

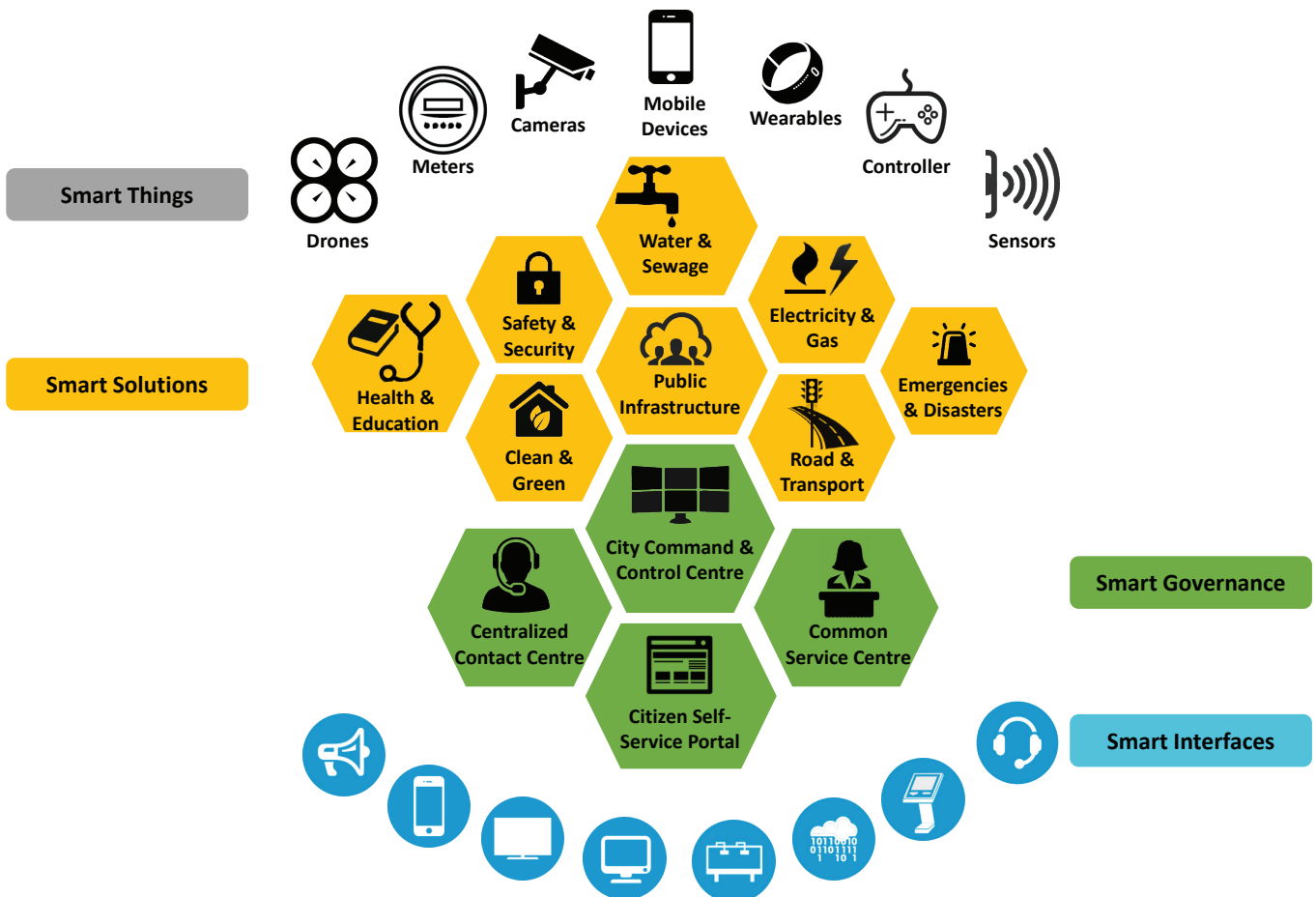
Smart Solutions for
Sustainable Smart Cities
Fluentgrid Actelligence™



SUPERIOR LIFE EXPERIENCES, MANAGED EFFORTLESSLY

Smart Cities are expected to provide better quality of life to residents and effective operational control for city managers to deliver utility services efficiently leveraging the city's smart infrastructure.

Fluentgrid Actelligence smart city platform from Fluentgrid Limited helps you deliver on superior life experiences for city residents, visitors and businesses through smart interfaces to deliver smart services across the city with unified multi-channel smart governance interfaces.



- Proactive asset and facilities management to minimize failures
- Effortlessly manage the city infrastructure and service delivery
- Respond to emergencies with centralized command and control
- Seamless real time interactions with citizens through multiple channels
- Future-proof ICT infrastructure that can scale both horizontally and vertically
- Quick RoI with premium positioning, enhanced productivity and resource conservation
- "Thus, position the city as a premium destination"

OUR DIFFERENTIATOR: MULTI-PURPOSE INTEGRATED COMMAND CONTROL AND COMMUNICATION CENTER (ICCC)



In Disaster Situation (City Scale)

- To provide accurate early warnings to all stakeholders and ensure their effective dissemination
- To forecast impact of disasters and help mobilize resources upfront, evacuate people from high impact areas and in turn minimize casualties and service outage during disasters
- Carry out competent Emergency Operations Management
- To improve the response time, coordination amongst various agencies during disaster and faster restoration of services post disaster
- Improve community/citizen understanding of risks in order to enhance their resilience in the face of disaster



In Emergency Situation (Area based)

- To provide a common operating picture for all emergency services departments with clear action points for joint action
- To forecast impact of emergency and help mobilize resources upfront, evacuate people from high impact areas and in turn minimize casualties and service outage during disasters
- Carry out competent Emergency Operations Management
- To improve the response time, coordination amongst various agencies during disaster and faster restoration of services post disaster



In Normal Situation (Department / Person)

- Enable better functioning of city administration in daily operations
- Improve response time towards citizen complaints, which in turn will lead to citizens delight and satisfaction
- Enable various channels/online tools for citizen interactions with civic administration for issue reporting and resolution
- Enable better inter-agency coordination, within various administrative bodies to improve service delivery and governance transparency

COMMAND CONTROL & COMMUNICATION CENTRE COMPONENTS



Map based Visualization and MIS layer

- Integrate with GIS and map information to dynamically update information on the GIS maps to show status of resources
- Executive Dashboards, KPI & Performance Monitoring for City Administrators, Operators and managers with a management dashboard that provides a real-time status and is automatically updated when certain actions, incidents and resources have been assigned, pending, acknowledged, dispatched, implemented and completed



Unified Contact Centre Collaboration Platform

- Facilitate collaboration between various stakeholders and aid in grievance redressal of citizens
- Ability for Stakeholders with various smart devices (smart phones, Laptops, Analog Phones etc.) to invoke/participate in a joint discussion



Pre-Integrated Standard operating procedures for Incidents and Alarms

- Ability to invoke an un-limited number of configurable and customizable standard operating procedures through graphical, easy to use tooling interface
- The SOP editing interface provides configuration by sections involving 1) Manual Activity 2) Automation 3) If - Then - Else, 4) Notification



Mobile workforce management system

- Interact with field officers of the various departments and city administration to resolve and escalate incidents
- Trigger individual Tasks/Activities which involve actions like sending a notification/message, dispatching a crew for inspection or fixing, through a Mobile Work Force Management System



Analytics Platform

- Provides descriptive, predictive and prescriptive analytics by consuming data from heterogeneous data sources of various city infrastructure to unravel the patterns that are previously hidden
- Artificial intelligence-based smart city analytics platform module to maximize business value through advanced machine learning capabilities



Data Normalization Layer through IOT & ETL Platform

- Aggregate and normalize data coming from different devices and provide secure access to data using data API(s) to application developers
- Extract and Transform non IoT data that comes from Camera feeds, Video Management and ERPs through a standard ETL or Enterprise Service Bus (ESB)



GEOSPATIAL VIEW

Web-based Geospatial View, CAP-based alerts and events from smart elements and incidents from CAD system will be represented as part of emergency-communications, and it can be used by multiple operators simultaneously and supports multi-departmental operation using Region assignments. Geospatial representation by using geospatial-mapping facilities provided through Google Maps, ESRI IGiS, and Bing. Support GML and KML standards for data representation and import.

Along with mapping functions, Geospatial View also combines multiple means of monitoring and tracking field Units and resource tracking, Individual field level device functioning status with alert pop-up is available, and positions displayed on the Situation map, with location configuration for unmovable assets can be incorporated based on business requirement.



INCIDENT MANAGEMENT

The incident management software shall have dedicated incident log screen, which provides situation decision guidance support. Command & Control Center application will support for receiving different types of VMS alerts. The application provides the following information related to VMS alert:

- Shows the Severity of the alert
- Time the alert was created
- Description of the alert
- Device which created the alert
- It will have provision to facilitate the operator to locate the Camera on GIS map
- Provision to amend the alert
- Collaboration chat against specific incident for the stakeholders

Objectives

- Department wise KPI Monitoring to measure progress against targets
- Continuous drive for improvement across all departments with a dedicated team
- Provide users with SOP's , Notifications and Alerts of Incidents with Geographical location which will enable the City administrators to respond dynamically and make city operations SMART
- Role based access control to provide access to view/edit master data according to department hierarchy.
- Multi-level video rveillance at the city command center to monitor events realtime, manually or automatically by CCTV and Sensor feeds.

SOP SOP MANAGEMENT

SOP is a set of instructions to respond to events or incidents and carry out routine operations in an organized manner. These enable to achieve efficiency, quality output and uniformity of performance while reducing miscommunication and help involved organizations to achieve complete control over the task along with escalation process.

Features of SOP Authoring

- Granting access to SOP definition portal page
- SOP actions and required roles
- Configuring and launching SOPs
- Viewing SOP



INTERACTIVE VISUAL ANALYSIS

Fluentgrid Actelligence™ offers impeccable quality of Visual Analytics with features including but not limited to the following:

- Users are self-reliant and can immediately access, analyze and visualize any data through simple user interfaces resulting in complex analysis
- Interactive visual analysis with drill through, lasso filtering, zooming, and attribute highlighting for greater insight.
- Out-of-the box library of interactive visualizations - including geo-mapping, heat grids and scatter/bubble charts.
- Specialized, visualization plug-ins delivers “the art of the possible” for advanced visualizations.
- Extreme scale in-memory data caching for speed-of-thought analysis of large data volumes.
- True mobile experience with support for native gestures and complete analytics capabilities, including content creation.



LIVE DASHBOARDS

Fluentgrid Actelligence™ Live Dashboard is a set of visualizations, different type of charts from one or more categories presented in a managed way, which makes user easy to draw an insight and analyze without any need of expertise in analytics.

A dashboard contains visualizations from multiple reports and it is interactive tool also. As user can view the information ore deeply and drill down the data see the information up to reachable level.

Objectives

- Command and control across all functions to drive actions towards a common goal
- War room facilitation during emergencies with people from various departments coming together to attend to an emergency
- Inter-department coordination for faster issue resolution and clearances to speedup works
- Data correlation and analysis to alert on certain events, identify exceptions, observe patterns and predict trouble
- Data visualization for easily grasping critical information faster than usual



BUSINESS RULE & POLICIES

Configuring business rules for air quality, street light and bin monitoring, water SCADA, energy data etc. the rules are deployed into the rules repository. Rule engine uses these rules to determine abnormality. The rules can be changed using a web-based user interface whenever there is a change in rules.

Data receives from various sources like street lights, water SCADA, Energy and Air quality sensors through MQTT protocol. Once the data received, ETL tool executes the Spark Jobs to apply the business rules.



EVENT MANAGEMENT

An event is anything important that happens or is envisaged as happening. Events generated by IoT sensors or component management systems when any defined/measured parameter exceeds the set threshold. Events from all the sources are aggregated and CCC operator is alerted. The operator can analyse and decide whether to accept or dismiss the event.

The event management occurs in four steps: monitor, analyse, plan and execute. All the log monitoring, video monitoring and the event feed come under the monitor section. The events get correlated and will be assigned each a ticket. The event correlation tool can correlate events from multiple monitoring sources.

Complex event processing combines data from multiple sources to infer events or patterns that evince more complicated circumstances. Event processing occurs when dealing with either one or more events with the purpose of recognizing prioritized events from the event cloud.

When multiple references to different events are detected, such events, the events may spread over different types and through a specific time. Based on the nature of data/information, the event would be stated whether it is complex or not to a user.

Today, CEP is used for various use cases, including:

- Air quality: Air quality data analysis and detection of the polluted area in the city on a real-time basis.
- Water SCADA: detection of abnormal usage.
- Energy: detection of abnormal usage.
- Street Light: detection of non-functional streetlights.



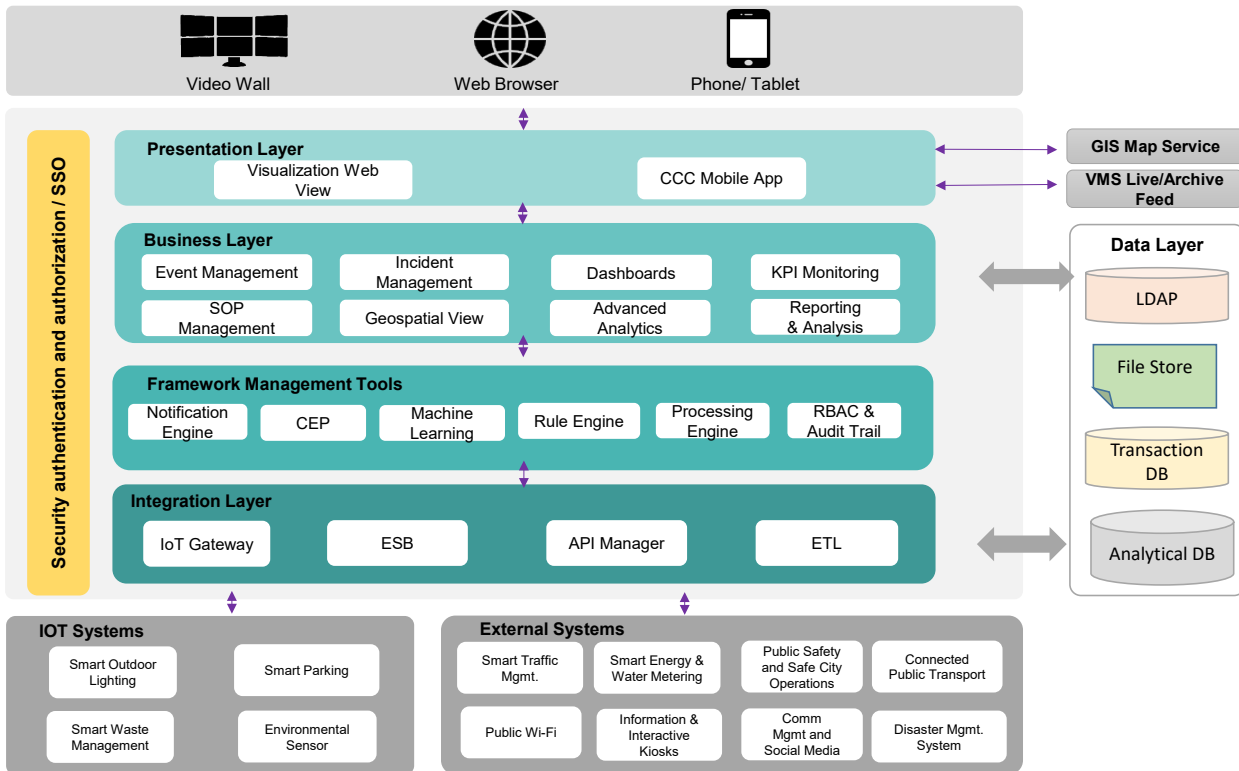
COMPREHENSIVE SOLUTION FOR REPORTING

- Our reporting capabilities span the entire continuum from self-service interactive reporting to high volume, highly formatted enterprise reporting.
- Intuitive web-based interactive reporting for business users.
- Rich graphical enterprise report designer for power users.
- Output in popular formats: HTML, Excel, CSV, PDF and RTF.
- In-memory caching for fast results.
- First to market direct reporting for NoSQL

Fluentgrid Actilligence™

Fluentgrid Actilligence™ is the foundation on which the Integrated Command, Control and Communication center (ICCC center) solutions for cities are built. It comes with loosely coupled federated architecture where granular functionality is broken down into independent modules minimizing inter-module dependencies. Following diagram illustrates how Fluentgrid Actilligence™ components come together for ICCC center solutions in smart cities.

Fluentgrid Actilligence™ for ICCC is based on an n-tier Service Oriented Architecture (SOA), built using industry open standards and technologies to provide maximum benefit to customers without compromising on robust security.



Functional & Presentation layer: This layer provides easy access to city operations center users and field staff through web, mobile or video wall interfaces. Users have flexibility to customize the views to suit their needs

- **List and Map View:** Events/alerts and incidents across the field devices and functional systems throughout the city are available for user/operator view along with location, source and evidence. Also available are the incidents directly reported, social media complaints and the system generated incidents thought pattern analysis.
- **Operation Dashboard:** is an interactive executive dashboard with various department level sub-dashboards. Data coming from multiple departments is analyzed to identify abnormal events, patterns and exceptions and alert the concerned for further action.
- **KPI Monitoring:** empowers executives to define and closely track progress on broader parameters of city transformation. It also enables the city to benchmark against standards and get certified for compliance by international bodies such as ISO

Business layer: Business layer is the brain and soul of the Actelligence platform. It holds the business logic and rules engine that systematically process the data received into actionable information, insights and suggestions.

Complex Event Processing (CEP) & Correlation: allows streaming of large sets of city data to bring out events of relevance. Broad steps involved in processing an event include

- Stream Processing
- Business Process Management and Correlation
- Business Rules
- Notification Service

Incident/Alert Management

- Instant alerts and notifications from field devices, city systems and real time data analysis
- Automatic conversion of business exceptions into actionable workflow tasks (pre-configured SOPs)

SOP (Standard Operating Procedure) Management

- SLA tracking and escalation for each workflow task
- Web or mobile based workflow issue resolution
- Mobile field service integration for field activities

Governance services: Fluentgrid Actelligence™ offers seamless integration with various e-governance services and city ERP system. Citizen grievances and feedback services offer direct channel for engaging citizens.

Data Normalization & Analytics Layer

- **Advanced Data Analytics:** Doing statistical analysis, machine learning, predictive and prescriptive analytics, social media analytics on city operations data (e.g. video analytics for traffic and surveillance cases, citizen sentiment analysis about operations and new initiatives, hygiene analysis with waste bin clearance and weather forecast, event planning, encroachments, utilities leakage detection, impact analysis of hazard and relief/evacuation planning, etc.) and feed the output such as anomalies and exceptions to incident management system to track them to closure, and insights to operation dashboards and performance monitoring cases.

- **Business Analytics:** Doing real time analytics of the normalized data from external city systems, machine generated data, field devices, sensors, social media, etc. and provide insights for city operations. For example, route optimization for waste bin dispatch, traffic clearance emergency dispatch, number plate recognition, city planning cases such as building permissions, event planning, etc., emergency response and relief after the event, utility outage management, utility usage forecast, epidemic isolation/prevention of spread, etc.

- **GIS & Geotagging:** Digitize all the assets available like buildings, vacant plots, roads, bridges, railway tracks, parks, gardens, stadiums, slums, traffic squares, water bodies (river, lake, pond, drainage, canal, etc.) and overhead tanks etc. Actelligence uses standard markup language for interchanging GIS data, maps, and graphics information.



Integration Layer: Seamlessly access and manage data from all the external systems such as city ERP, video management systems, utility management systems, asset management systems, transport management systems, traffic management systems, social media streams, citizen service systems, etc., and field devices (provisioned with access) such as smart poles (Wi-Fi, LEDs and Air quality sensor), environmental sensors, emergency call box, public address system & variable display boards, smart bins, etc. which flows into Fluentgrid Actilligence™.

- **API Manager:** Enable easy and standards-based access to existing city systems and facilitate exposure of city APIs to third-party service providers and users who can bring meaningful services on top of the data what city hold.
- **Enterprise Service Bus:** For managing integrations and reliability among disparate systems and different messaging formats and standards.
- **IoT Gateway:** Open standard IoT platforms to manage access and control of IoT devices such as sensors, field devices, public messaging systems, video surveillance, etc. It allows us to easily and securely
 - Provision and control devices
 - Collect and visualize data from various messaging standards. E.g. MQTT, CoAP, HTTP, LoRa, Zigbee, OPC UA, etc.,
 - Analyze device data and trigger alarms
 - Deliver device data to other systems
 - Enable use-case specific features using customizable rules and plugins

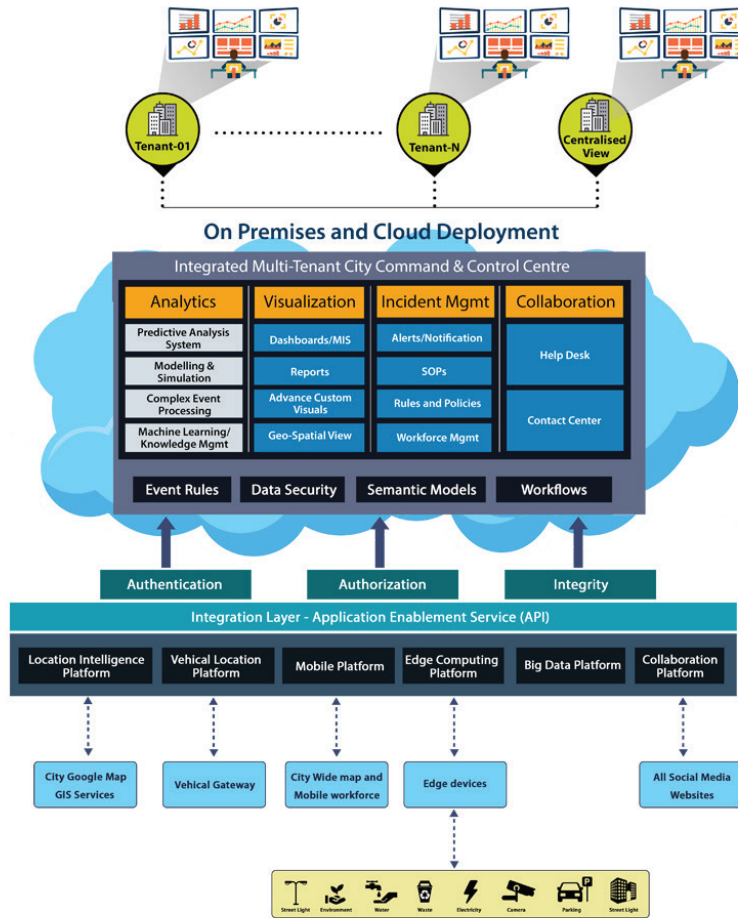
Cloud and multitenancy support

Hub and spoke model is the most common way of deploying a multi city implementation. Fluentgrid Actilligence™ architecture allows for adding new cities to existing platform on the fly with minimal configurations and available as

- Multi-Tenant Platform to support multiple cities as a group into single deployment
- Cloud based Platform as a Service (PaaS) or Software as a Service (SaaS) for Data Center and Disaster Recovery Center for all smart cities in a group

Multitenant Functionality	Description
Default City	Fluentgrid Actilligence™ allows defining default city with SOPs and other city level configurations. This can be a base city that other new cities that are added can inherit from
Adding New City	Fluentgrid Actilligence™ has the provision to create a new city on the fly by cloning an already existing city or by inheriting from default city
Attaching devices and smart elements to a citys	Device and smart elements can be attached to a city through a simple onboarding process. Devices can be disengaged from a city and reassigned to another city
Services Consumption Metering	APIs/Services consumption is tracked at city level pay as you go model can go to individual city level
City Performance Comparison	City performance indicators can be compared to standards such as ISO 37120 and to other cities to benchmark their performance and progres

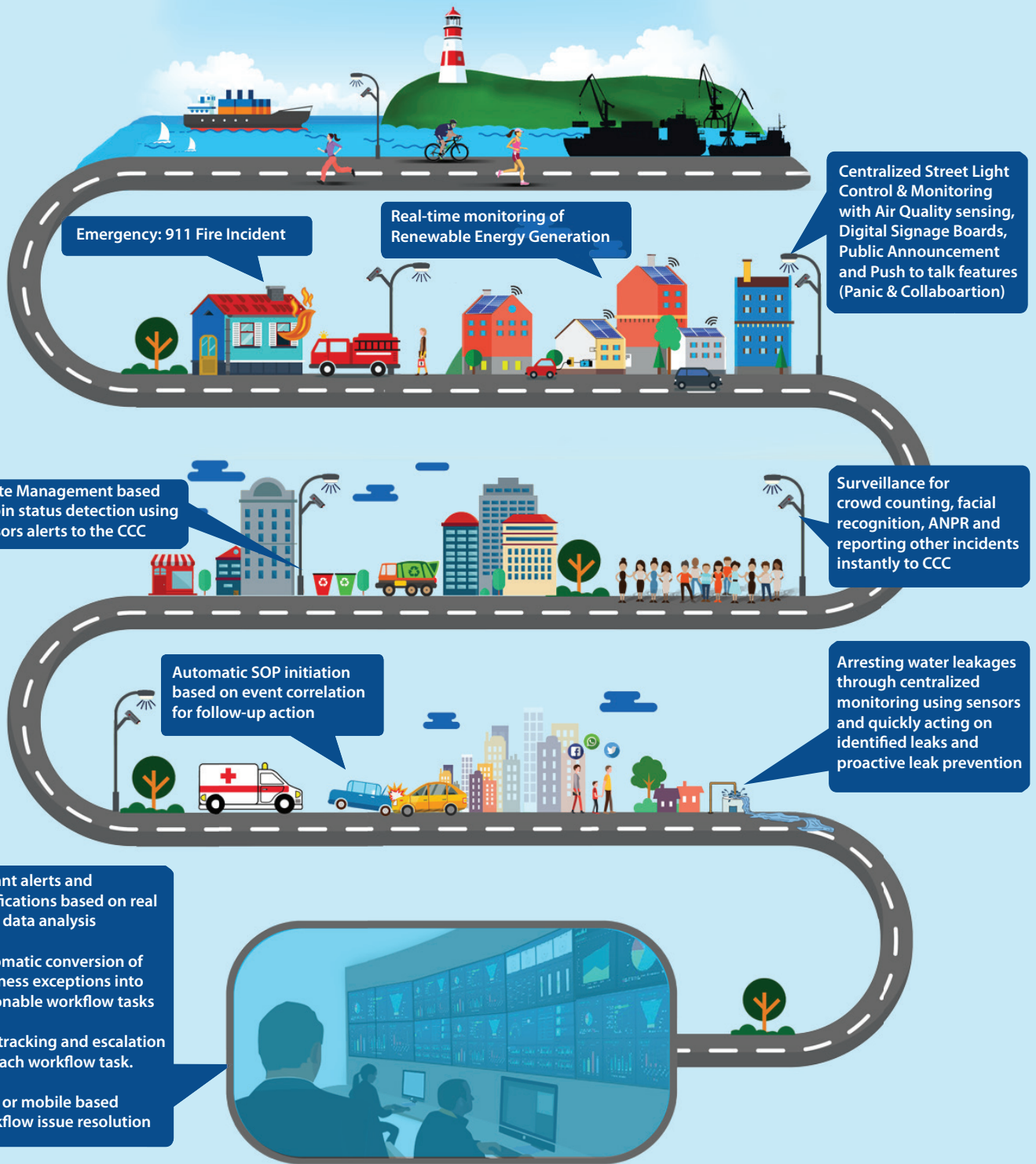
MULTI-TENANT ARCHITECTURE



Functionality	Description
Default City	The CCC allows for defining a default city with SoPs and other configurations. This forms as a base city that other new cities that are added can inherit from
Adding a new City	CCC can demonstrate the ability to create a new city on the fly in CCC. This can be done by cloning an already existing city and copy the SoPs and other city specific artefacts to the new city or by inheriting from the Default City
Attaching Devices to a city	Devices and Smart Elements can be attached to a city through an onboarding process. Devices can also be disengaged from a city or re-assigned to another city.
Consumption through API manager	Shows API consumption for both the cities so that Services billing is done as a pay as you go basis at an individual City level
Comparative City Analytics	ISO 37120 defines and establishes methodologies for a set of indicators to steer and measure the performance of city services and quality of life. This will help cities to assess their performance and measure progress overtime, with the ultimate goal of improving quality of life and sustainability. The standard's uniform approach will enable cities to seamlessly compare where they stand in relation to other cities.

Fluentgrid Actelligence™

Command & Control Center Platform



Our Fluentgrid Actelligence™ platform won wide acclaim among utilities, communications and cities across the world for enabling :

- > Unified Information Access
- > Enterprise Integration
- > Communication & Collaboration
- > Smart Grid Integration
- > Intelligence & Big Data Analytics
- > Security and Auditing Services
- > Business Operations Agility

Licensing

Fluentgrid Actelligence™ comes in both on premise and cloud hosted deployment models. The platform can be deployed on a cloud owned by Fluentgrid's cloud partners or other cloud service providers.

- On premise – Entire solution deployed in the customer premise for one or more cities
- Cloud – Entire solution deployed in private, public or hybrid cloud environment for one or more cities in SaaS (Software as a Service) or pay as you go model

Support

Solutions built using Fluentgrid Actelligence™ are fully enabled by Fluentgrid Software Technical Support. All your queries and concerns can be easily corresponded via email to cccsupport@fluentgrid.com All our customers are provided access to track tickets, provide additional information and browse through the knowledge repository by logging to <https://fluentgridccc.freshdesk.com>



FLUENTGRID LIMITED

(formerly Phoenix IT Solutions Ltd.)

Visakhapatnam

Level 5, 9-29-19/A
Waltair Heights, Balaji Nagar
Visakhapatnam - 530 003
Andhra Pradesh, India

Tel: +91 891 2500000
+91 891 6600999
Fax: +91 891 2766773
Email: cccsupport@fluentgrid.com
sales@fluentgrid.com

Hyderabad

#707 & 708, B-Block
The Platina, Gachibowli
Miyapur Road
Hyderabad - 500 032
Telangana, India

Tel: +91 40 65557733

USA

3100 W Ray Road,
Suite 201, Chandler,
AZ 85226, USA.

Tel: +1 480 239 7115

www.fluentgrid.com