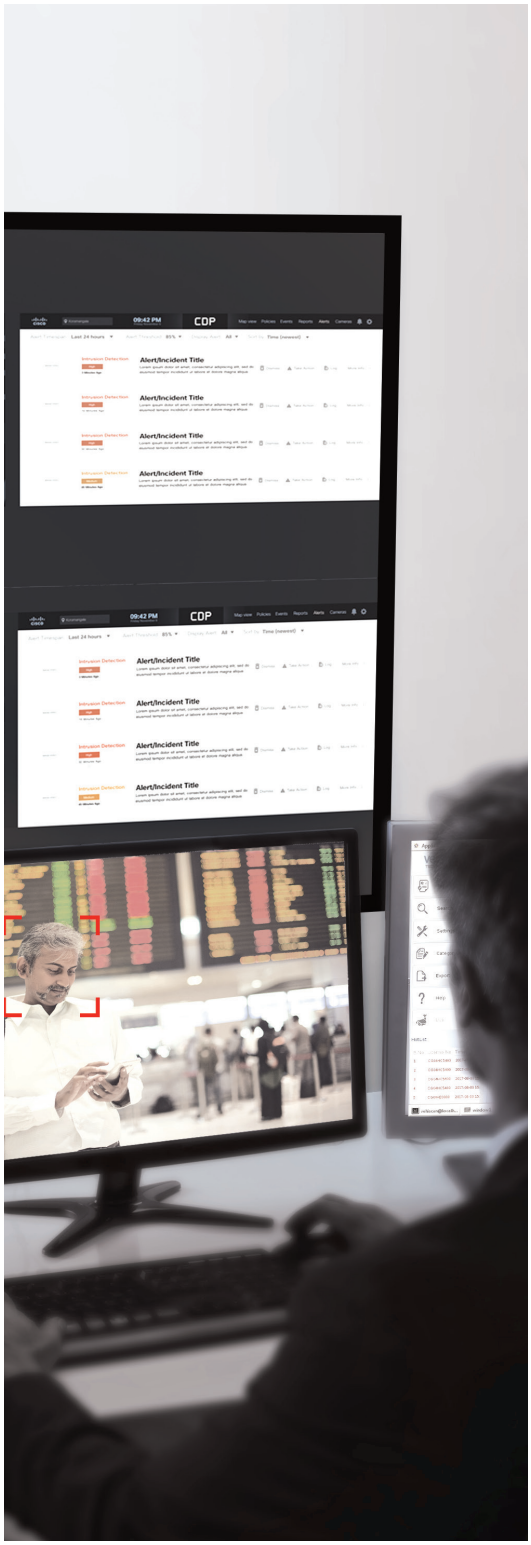
Honeywell | Connected Building

Command and Control Platform

Honeywell Command and Control Platform (CCP) enables cities to build a city-level digital platform that integrates data from various connected systems like, city surveillance, access control system, city vehicle, building and roadside sensors. It further aggregates, stores, and analyses the data to efficiently support city administrative services.

CCP serves as the foundation of the city command centre from where the city administrators can monitor and operate public service solutions intelligently and effectively.



Platform Overview

CCP provides common services like GIS-based map visualisation and intelligence, and enables the citizens and the city workforce to use mobile apps for real-time visibility of the incidents and take action.

An API management engine integrates the city-level digital platform to other external and internal applications and enables RESTful API service – making data available to CCP application platform, smart city applications, mobile apps for citizens and civic workforce, and external city applications.

Application

Integrated Command and Control Center Platform is a software that provides situational awareness and analytics that enable city operators to manage their day-to-day operations and provide citizen service.

The platform integrates with city digital platform which forms the foundation of services like GIS, Mobile, IoT, Big Data, and Social Platform.

The platform integrates all the video or sensor alerts aggregation from multiple sources and offer rich tools for processing, records management, control and monitors all the dispatch or notification-related activities with all stakeholders – citizen, field responders, mobile units with officers to carry out the mission and provide a speedy response to all alerts.

The Command and Control Platform integrates various functionalities like Complex event processing, rule engine incident management, computer-aided dispatch, GIS (geographical information system), mobile application system for first responders, incident reporting system, location analytics, and notification system.

The platform interfaces with industry-standard video management systems, video analytics, and unified communication system.

Command and Control Platform Key Features

Visualisation and Situational Awareness

Command and Control Platform is a web-based application and provides the operator the flexibility

These multi-screens are configured for alarm management, GIS visualisation, and video

Flexible Deployment Model

Cloud-hosted Deployment Model: The digital platform is deployed on a cloud owned by a certified cloud partner and is hosted and managed by Honeywell.

On-premise Deployment Model: The digital platform is deployed on a premise managed by the customer. The initial deployment is handled by Honeywell, and afterwards the customer is in charge of managing the digital platform.

A. Alarm Management

Alarm management system provides the details of each alarm received from various integrated smart city sub systems. Operators get notifications of theses alarms as visual popups with audio. Alarms are grouped into categories for ease of use and visualisation based on the alarm sources like surveillance, access control system, and city sensors like parking, lighting, bin sensor, vehicle, environment, panic button, and building sensor.

Alarm management screen provides the details of the source of the alarm, type of alarm, generated time, priority, and elapsed time to take the appropriate action. Also, system provides advanced map and video visualisation for situation awareness.

Based on the situation, operator can create the incident or abandon the alarm by providing comments.

CCP is integrated with multiple sub-systems like

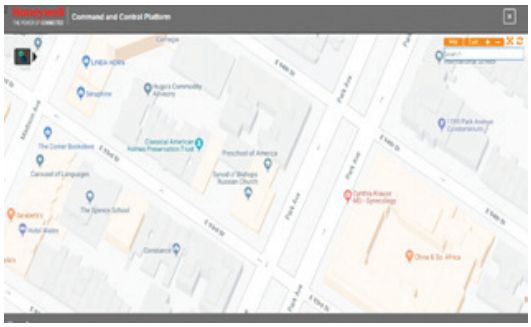
- Camera
- Access Control System
- GIS
- Parking
- Citizen KIOSK
- Solid Waste Management (SWM)
- Intelligent Transport Management System (ITMS)
- Water SCADA
- Call Center Integration
- Dial 100 Integration
- Social Integration

The module provides an easy-to-use GUI that is simple to operate. Operator can view various types of alerts in a single place and validate the alerts for further processing.

Command and Control Platform Application

B. GIS Visualisation

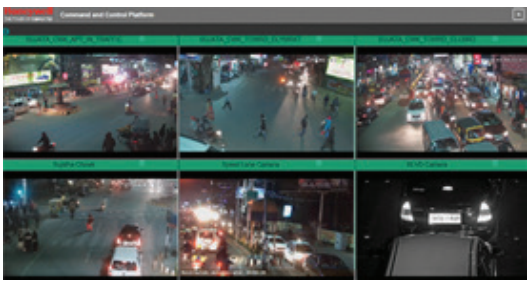
Second screen provides map-based visualisation which provide all the details of the alarms and enable the operator in decision making.



C. Video Visualisation

The operator's third screen provides live feed of all the surveillance cameras in matrix view and helps the operator in decision making. Selection of cameras are based on the following:

- Map-based selection
- Jurisdiction/Camera selection from the Camera List alert the details of the alerts



D. Asset Visualisation

Urban assets (camera, parking, lighting) are visible on the GIS map as a layer. Unique identification (icon/symbol) are provided for each type of assets. The health status (functional/non-functional) are identified using colour code.

Resource Mapping: All field resources (vehicles/ field workforce) are location-enabled and mapped to the GIS with unique identification (icon/symbol).

Layer ON/OFF: Each of the asset is created as a layer on the map and can be turned ON/OFF by the operator depending upon the alarm type and incident use case.

Search Assets: Application enables operator to search assets based on their type and jurisdiction.

Visualise Parking and Building Floor Plan: Operators get access to object-based interactive building floor plan, parking lot layouts, and inside view of vehicles.

Command and Control Platform Application

Multitenancy

Honeywell CCP architecture provides full multitenancy for improved tenant configuration and ease of operation. With this approach, the platform is segregated into logical instances. Users of each instance are completely segregated and cannot access other instances in any way. The respective users access unique dashboards for each segregated, logical instance. The platform supports high availability and a highly responsive user experience, all on a secure network, with reliability and operational availability that the operators can trust.

- Authentication and Authorisation
  - Role-based access view to applications.
  - Standard authentication, authorisation mechanism.
  - User and privilege management through LDAP/AD.
  - Performs user authentication, authorisation, management, and role-based access control.
  - User Management: Provides unique user roles, authentication and access based on user subscriptions.
- Multitenancy Support
  - Tenant wise administrative roles. Responsible for associate asset and operation management.
  - Role-based Access Control: Operator User Management specifies roles to perform monitoring and management of city resources based on regions (sub- boundaries in the tenant/city geography).
  - Each tenant (city) can be further partitioned with access to users for the respective zones/streets.

Security

Honeywell CCP is secure at each layer of its architecture to protect data, reduce complexity, and help the IT team be more productive. We use an identity-based key management mechanism that detects and stops threats to protect data across the platform.

- Key Management Mechanism
  - Enables certified users to access and collaborate on ecosystem partner data in a secure and safe manner.
  - Validates stakeholders using role-based keys and workflows, assuring security.
  - Authorises certified users to leverage data, service, and domain capabilities based on their subscriptions. Appropriate information is available for collaboration.
- User ID Management
  - Protects users, data, and applications through centralised automated identity management.
  - Provides different tiers of user categorisation and services based on subscriptions such as anonymous users, named users, registered users, and enterprise users.
  - Provides application management – user-based application access and view.
- OAuth 2.0 Framework
  - Provides clients secure delegated access to server resources on behalf of a resource owner.
  - Allows an authorisation server to issue access tokens to third-party clients, with the approval of the resource owner.

Command and Control Platform Application

APPLICATION MODULES

MODULES	DESCRIPTION
COMMAND CENTRE OPERATOR	Visualisation and Situational Awareness.
COMMAND CENTRE ADMINISTRATOR	User, Asset, and Operation Management.
PRE-INTEGRATED ANALYTICS	Big Data-based Storage for Reporting, Dashboard and Analytics.
SOCIAL INTELLIGENCE	Big Data analytical platform that enables public safety agency to listen to various social media networks to understand the trends, issues, and sentiments related to a topic or location.
INCIDENT ANALYTICS	Big Data-based analytics platform provides actionable intelligence to city operators to respond effectively and efficiently.
KPI DASHBOARD	Quick summary of the various smart city applications and their KPIs.
CONTROL ROOM DASHBOARD	Overall summary of the command and control room operations.
MOBILE APPS	Centralised logging and monitoring platform for getting actual insight of services and operations.
FIELD WORKFORCE APP	Enable field workforce to get complete visibility of the alarms/incidents and update status of the action taken.

Command Center Operator

MODULE	DESCRIPTION
MULTI-MONITOR SUPPORT	The application supports single or multiple screen monitor for alert details, GIS visualisation, and live stream camera.
STANDARD USER INTERFACE	Provides a uniform, coherent, user- friendly, and standardised interface.
	Supports standard web browsers like Internet Explorer, Chrome, Firefox, and Safari.
ALARM MANAGEMENT	Provides alarm popup notifications with audio tone for each alarm.
	Provides alarms details like the source of the alarm, sensor/camera name, alarm type, priority, and alarm time.
	Provides additional details like snapshot of the camera alarm, recorded video of the alarm, sensor alarm configuration, and sensor history whenever required to authenticate the alarm.
	Enables the operator to view camera/sensor on GIS map based on the alarm selection.
	The application allows the operator to view associated camera's live feed based on the alarm selection.
	Provides the live stream of the associated camera in the third screen of the operator.
	Supports the operator to create incident or abandon the alarm.
	Supports the operator to categorise alarm based on priority.
	Enables the operator to filter alarm based on the defined category type.
	Supports the operator to search alarm by using sensor name/alarm type.
INCIDENT MANAGEMENT	Shows the list of incidents in the incident panel.
	Provides incident details like source of the alarm, incident ID, incident time, sensor/camera name, alarm/incident type, priority, time out, and action to do for the incident.
	Provides additional details for each Incident like snapshot of the camera incident, recorded video of the camera incident, sensor incident configuration, and sensor history whenever required.
	Enables the operator to view camera/sensor on GIS map based on the incident selection.
	Authorises the operator to view associated camera's live feed based on the incident selection.
	Provides the live stream of the associated camera in the third screen of the operator.
	Supports the operator to categorise incidents based on their priority and filter incidents based on the defined category type.
	Enables the operator to search incidents by using sensor names/incident type.
	Offers the feature of viewing the camera details on map.

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Command and Control Platform Application

Command Center Operator

MODULE	DESCRIPTION
INCIDENT MANAGEMENT	Supports operators to execute SOP for an incident.
	Offers the flexibility of attaching documents and other supporting information during SOP execution.
	Promotes execution of activities like notification, correlate, collaborate, if-then-else, dispatch, and close.
	Supports operators to inform/notify concerned agencies (waste management, transport, police, fire and medical department) about incidents during SOP execution.
	Enables operators to dispatch concerned field work force (waste management, transport, police, fire and medical personnel) through mobile app about incidents during SOP execution.
GIS VISUALISATION	Integrates with any GIS map engine like Google, Open Street, and ESRI.
	Enables operators to view all assets and status using colour code on GIS map.
	Provides the layer switcher option to hide/unhide the assets/resources/workforce/events on GIS map.
	Offers the map selection option to select different types of map like Google Road Map, Google Satellite Map, Open Street Map or ESRI Map.
	Supports asset-based search on the map by using the search option.
	Supports resource search on the map by using the search option.
	Enables the operator to search assets/resources by conditions like category type, location, and radius system on the map.
	Empowers the operator to search any location on the map by entering location/place name.
	Provides map tools like zoom-in, zoom-out, extent, reload, and pan.
	Offers the option to track the resource/vehicle on GIS map.
	Supports the option to view the history of the vehicle on GIS map using timestamp.
	Supports the integration of floor plan, parking lot on GIS map.
	Provides the option to view the sensor/device details on GIS map.
	Provides the option to do geospatial calculations like determining the distance between two or more locations on the map.
VIDEO VISUALISATION	Provides the option to select camera based on list or through map to view the camera live stream.
	Supports viewing of single or multiple camera live stream by using map interface like Draw Circle or Draw line on map.
ALARM LOG	Enables the feature of viewing alarm history even after the alarm has been acknowledged or closed.
	Offers the functionality of sorting alarms according to date/time, category, priority, and alarm type.
INCIDENT LOG	Enables the feature of viewing incident history even after the incident has been created or closed.
	Enables the feature of sorting incidents according to date/time, severity, type, and incident ID or location.
	Enables the operator to generate action taken report for the incident. This includes details like incident details, alarm details, SOP summary, and workforce update.
MANUAL INCIDENT CREATION	Offers the option to create manual incident.
CITIZEN GRIEVANCE	Provides the option to view list of citizen grievance and details like citizen name, mobile number, complaint status, complaint date and time.
COMMUNICATION	Provides the option to chat with selected operator regarding an incident.
AUDIT LOG	Maintains a comprehensive and easy to understand audit trail of read and write actions performed on the system.

Command and Control Platform Command Center Administrator

MODULE	DESCRIPTION
ASSET AND OPERATION	Supports the operator to execute different types of activities like notification, correlate, collaborate, if-then-else, dispatch, and close.
MANAGEMENT	Provides an option to manage site and jurisdictions.
	Provides an option to manage sensors/device for each site and jurisdictions.
	Provides an option to view sensors/device details based on the site and jurisdictions like site name and location, primary name, mobile number, and email address.
ALARMS	Enables the operator to manage the types of alarms like create, edit, and delete.
	Enables the operator to deactivate and activate the types of alarm, if required.
	Provides option to configure the rule/policies for each alarm based on time, sensor data, and event.
	Enables the administrator to configure set of conditions that can be used to trigger an event- based policy.
	Provides the option to configure the rule/policies for the cloud or edge.
	Provides the option to view all the configured rules/policies.
USERS	Supports the administrator to manage users by setting different type of roles to the user like operator, supervisor, and dashboard.
	Enables the administrator to assign one or more locations to the users for the alarm management.
	Enables the administrator to assign one or more category to the users for the alarm management.
STANDARD OPERATING PROCEDURE	Supports authoring and invoking un-limited number of configurable and customisable Standard Operating Procedures (SOP) through graphical, easy-to-use tooling interface.
	SOP established; approved sets of actions considered to be the best practices for responding to a situation or carrying out an operation.
	Provides option to edit the SOP, including adding, editing, or deleting the activities.
	The users can add comments or stop the SOP (prior to completion).
	Supports automatic logging of the actions, changes, and commentary for the SOP and its activities, so that an electronic record is available for after-action review.
	Supports the capability to define the following activity types: • **Manual Activity -** An activity that is done manually by the owner and provides details in the description field. • **Automation Activity -** An activity that initiates and tracks a work order and selects a predefined work order from the list. • **If-Then-Else Activity -** A conditional activity that allows branching based on specific criteria. Either enter or select values for Then and Else. • **Notification Activity -** An activity that displays a notification window that contains an email template for the activity owner to send an email notification. • **SOP Activity –** An activity that launches another standard operating procedure.
WORKFORCE	Provides an option to manage the workforce by adding, editing, and deleting the workforce details.
	Provides an option to configure Sim and other details to resource.
	Provides an option to manage SIM details.
CATEGORY	Provides an option to create, edit, and delete the category.
	Provides an option to map the different types of assets to the category to manage the alarms.
LAYOUT	Provides the administrator the flexibility to add, modify, and delete different types of layouts like building plans, parking lot, and bus plans.
DEPARTMENT CONTACT	Supports the features of creating, editing, and deleting the departments like police, SWM, and ITMS.
	Supports the features of creating, editing, and deleting the division details.
	User can add, edit, and delete the in-charge details.
CONFIGURATION	Supports the configuration of the application settings.
	Enables the administrator to configure different maps like Google Map, Open Street Map, and ESRI.
AUDIT LOG	Maintains a comprehensive and easy to understand audit trail of read and write actions performed on the system.

Command and Control Platform Pre-Integrated Analytics

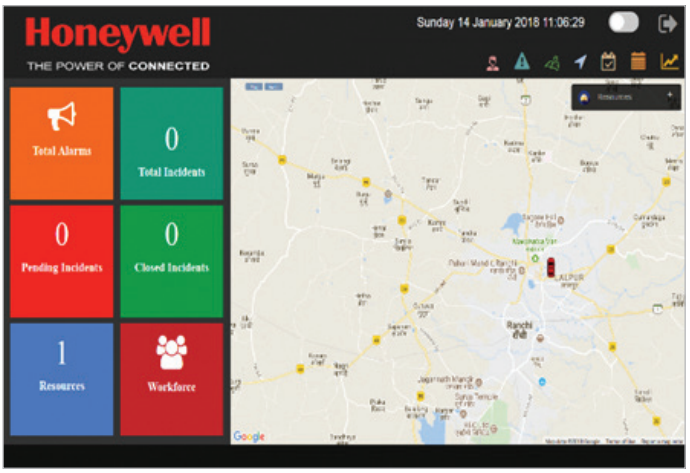
The analytics platform enables further analytics to be performed including predictive analytics. The platform comes bundled with incident analytics and dashboard applications in a pre-integrated manner.

INCIDENT ANALYTICS

Big Data-based analytics platform provides the foundation for carrying out analytics and provide actionable intelligence to city operators to help them respond effectively and efficiently. The analytics platform enables city operators to extract, transform, and load data from external sources and fuse this data to understand data patterns and enable predictive intelligence.

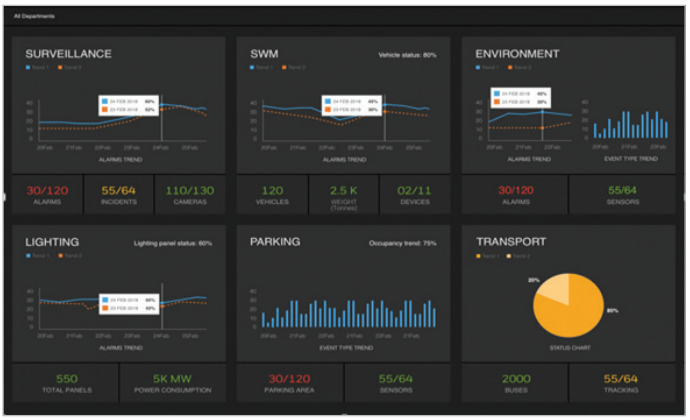
CONTROL ROOM DASHBOARD

Control Room Dashboard provides overall 360-degree view of the command center operations.



KPI DASHBOARD

The dashboard provides a quick summary of the various smart city applications and their KPIs.



Command and Control Platform Pre-Integrated Analytics

ANALYTICS FUNCTIONAL FEATURES

MODULE	FEATURE
GENERAL	Supports web-based platform that enables monitoring, analysing, and generating reports.
	The basic architecture supports scalability and uses state-of-the-art technology like Big Data platform based on Hadoop Framework to enable easy search, filter, and handle massive amounts of social data.
	Core capability to listen/monitor data from social media platforms through available APIs and collect information in real-time using key words and locations.
	Support internet-based social data sources and performs integration including social networks such as Facebook, Twitter, Google+, YouTube, Instagram, and Flickr as well as web crawling on various other websites.
	Supports popular web browsers like Chrome and Firefox.
ADVANCED VISUALISATION	Enables the feature of viewing the social data along with various visualisation options like map view, grid view, and analytics.
	Supports the use of Google map/ Open Street maps to visualise, search, and locate places on map.
	Map view shows the geolocation, pin map-based source type and attributes. The system enables the user to differentiate the data sources with respect to the icons on the map.
	Software extracts messages and displays it on dashboard. It provides an active geo map to display the locations of harvested posts, tweets, and social media content.
	Creates a tag cloud that gives an easy view on number of messages coming from open source/social media across different categories.
	The grid view shows the timing and sequence of social content. It offers the feature of viewing images and playing videos from this grid view.
	The social content on grid view helps locate the specific post/tweet on the map based on the available location information.
USER SPECIFIC DATA FILTERING	Enables the user to easily filter the social content based on the data sources.
	Enables the user to filter the social content based on customisable date filters with 'From Date' and 'To Date' features.
	Support text-based filters like keyword contains, not contains, and by length.
	Supports the user to filter content based on the social user ID based accounts.
	Enables the user to compute social sentiments-based filtering like positive, negative, and neutral.
	Supports filtering data affect in all the views like map view, grid view, and corresponding analytics.
NOTIFICATIONS	Notifications are initiated from the data grid after the social content is visually interpreted.
	Enables notifications through email, social accounts.
APPLICATION CONFIGURATION	Supports the user to configure various keywords for web crawling.
	Supports the user to configure various social media platforms like blogs, forums, and news for web crawling.
	Provides the feature to configure email ids/group ids, social accounts to notify.
	Provides the user to configure geo shapes for continuous monitoring.
REPORTS	Supports the user to generate report in PDF/CSV formats.
INCIDENT ANALYTICS	GIS spatially powers location analytics BI suite that provides data visualisation and geographic intelligence for business analytics. Location analytics delivers the missing perspective to offer the clearest possible view of the data. By combining the location analytics, core capabilities of mapping visualisation, spatial analytics, and spatial data business, operators can use location analytics for incident management and customer segmentation.
	The module integrates the data collected from various sources and provides an innovative way to view the data – pin map, repeat incident count map, and hot spot map.

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Command and Control Platform Pre-Integrated Analytics

ANALYTICS FUNCTIONAL FEATURES (.cont)

MODULE	FEATURE
REPORTING AND VISUALISATION	Provides various visualisation dashboards and analytics for the various smart city entities.
	Provides the option to change the analytical attributes of a graph.
	Enables the operator to do the following operations: • Change the graph/visualisation type • Export the graph • Toggle the axis labels • Print the graph • Narrow down on the value ranges
	Supports exporting the analysis in the following formats: • XML/JSON • PDF • Excel • CSV
DISASTER MANAGEMENT	The disaster management module collects, gathers, and analyses the critical data of the city and provides strategic view or big picture of probable disaster.
	The disaster management module provides real-time intelligence to make decisions that protect life and property. Also, system disseminate such decisions to all concerned agencies and individuals.

REPORTING AND DASHBOARD FUNCTIONAL FEATURES

MODULE	FEATURES
AUTHENTICATION AND AUTHORISATION	Supports standard authentication and authorisation.
	Supports role-based access view of applications.
	Supports LDAP authentication mechanism.
STANDARD USER INTERFACE	Provides a uniform, coherent, user- friendly, and standardised interface.
	Supports standard web browsers like Internet Explorer, Chrome, Firefox, and Safari.
MULTITENANCY SUPPORT	Multitenant city operations dashboard: City software platform dashboard displays only relevant data (associated geographical data) to the users who logs in.
CEO DASHBOARD	Provides customisable and configurable widgets that support a range of sensor data visualisation across the city.
	Displays overview of smart city entities such as surveillance, waste, environment, parking, water, and lighting.
	Provides operation dashboard for each of the smart city entities to view the detailed operational data to analyse the information and take better decisions with time.
CONTROL ROOM DASHBOARD	Dashboard live widgets provide a quick summary of key parameters like total alarms, total incidents, pending incidents, closed incidents, resources, and workforce with real-time updates.
	Provides a bird's eye view of operator's summary that displays the legends with name and ID, specifying the status of the operators (logged-in/logged-out/number of alarms received).
	Provides the graphical trend view of number of alarms received on hourly basis within a 24 hours timeframe, showing alarms for ITMS, lighting, SWM, environment, camera, and safety with color representation.
	Dashboard map view provides visuals of all category assets on the map. The asset icon colour helps to easily identify the status of the assets (ON/OFF).
	Provides the real-time pie chart for the number, status, and percentage of complaints received.
	Provides the chart that displays the number of alarms handled by the operator such as camera, environment, ITMS, safety, and SWM for the current day and the last thirty days.
REPORTS	Provides the capability to generate incident and alarm reports in PDF/Excel format.
	Provides access to real-time data and historical data from various connected devices for reporting and analytics.
	Enables dashboard to generate reports and have provision to add reports in favourites list.

Command and Control Platform Field Workforce App

The city operations platform is integrated with the city workforce through mobile apps running on smart phones. The platform is customised for different use cases and enables the field workforce to get complete visibility of the alarms/incidents, stay connected with the command centre, and update status of the action including integration of action taken reports (audio records/image/video).

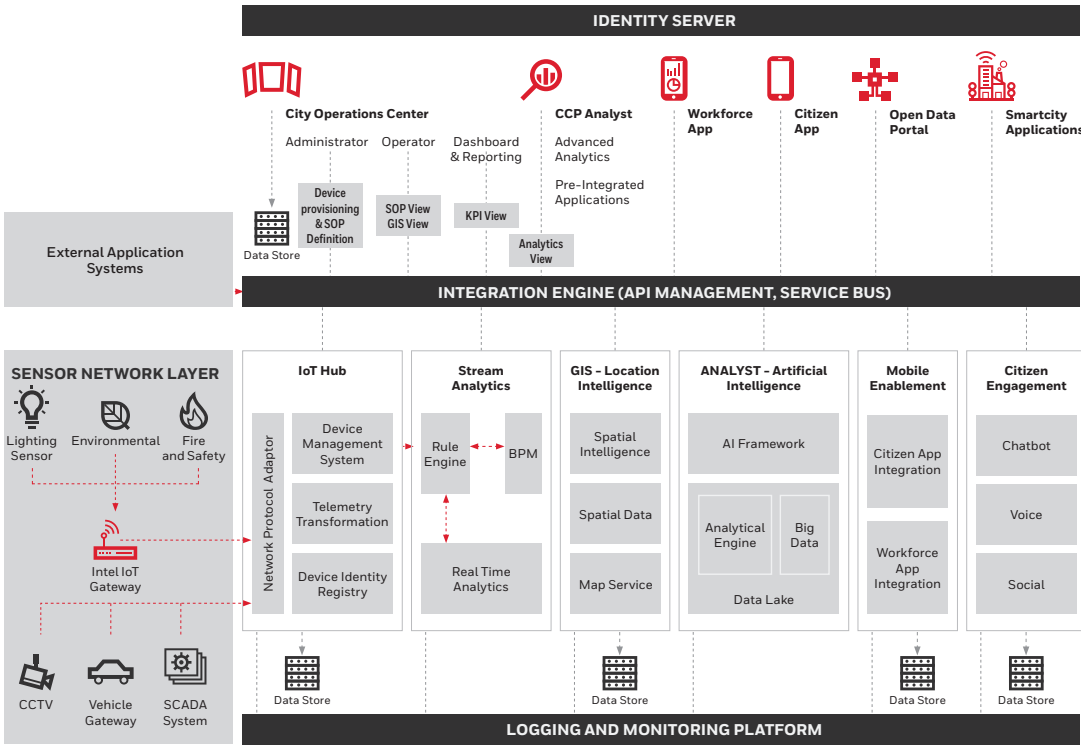
The mobile app also provides the location of the field workforce to the city operation centre to ensure dispatching the right resources.

FEATURES	FUNCTIONALITY
LOGIN	Supports user-based login.
TRACKING	GPS-based tracking application sends the exact location of the mobile responder to the CCP system in real-time to support dispatch decisions.
INCIDENTS	Supports the receipt of dispatch details from the CCP and displays the same for mobile responder to gather all the information about the incident and its location. The mobile responder updates the status of the action that becomes visible to the operator in real-time.
ACTION TAKEN REPORT	Updates the incident status by tagging the proof of service (image/audio record of action taken/video record) along with additional details and notifies the CCP system.
INCIDENT SNAPSHOT AND RECORDED VIDEO	Supports display of incident image/recorded video.
LIVE STREAM	Supports live stream viewing.
VIEW LOCATION	Supports viewing incident location on map.
NAVIGATION	Supports map-based navigation facility with audio guidance to enable mobile responders to reach incident location.
REPORTS	Provides view of the summary of incidents received in a day/last one week/last one month, along with their corresponding status.
LOCATION SERVICE	Supports users to locate nearby incidents and resources on the map.
MOBILE APPS	Field Workforce App

Version Details

PLATFORM MODULES	SOFTWARE/HARDWARE COMPONENT NAME	VERSION/MODEL#
IOT HUB AND STREAM ANALYTICS	IoT Hub	Version 1.0.0
DATA ANALYTICS AND BIG DATA PLATFORM	Big Data Storage and Analytics Platform	*Version 1.0.0*
GIS PLATFORM	GIS Application Server	Version 1.0.0
MOBILE PLATFORM	Mobile Platform	Version 1.0.0
API MANAGEMENT AND INTEGRATION PLATFORM	API Platform	Version 1.0.0
APPLICATION MODULES	SOFTWARE/HARDWARE COMPONENT NAME	VERSION/MODEL#
COMMAND AND CONTROL APPLICATION SERVER	Application Server	Version 1.0.0
COMMAND CENTRE OPERATOR	Operator	Version 1.0.0
COMMAND CENTRE ADMINISTRATOR	Administrator	Version 1.0.0
PRE-INTEGRATED ANALYTICS		
ANALYTICS	Incident Analytics	Version 1.0.0
	KPI Dashboard	Version 1.0.0
	Control Room Dashboard	Version 1.0.0
MOBILE APPS	Field Workforce App	Version 1.0.0

Command and Control Platform Architecture



The various components of the CCP and the services are integrated in a way that the IoT value generated in the various stages of the data life cycle is seamlessly aggregated and processed by the subsequent stages.

Platform Technology Stack

MODULE	DESCRIPTION
IOT HUB	IoT hub aggregates the sensor data and integrates it with Big data platform to enable stream processing.
REAL-TIME STREAM ANALYTICS	Real-time stream analytics for processing data and generating alerts.
DATA ANALYTICS AND BIG DATA PLATFORM	Big Data storage for reporting, dashboard, and analytics.
GIS PLATFORM	Provides location intelligence capabilities for city applications by integrating with any standard GIS Engine – ESRI/Open Source/Google.
MOBILE PLATFORM	Delivers city services through mobile devices to field workforce and citizens. City Operations Center seamlessly integrates the field workforce for coordination, dispatch, and field action.
API MANAGEMENT AND INTEGRATION PLATFORM	Platform inter-operability with all stakeholders – web application for operators, smart city applications, mobile user, and Data as A Service will be managed through the API management layer. ESB integrates different services and processes, and functions as a single aggregated service to facilitate operations.
NOTIFICATION SYSTEM	Notification system enables the API services in all the smart city applications to provide services like SMS, Email, and social media applications.
LOGGING AND MONITORING	Centralised logging and monitoring platform to get actual insight of status of services and operation.

Command and Control Platform Features

IOT HUB

IoT Hub enables the city digital platform to connect, aggregate, and process the connected solutions data. It allows the authorised stakeholders to get all the data in API for real-time processing and management.

Features

- Integration and deployment of smart city solutions like:
  - City Surveillance Cameras
  - Access Control System
  - Smart Outdoor Lighting
  - Smart Parking
  - Smart Traffic Management
  - Smart Energy Metering
  - Smart Water Metering
  - Connected Public Transport
  - Public Wi-Fi and Urban Service Delivery over Public Wi-Fi
  - Environmental Monitoring
  - Smart Waste Management
- Smart Integration Platform allow on the fly provisioning of sensors/or Devices.
- Collection of data from all the integrated devices and sensors.
- Normalises the data coming from different devices of the same category (different lighting devices, all kinds of energy meters).
- The platform's smart adapter feature supports devices/sensors connect and send data securely irrespective of type or vendor.
- Normalised data is further grouped as domain services (parking/outdoor lighting/traffic/ environment/urban mobility/smart building) and provide the live data to the smart city applications via secured APIs.
- IoT platform facilitates the downlink communication with devices/sensors for the domain owner to monitor and control sensor and/ or actuator functionalities via API.
- Compile M2M standards for device management and configuration operations.
- Secured key management and role-based access control.

REAL-TIME STREAM ANALYTICS

Real-time stream analytics enable secure cloud technology to provide storage, virtualisation, adaptability, and information to boost data value and transmission speeds while reducing costs

Features

- Real-time data analytics to increase situational awareness and provide the basis for cost savings and more reliable short-term and long-term planning.
- Perform sophisticated analyses on real-time and near real-time streams of data using a rules execution engine and a comprehensive set of functions for querying, transforming, and analysing time series data
- Data archive and logging – stores data feeds from the device engine and external data sources to the Big Data platform for further analytical operations.
- Provides time-shifting or analytics on the archived data. Delivers reports based on events triggered by device engine data and external notifications.

NOTIFICATION SYSTEM

Features

- Enables the API services to all the smart city applications to perform the notification services.
- Mass notification service enables city operators to notify citizen and other stakeholders through Email, SMS, and social media networks.

Command and Control Platform Features

DATA ANALYTICS AND BIGDATA PLATFORM

Data analytics and Big Data platform aggregate the time-series data from sensor/device-based system and event series data coming through ELTL process to get insight of city solutions and KPIs. Machine learning and analytical platform enable predictive reporting and help city authority improvise operational strategies.

Features

- Constructing a common data model using aggregated information that enables more meaningful analysis.
- Exposes time/event-based data API through which local and global Independent Software Vendors (ISVs) and application developers can meet the needs of an urban service marketplace.
- Ability to combine data from many sources, regardless of their individual protocols, and communicate it securely while also tapping into geospatial mapping for applications across the city.
- ELTL process connects and retrieves data from a set of databases (HBase, MongoDB, Oracle, Cassandra, MySQL, Impala).
- Pre-Integrated analytics allow the authority to get overview of city operations and KPIs.
- Use case driven machine learning aid in automating policies that result in better asset and infrastructure management.
- Predative model is built on top of the collected data from city infrastructure viz., traffic, parking, and lighting to plan city operations efficiently.
- Horizontally scalable.
- Support correlation of multiple data sources (CSV, TSV, MS Excel, NoSQL, RDBMS) to build analytical insight.
- Analytics platform will provide a set of predefined algorithms to do predictive analytics like route optimisation, resource utilisation, demand analysis, social media events and passenger.
- Pre-integrated analytical dashboard with rich graph-based visualisation capability and detailed insight of data.
- Allow the user to export the report on desired format (Excel, CSV, PDF).
- Data access is secured using strict access control policies with LDAP authentication and authorisation.
- Encryption of data volumes to protect the data at rest.

GIS PLATFORM

GIS platform provides the location intelligence capabilities for city applications. The Platform integrates custom built map service or any API-based map service like, Google, ESRI, Bing, or Open Street, seamlessly. The platform has its own storage for archiving map data. The GIS platform supports rich spatial functionalities and features that are specifically required for city operations.

Features

- Map View: Supports map satellite and vector map visualisation.
- Map Search: Searches place names/landmarks.
- Asset Search: Search all kinds of resources like cameras, sensors, emergency panic buttons, PA systems, and VMS.
- Nearby Resources: Geo reference nearby resources like cameras, sensors, and PA Systems.
- Map-based visualisation of alerts: Show all the alerts on map, zoom on the selected alerts based on resource location, show history, and provide insights to the operators for situational awareness.
- POI Creation: Create, edit, and delete customer-specific map POI and geofence.
- Map Layer Creation and Management: Create map layers and switch customer-specific layers on/off.
- Map-based Visualisation of Vehicle Movements: Monitor vehicles on map and locate nearest vehicles based on features like alerts, track, and play trip.
- Route Functionality: Routing and distance measurement based on road network.
- Map-based Analytics: Map-based spatial analytics pin maps, heat maps, and trend maps.

Command and Control Platform Features

MOBILE PLATFORM

Mobile Platform delivers the city services through mobile devices to city field workforce and citizens. The city field workforce is seamlessly integrated to the city operations center for coordinating dispatch and field action.

The mobile platform empowers the city operations center in deploying mobile applications to support multiple devices and OS.

Features

- Enable easy integration with city applications, and facilitate security and application management.
- Scalable and commissions cross-platform support for deployment across many type of devices and OS.
- Integrate with multiple server data sources to leverage SOA services from backend systems.
- Centrally manage mobile application deployment and user Management.
- Integrate all city services and enable them through mobile devices.

LOGGING AND MONITORING PLATFORM

Centralised logging and monitoring platform gives a detailed insight of platform infrastructure and audit trails.

Features

- Continuous Monitoring and Alerting Service
  - Measure and monitor system availability and automated notification for system failure and unavailability.
  - Providing key performance indicators of platform and application services.
  - Hot path analysis of data.
- Centralised Logging Platform
  - Centralised logging system with detailed insight of both operational and audit logs.
  - Read-only audit logs view with accurate timestamp.
  - Universal search option for log investigation, configurable log duration.

API MANAGEMENT AND INTEGRATION PLATFORM

API management and gateway provides secure API lifecycle, monitoring mechanism for all integration APIs.

Features

- API Management
  - API management platform exposed API ecosystem is managed and secured through API gateway, API security, and API key management.
  - API access based on roles and access control policies defined for each user and the key issued to that user.
  - API management platform integrate with LDAP/AD for the user role and access role permission management.
  - API management platform support security standards: OAuth 2.0, HTTPS over SSL.
  - API Management platform support HTTPs/ TLS-based communication.
  - API management platform will provide the attributes of the API key(s) to users. This authorises the system to restrict/allow access to relevant data – the attributes can be specific domain (parking/lighting/waste or a combination of these), and RO/RW specific to tenant (city/street).
- ESB
  - Integrating with multiple stack endpoints and message routing.
  - BPM Integration for service stack automation
  - Enable static/deterministic routing, content-based routing, rules-based routing, and policy-based routing.
- Integration Platform
  - API-based integration of various urban service devices at the street layer such as, city surveillance cameras, access control system, smart outdoor lighting, smart parking, smart traffic management, smart energy metering, smart water metering, connected public transport, public Wi-Fi and urban service delivery over Public Wi-Fi, environmental monitoring, and smart waste management.
  - API-based integration of collaboration tools get multiple stakeholders and responders to address an emergency or an urban services event.
  - Provides cross-domain API(s) to develop operation applications for each of the urban service domains – smart lighting application can get access to environmental sensor data for better insight and operations.
  - Smart city integration services are authorised to connect and manage.
  - Provide access to time-based and event-based historical data from various connected devices for reporting and analytics through APIs.
  - API-based integration of business process in ERP workflows like property tax collection.
  - Open platform for data will provide the APIs for development of useful application for public.

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