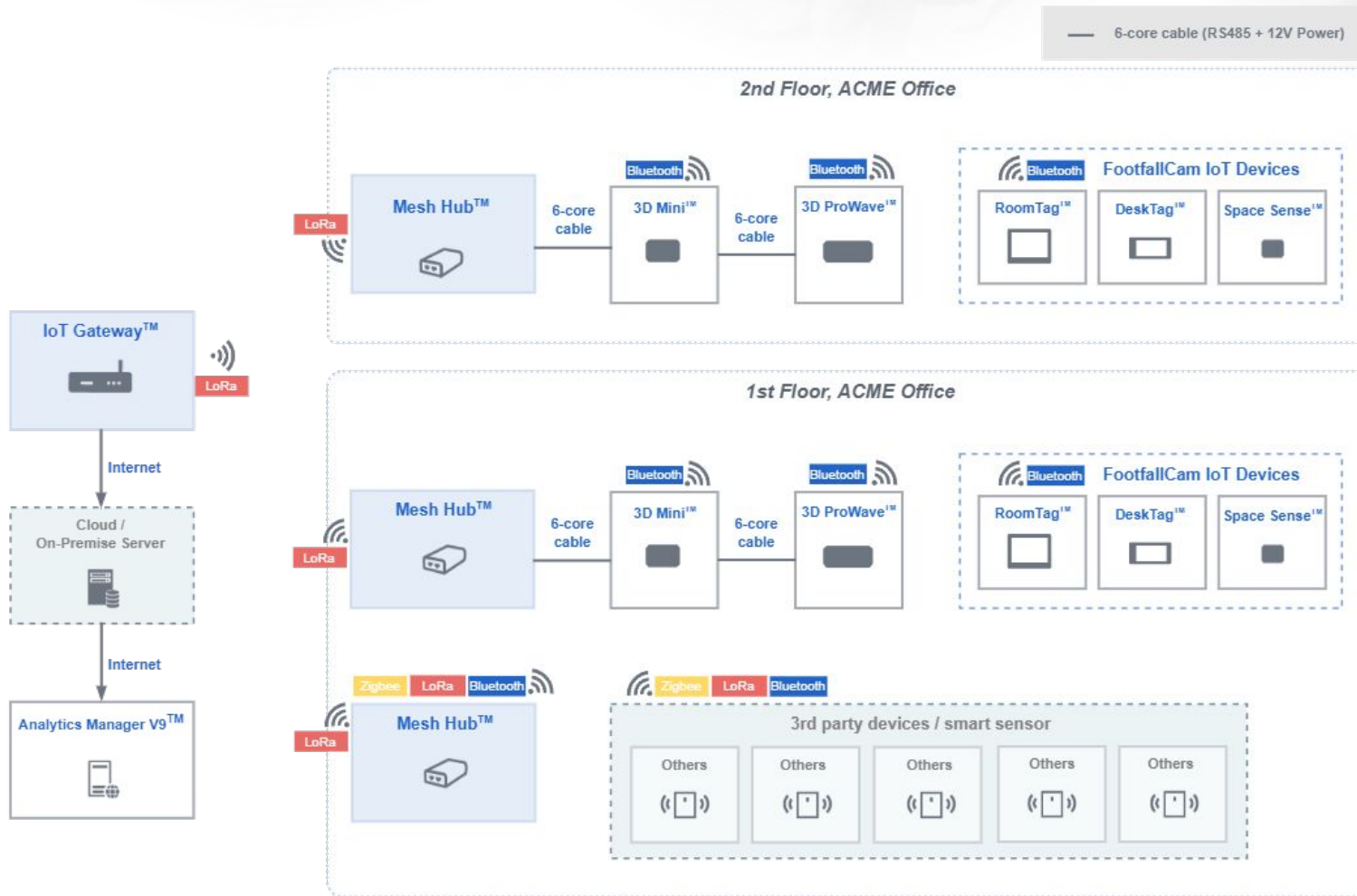
diagram

- Mesh Hub - has the flexibility to connect up via 4G, LoRa, Zigbee, Bluetooth, RS485
  - RS485 - can daisy-chain all FootfallCam IoT devices
- Low deployment cost. Can cover large areas and multiple buildings.

FootfallCam™

Floor Plan Designer

V9 Floor Plan Designer allows re-configurations the devices according to the floor plan changes. [View]

Data Integrity

360° System Dashboard

- Ⓐ *360° summary -* of all aspects of the system; including availability, accuracy, alerting, and tracking of issues.

- Ⓑ *Reduced Training Costs* - Maintain optimal system availability during personnel changes

- Ⓒ *Faster Response Time* - To minimise the impact of the issues on data integrity.
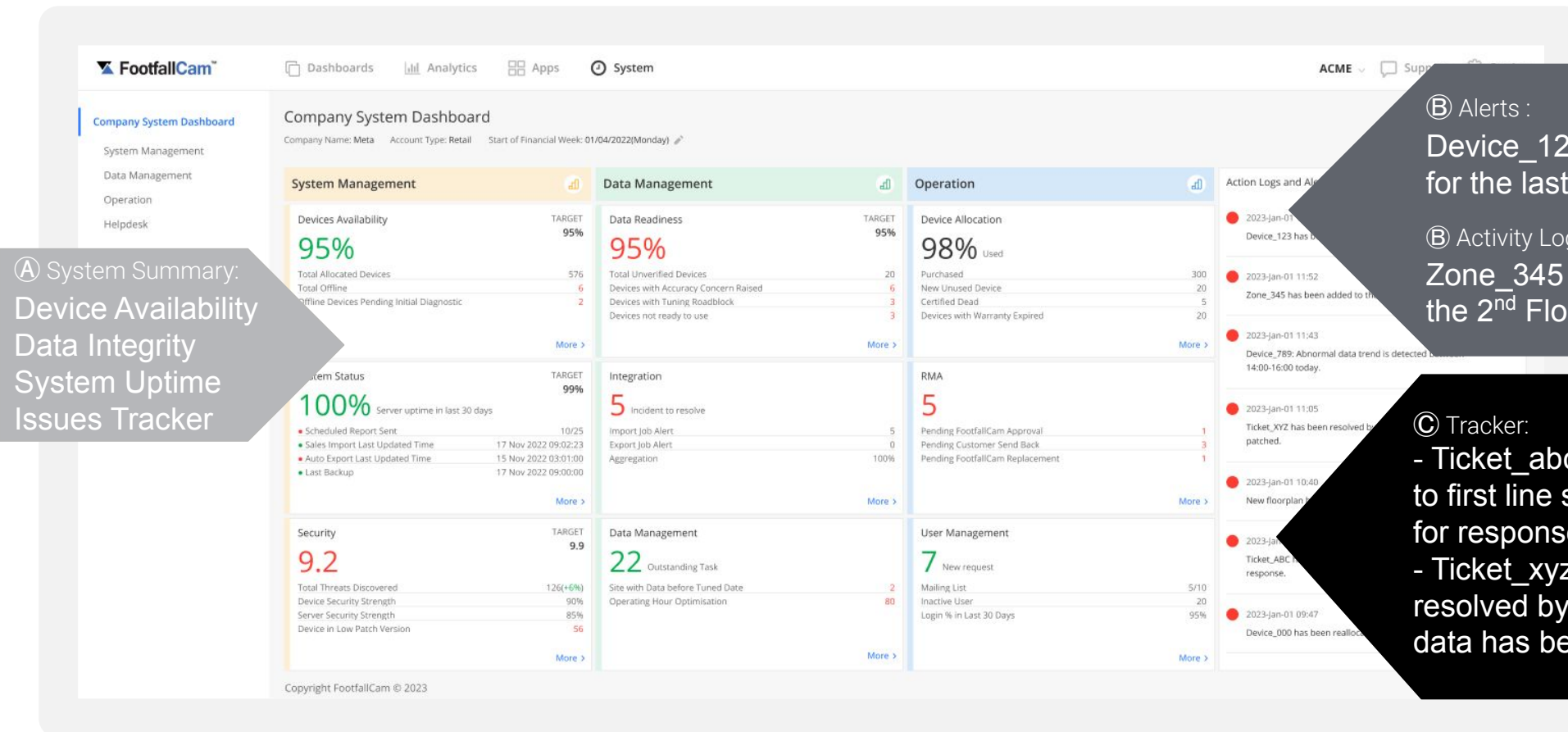
Ⓐ System Summary:
Device Availability
Data Integrity
System Uptime
Issues Tracker

Ⓑ Alerts :
Device_123 has been offline for the last 8 hours.

Ⓑ Activity Logs:
Zone_345 has been added to the 2nd Floor

Ⓒ Tracker:
- Ticket_abc has been raised to first line support - waiting for response
- Ticket_xyz has been resolved by Engineer_999, data has been patched.

360° System Dashboard - View

FootfallCam

Accuracy Audit

How do we audit accuracy to ensure up to 99.5% counting accuracy?

Device Accuracy Certificate

FootfallCam™ CERTIFICATION

Company	: Hutchison Group
Site	: Site ABC
Device Name	: MainEntrance01
Serial	: 15F010290099	00000000f7004310
Certified Date	: 27 Jul 2022
Certified By	: Jaden

Accuracy Statement

This device has been tuned with a consistent accuracy sufficient for business use. We hereby certified that it has achieved the **expected accuracy of 95% and above** during all hours within operating hours of the site based on the scheduled video(s).

Disclaimer:
This device could not cover approximate the 30cm on the left side of the entrance door. Its impact on the overall inaccuracy is 2%. Re-adjusting the position of the device 15 cm to the left should resolve the issue. FootfallCam recommends no action is required.

Video Proofs

Statistical Evidence(s)
With 6,000 sample size collected over the last 7 days, we are confident to assure that the configured tracking zone and lines are able to capture all the required walk paths for both In and Out without 3D noises generated.

Frequently Asked Question

Q: What can I do if I have doubt on the counting accuracy?
A: You may schedule video recordings and perform the manual counting in the recorded videos to gather more hard evidences of the video recordings to reassure the counting accuracy. If there is any data inaccuracy identified in the video(s), please raise a support ticket together with the video evidences to us.

Generated by FootfallCam Analytics Manager V9

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1 **Schedule video recordings**

Schedule video recordings from peak hours with sufficient sample size (20 and above) to audit the accuracy of the counter.

2 **Compare system count and manual count**

Compare the system count by FootfallCam device against manual observations to determine the accuracy of the FootfallCam.

3 **Generate verification report**

Once there is sufficient sample size and the accuracy is satisfactory, a verification report with the video proof used in manual observation will be generated.
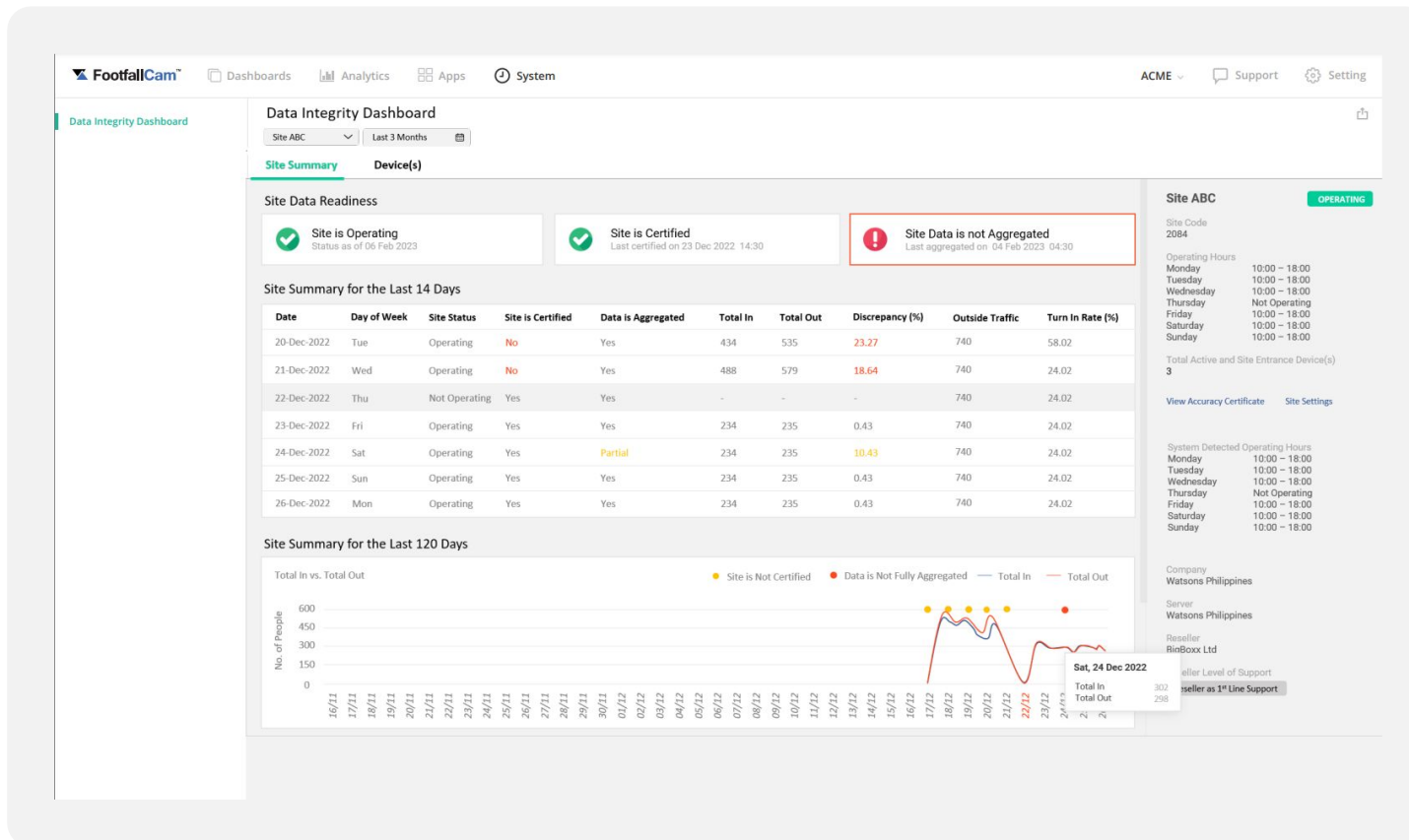
Document	Accuracy Certificate	Document

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Maintaining Data Integrity

The [Data Integrity Report](#) allows users to monitor data discrepancies and site changes. For example:

- To recover the missing data, FootfallCam server will re-aggregate the raw data stored in counter level and store the re-aggregated data in the server

- Hence, users can retrieve the missing daily or hourly data so that macro trends will not be affected

- For more details, refer to Accuracy Tuning webinar.

Integration

API
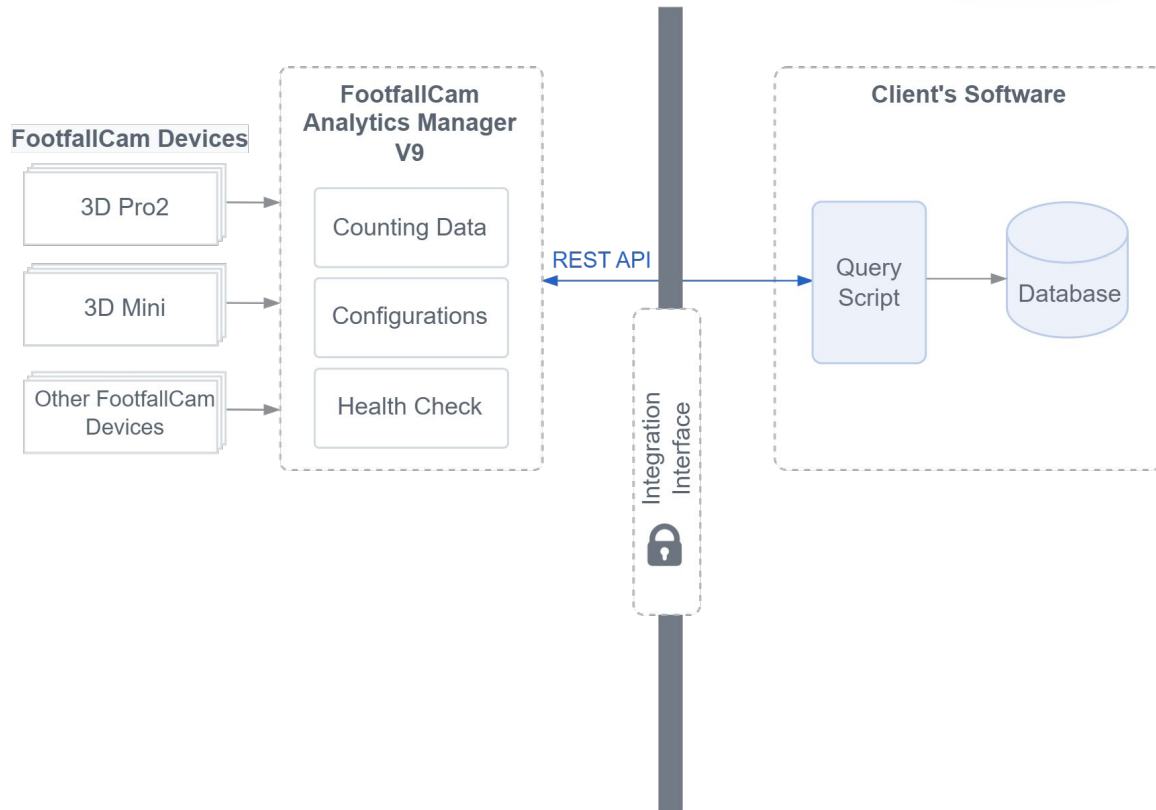
- **Integrate** people counting data into third-party software platform or sample projects via API or FTP

- **Real-time** data retrieval

- Data in **aggregated** or **raw** format

- Allow **customised** scripts and handling for specific customer's project

| User Guide	API Document - Retrieve Data via API From Analytics Manager	Document
Video	Data Integration via REST API	Video Link

Open Architecture

Open Architecture Diagram

- FootfallCam supports:
  - Certified third-party smart sensors
  - Bluetooth, Zigbee and LoRa compatible third-party smart sensors
- Can be hosted on FootfallCam Servers or hosted on clients' servers, as long as it is a FootfallCam Sensor with IoT gateway.
- Offers flexibility to work with a variety of smart sensors
- Dedicated FootfallCam specialist who will be responsible for integration

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IEEE 802.1x Certificate
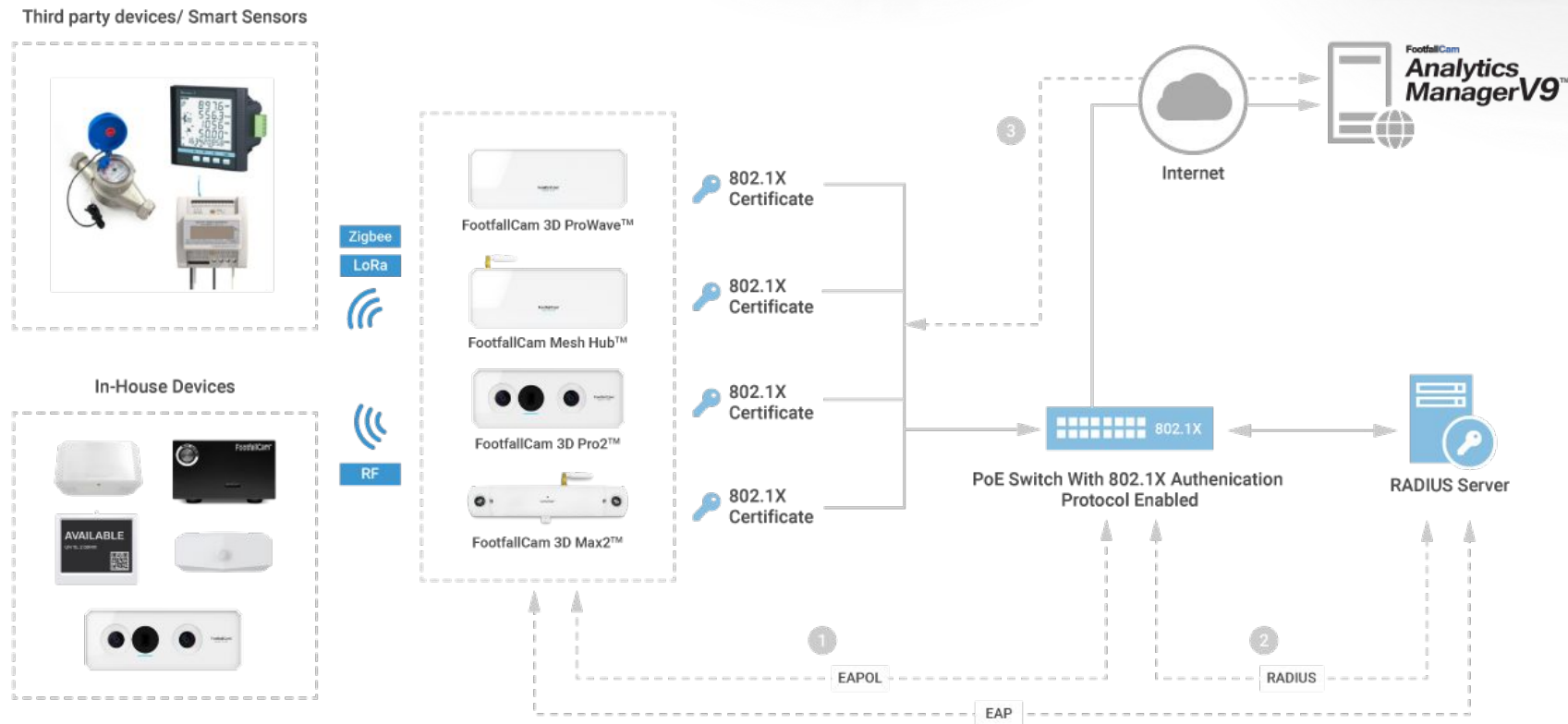
- FootfallCam™ Counters supports IEEE 802.1x network authentication protocol, allowing greater security for your own network environment while using our counters.

- RADIUS Server (Authentication Server) must be readily deployed, and a PoE Switch with 802.1x enabled ports (Authenticator) is required to interconnect and authenticate between our counters and the RADIUS Server.

- FootfallCam™ Counters (Supplicants), required to install 802.1x certificate, generated by the RADIUS Server, to enable this security feature.

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Data Privacy and GDPR Compliant
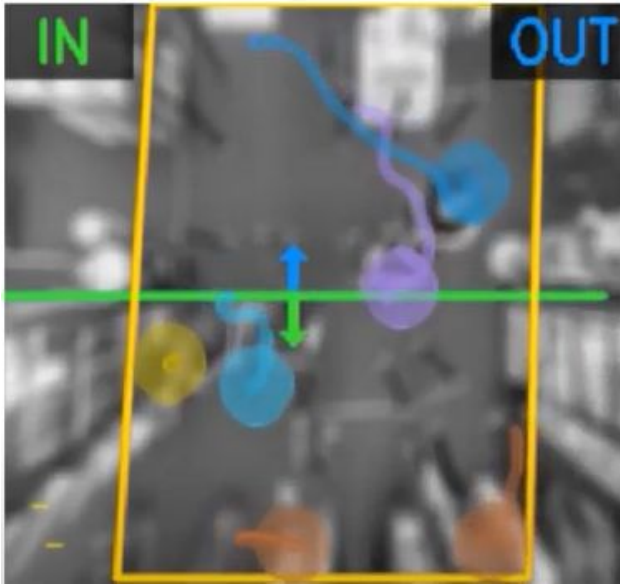
Option 1: Black and white mode
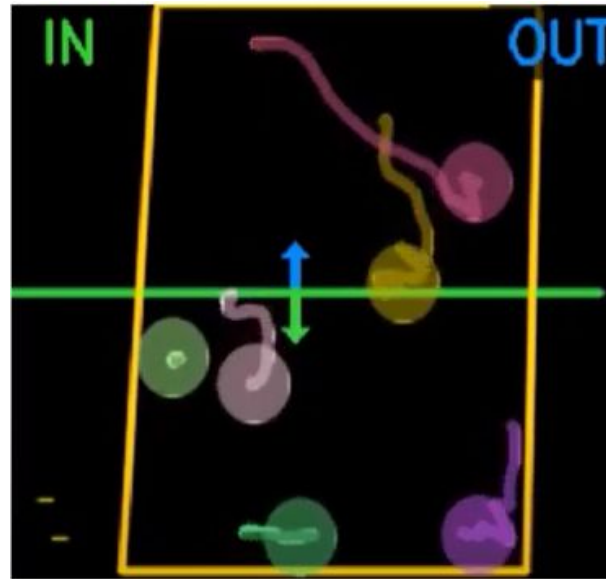
Option 2: No live view mode

Option 3: Low resolution mode

- Counters installed downwards facing the ground – does not capture the entirety of the customer & unable to pick up facial features.

- Videos are recorded only for verification purposes and taken in low resolution. The videos will be deleted once verification is completed. View video on different privacy mode here.

- FootfallCam uses 3D depth map instead of video images for counting purposes – data collected are non-visual and are will not be able to be identify with any individuals.

- FootfallCam is compliant of GDPR. More information can be found here.

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Contact Us

You need further information or have a question?
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www.footfallcam.com

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