November 16th, 2020

IT Infrastructure Setup

F100327-03

For FootfallCam People Counter

FootfallCam™

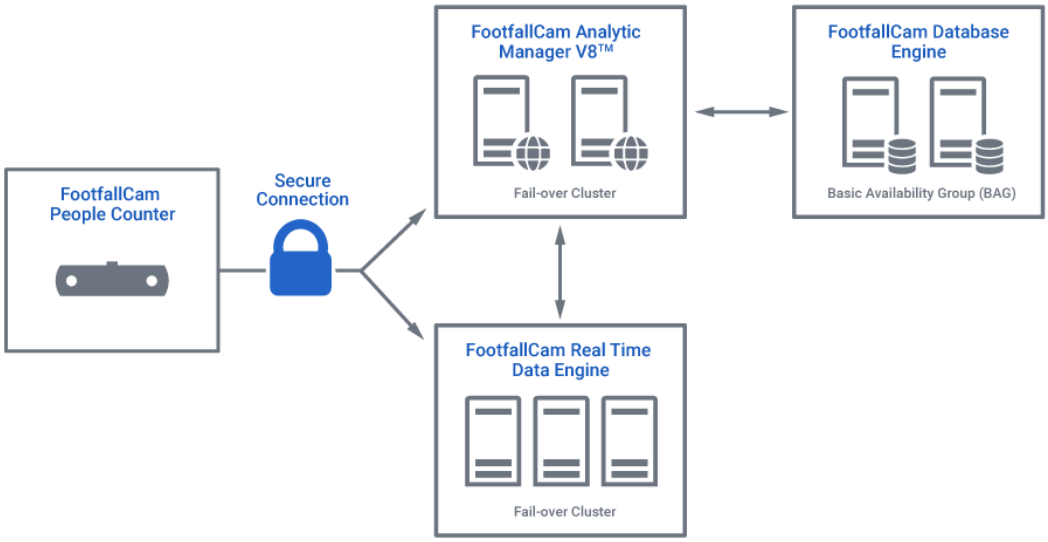
Revision History

Revision Number	Description of Revision	Date of Revision
1	Initial Draft	14th November 2016
2	Revision	1st August 2017
3	Initial Release	6th September 2017
4	Update Server Installation Form	3rd March 2020
5	Update Additional Configuration	31st March 2020
6	Revise and Update	26th April 2020
7	Revise and Update	27th May 2020
8	Revise and Update	1st June 2020
9	Update Secondary Server Installation	18th June 2020
10	Revision	30th October 2020
11	Revision and Update on Server Requirements	16th November 2020

Contents

Chapter 1: FootfallCam Analytic Manager V8™ Installation

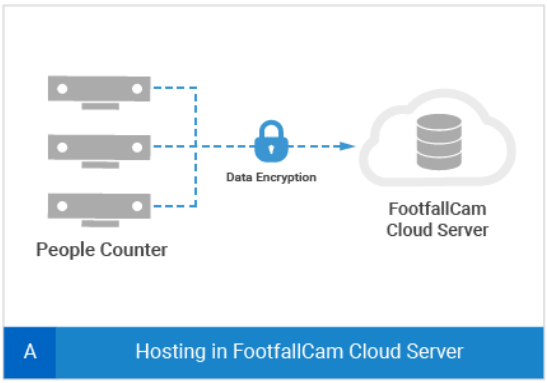
1.1 FootfallCam™ Cloud Architecture

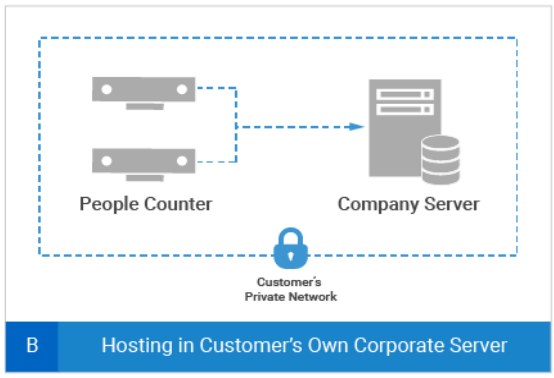


Since 2002, **FootfallCam™** has continuously honing and established a well-designed **Multi-Tenants Cloud Solution** to centralize and refine all data that has been collected from all of FootfallCam™ Devices, offers **secure**, **reliable, scalable**, **high availability** service, catering with the best possible experience to customers all around the world.

FootfallCam™ Cloud Solution incorporates 3 main services, which are: **FootfallCam™ Analytic Manager V8**, **FootfallCam™ Real Time Data Engine**, and **FootfallCam™ Database Engine**.

FootfallCam™ Analytic Manager V8, which simplifies the way we use the processed information for business needs with customisable features. **FootfallCam™ Real Time Data Engine** offers the near real-time data retrieval and process from FootfallCam™ Devices, allowing customers to view the data from predefined or custom live dashboards in FootfallCam™ Analytic Manager V8. **FootfallCam™ Database Engine** is the cornerstone of data aggregation that constantly collects and processes the data, with a robust backup plan and redundancy that mitigates data loss from catastrophic events.





These services are available for all of FootfallCam™ customers who purchased FootfallCam™ People Counter, with **free of charge**. *(Diagram A - Hosting in FootfallCam Cloud Server)*

Alternatively, customers can choose to **host FootfallCam™ Solution on-premise** *(See Diagram B - Hosting in Customer's Own Corporate Server)*. This option enables customers to further securely store and complete control of data in their own premises, with the same methodology and functionality as the Cloud Servers provided by FootfallCam™.

1.1.1 FootfallCam™ Devices Network Specifications

FootfallCam™ Devices consumes network bandwidth, allowing servers to collect and process the data into analytical information in FootfallCam™ Analytic Manager V8. Below are the Minimum Bandwidth Usage for FootfallCam™ Devices.

MINIMUM BANDWIDTH USAGE

Item	Data Type	Approximate Bandwidth Usage	Frequency
Counting Data	JSON	6 KB per counter	Every Hour
Wi-Fi Data (Hashed)	JSON	5KB per counter	Every Hour
Client Data	JSON	50KB per 350 detected clients	Daily
Compressed Counting Video	ZIP	10MB per scheduled video from portal (15 minutes duration)	Three videos per day until Accuracy Audit is completed

1.1.2 Requirements for using FootfallCam™ Cloud Servers

In this section, customers that chosen to use our FootfallCam™ Cloud Servers are advised to meet the below requirements.

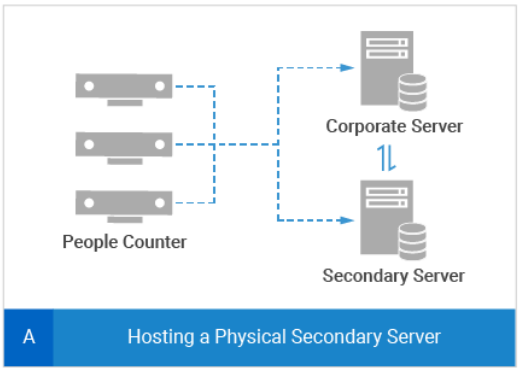
NETWORK OUTBOUND FIREWALL RULES (ON-SITE)

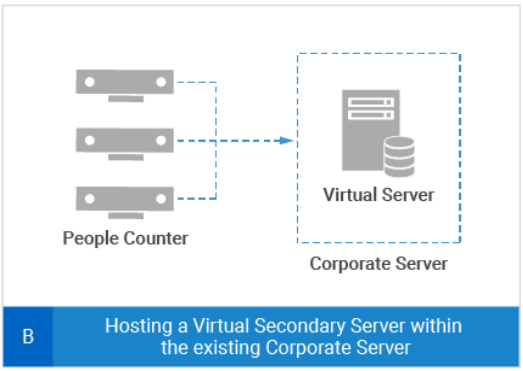
IP Address	Port Number	Protocol	Purpose
145.239.4.218	80, **[Mandatory]** 443	HTTP/TCP, HTTPS/TCP	**[Mandatory]** To enable data upload from device to FootfallCam Cloud Server.
91.109.10.77			To enable data upload from device to FootfallCam Cloud Server (failover server) in case of primary server is down.
51.255.103.189			Allows users to access FootfallCam™ Analytic Manager Portal
51.210.114.229			**[Mandatory]** To enable live counting data upload from device to server.
51.89.155.156			**[Mandatory]** To enable Space Occupancy data upload from devices to server**.**
54.85.80.97	80, **[Mandatory]** 443, 22	HTTP/TCP, HTTPS/TCP, SSH/TCP	**[Mandatory]** VPN server to allow FootfallCam Support Team personnel remote access to device in case of supporting / error diagnosis.

1.2 On-Premise Server Architecture

To host FootfallCam™ Solution on-premise, customers are required to prepare **2 server instances** for hosting **Microsoft Windows Server** *(Primary Server)* and **Ubuntu Server** *(Secondary Server)* to operate the whole FootfallCam™ Solution.

There are **THREE** ways to host these 2 server instances, which are **A. Hosting Primary and Secondary servers individually *(Type A On-premise Infrastructure)***, **B. Hosting Secondary Virtual Server in Primary Server *(Type B On-premise Infrastructure)***.





In service level perspective, **Primary Server Instance** hosts both **FootfallCam™ Analytic Manager V8** and **FootfallCam™ Database Engine**, whereas **Secondary Server Instance** hosts **FootfallCam™ Real Time Data Engine**. Both server instances must present to work cohesively to deliver every single feature bundled in the solution. Below are the differences and the impacts of hosting different types of on-premise infrastructure.

ON-PREMISE INFRASTRUCTURE TYPE PREREQUISITES

	Type A	Type B
Scalability	Scalability depends on the hardware specification of the host servers	Higher scalability by increasing the hardware specification of the virtual machines (Up to the limit of the host server)
Availability	The availability of the service will be depending on the reliability of the provided host server(s) as there is only one running instance of each OS	
Performance	Good performance as our solution can access the servers' hardware resources directly	Performance may be slightly affected as the virtual machines access the server's hardware resources indirectly
Cost-efficiency	Adequate to higher cost for having 2 physical servers to accommodate a better performance	Slightly cost-efficient by introducing resources sharing on the host server, but may comes with the cost of performance
Number of device(s) supported	Up to 2000 devices**	Up to 300 devices**
Backup Module	Available	

***Estimations are done according to the recommended specification in Section 1.3.*

We **recommend to host Type A On-Premise Server** for stable and reliable performance, with easy setup process and turnaround time. However, customers may also choose **Type B On-Premise Server for better cost-efficiency** with a lower number of FootfallCam™ Devices to be supported.

1.3 On-Premise Infrastructure Installation

This section focuses on the requirements of hosting the FootfallCam™ Solution on-premise, which includes server requirements and network requirements. We will break down each type of on-premise infrastructure requirements below.

1.3.1 On-Premise Servers Requirements

We have categorised into 3 tiers to suit your needs in accordance to the number of counters being used in a customer's infrastructure.

TYPE-A ON-PREMISE INFRASTRUCTURE REQUIREMENTS

Item/Size	Light	Standard	Large
Capacity	Up to 200 devices	Up to 500 devices	Up to 2000 devices
PRIMARY SERVER			
CPU	2.6 GHz, 8 Cores 64-bit processor	3.0 GHz, 12 Cores 64-bit processor	3.5 GHz, 16 Cores 64-bit processor
Memory	16GB or above	32GB or above	64GB or above
Storage	500GB or above	1TB or above	2TB or above
Operating System	Windows Server 2012 or above (Standard or Datacenter Edition)		
SQL Server License	SQL Server 2016 or above (Standard or Enterprise Edition)		
SECONDARY SERVER			
CPU	2.2 GHz, 4 Cores 64-bit processor	2.6 GHz, 6 Cores 64-bit processor	3.0 GHz, 8 Cores 64-bit processor
Memory	16GB or above	32GB or above	128GB or above
Storage	250GB or above	500GB or above	1TB or above
Operating System	Ubuntu Server 18.04 (No GUI) or above		

For customers who have more than 2000 devices, we recommend seeking advice from our technical specialists to match your requirements.

TYPE-B ON-PREMISE INFRASTRUCTURE REQUIREMENTS

Item/Size	Light	Standard	Large
Capacity	Up to 30 devices	Up to 120 devices	Up to 300 devices
PRIMARY SERVER			
CPU	3.0 GHz, 8 Cores 64-bit processor	3.5 GHz, 12 Cores 64-bit processor	4.0 GHz, 16 Cores 64-bit processor
Support Virtualization	Yes		
Memory	32GB or above	64GB or above	128GB or above
Storage	500GB or above	1TB or above	2TB or above
Operating System	Windows Server 2012 or above (Standard or Datacenter Edition)		
SQL Server License	SQL Server 2016 or above (Standard or Enterprise Edition)		
Hypervisor	Microsoft Hyper-V, VMWare vSphere, or equivalent		
SECONDARY SERVER (VIRTUAL MACHINE)			
Allocated CPU (½ of host core count)	4 Cores vCPU or above	6 Cores vCPU or above	8 Cores vCPU or above
Allocated Memory (½ of host memory)	16GB or above	32GB or above	64GB or above
Allocated Storage (½ of host storage)	250GB or above	500GB or above	1TB or above
Operating System	Ubuntu Server 18.04 (No GUI) or above		
Virtual Network Adapter Mode	Bridged *(Read Section 1.3.2 for network requirements)*		

NOTE

We recommend customer to deploy ***Solid State Drive (SSD)*** as the server storage for the best performance, which is about 20x faster than a conventional Hard Disk Drive (HDD) with better I/O throughput in long term solution.

For customers who have ***more than 300 devices***, we recommend choosing **Type-A On-Premise Infrastructure** to match your requirements, delivering better and reliable performance.

If you'd like to have more advanced on-premise infrastructure (e.g. High Availability, Scalable, etc.), or have any other inquiries on hosting custom on-premise servers, please contact sales@footfallcam.com and consult our technical specialists to discuss on your requirements.

1.3.2 On-Premise Network Requirements

NETWORK REQUIREMENT AND FIREWALL INBOUND RULES (FOR PRIVATE NETWORK)

Server IP Address	Port	Protocol	Purpose
PRIMARY SERVER			
Static IP or **Domain Name**, externally accessible by FootfallCam™ Devices & Secondary Server	8881	HTTP/HTTPS** (TCP)	Allows automatic remote update for modules in Primary Server and Secondary Server if available.
	8088		Allows Secondary Server to push aggregated real-time data to Primary Server.
	1236		To support older versions of FootfallCam counter(s) for using certain feature(s).
	29999		To support older version of FootfallCam counter(s) for storing the data
SECONDARY SERVER			
Static IP or **Domain Name**, externally accessible by FootfallCam™ Devices & Primary Server	22	SSH (TCP), HTTP/HTTPS** (TCP)	Allows SSH connection for FootfallCam to perform software installation and maintenance.
	8080		Allows FootfallCam counter(s) to upload counting data to the server.
	8081		Allows FootfallCam counter(s) to upload counting data to the server with SSL encryption.

***Customer may choose to implement SSL connections by preparing SSL Certificate and a Domain Name*

OUTBOUND FIREWALL RULES (PRIMARY & SECONDARY SERVER, TO PUBLIC NETWORK)

IP Address	Port	Protocol	Purpose
145.239.4.218	80, **[Mandatory]** 443	HTTP(TCP), HTTPS(TCP)	To allow FootfallCam Analytic Manager in on-premise servers to communicate with FootfallCam™ Central Servers for the purpose of: • Remote counter tuning process will require video files to be transferred back to central server (require whitelisting for installation of counter count more than 5) • Routine server software update for performance optimization and bug fixes. • Servers' Health Check (Online Status, Storage, Version) • Configuration and basic data backups in case of data loss due to e.g. Hardware failure, etc.
91.109.10.77			To allow FootfallCam Analytic Manager in on-premise servers to communicate with FootfallCam™ Central Servers for the purpose of: • Configuration and basic data backups in case of data loss due to e.g. Hardware failure, etc.
51.89.155.156			To allow FootfallCam Analytic Manager in on-premise servers to communicate with FootfallCam™ Central Servers for the purpose of: • Servers' Health Check (Online Status, Storage, Version)

NOTE

Opening required ports are **MANDATORY** for all available features in FootfallCam™ Solution to be fully functional in on-premise environment.

1.3.3 Technical Support for Clients hosting On-Premise Servers

In the event of server maintenance or technical issues related to FootfallCam™ devices, hosted software and modules, FootfallCam™ recommends our clients to provide Desktop Remote Access with a fixed access credential (ID and Password), available for 24/7, on a given network access.

The reason that we required the Remote Desktop access with fixed credential are as below:

- The time to perform the necessary work might be different between time zone users and the FootfallCam personnel, to avoid any delay of action, the unattended access is preferable to smoothen the process.
- To shorten the communication time needed for FootfallCam personnel with the administrator on-premise, it's advisable that the password changing is not frequent, except necessary.

You may choose one of the following Remote Desktop Access method below:

Remote Access Method	Instruction / Download Link
Remote Desktop Connection (RDP)	Click HERE for instruction on how to setup RDP in your Primary Server
TeamViewer 15	Click HERE to download and install the application to your Primary Server
AnyDesk	Click HERE to download and install the application to your Primary Server

After completing the above action, please include your credentials into the **Server Installation Form** before requesting for server installation service.

NOTE

You **MUST** provide the **username** and **password of the Secondary Server** with **root permission** to FootfallCam™. Please include the credentials into **Server Installation Form**.

1.3.4 Requesting for FootfallCam™ Server Installation Service

FootfallCam™ Solution installation and setup can only be done by our FootfallCam™ Technical Specialists. Hence, you are required to order a Server Installation Service from us with one-off installation fee.

Below are the overall steps on deploying FootfallCam™ on-premise server on client site.

STEP 1 - Customer to identify/consult FootfallCam™ on on-premise server requirements and prepare server(s).

STEP 2 - Order Software Installation Service and submit Server Installation Form to **sales@footfallcam.com**.

STEP 3 - FootfallCam™ Technical Specialists to schedule and verify server hardware/network requirements.

STEP 4 - FootfallCam™ Technical Specialists to scheduleand perform Software Installation session.

STEP 5 - Customer to Setup account and bind counters on FootfallCam™ Analytic Manager in their server(s).

NOTE

Payment must be made before FootfallCam™ performs the server inspection and software installation. Customers must ensure the server(s) met the mentioned requirements in **section 1.3: On-premise Infrastructure Installation** unless consulted with FootfallCam™ Technical Specialists.

It will take approximately 4 hours to complete the software installation depending on network conditions.

1.4 SQL Server Version Update & Migration Flow

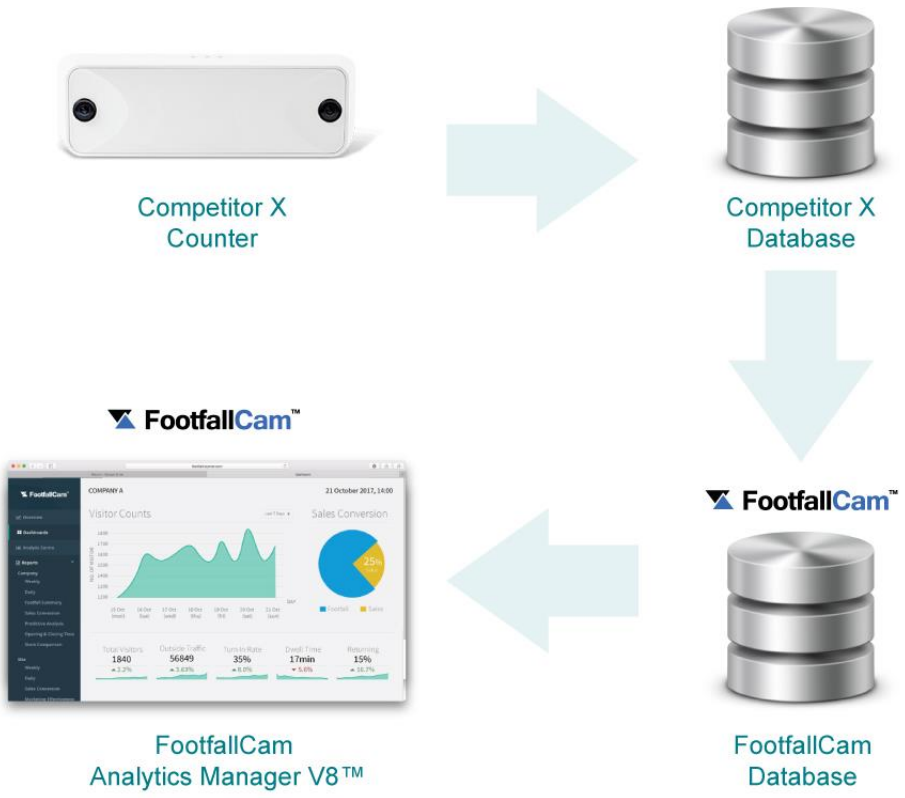
Purpose	FootfallCam	User	Timeline
Install FootfallCam Analytic Manager V8™ in new server DB.	Perform new server DB installation with license provided by user.	User prepare new SQL server DB with license and propose method of transfer backup files from existing server DB to new server DB.	2 Days
To choose a pilot store to install new FootfallCam counter.	Perform database backup of existing server DB and restore on new server DB. Counter service require to PAUSE for an hour downtime for data backup purpose.	Select one store for pilot testing, inform FootfallCam when new device is installed.	1 Day
To point test FootfallCam counter to new server DB.	Confirm the new device is connected to FootfallCam Analytic Manager V8™.	Point server address in counter level to new server.	1 Day
To test the connection for counter and new server DB and ensure the data able to insert to new server DB.	Confirm the server and data are working fine.		3 Days
To begin backup data from existing server DB before migrating to new server DB.	PAUSE FootfallCam Analytic Manager V8™ in existing server DB before backup process.	Confirm the method of transfer backup files from existing server DB to new server DB.	-
To restore the backup files on new server DB.	Clean up the new server DB to avoid conflict before migration. Duration needed to restore the existing server DB to new server DB depends on the storage size of historical data.	User may retire out old server DB by pointing of the domain name to new server IP. If client pointing counter to DNS, there's no need to point the counter to new server IP address, DNS will handle that, user side have to ensure this can be done	-
Data audit in new server DB after migration is completed.	Restart FootfallCam Analytic Manager V8™, data will upload to new server DB.	user MUST standby for at least an hour for roll back the process if issue found after the migration.	-

1.5 Integration with Incumbent People Counter

Note

User can **ONLY** migrate existing visitor count data to FootfallCam Analytic Manager.

User may choose to migrate historical data from incumbent device into FootfallCam Analytic Manager The process will take up to a week to generate reports based on the historical data.



However, this function is currently not available for public release. If you would like to migrate your data from your existing people counter, please email to FootfallCam Sales Team via sales@footfallcam.com.