



CrowdFlow

人海

Big Data Crowd-Management
powered by **Huawei Cloud**



Huawei Developer Competition 2023 APAC

Our Team

Creating a Team Focused on Product Development

With Technical Expertise and Domain Knowledge



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Experienced in
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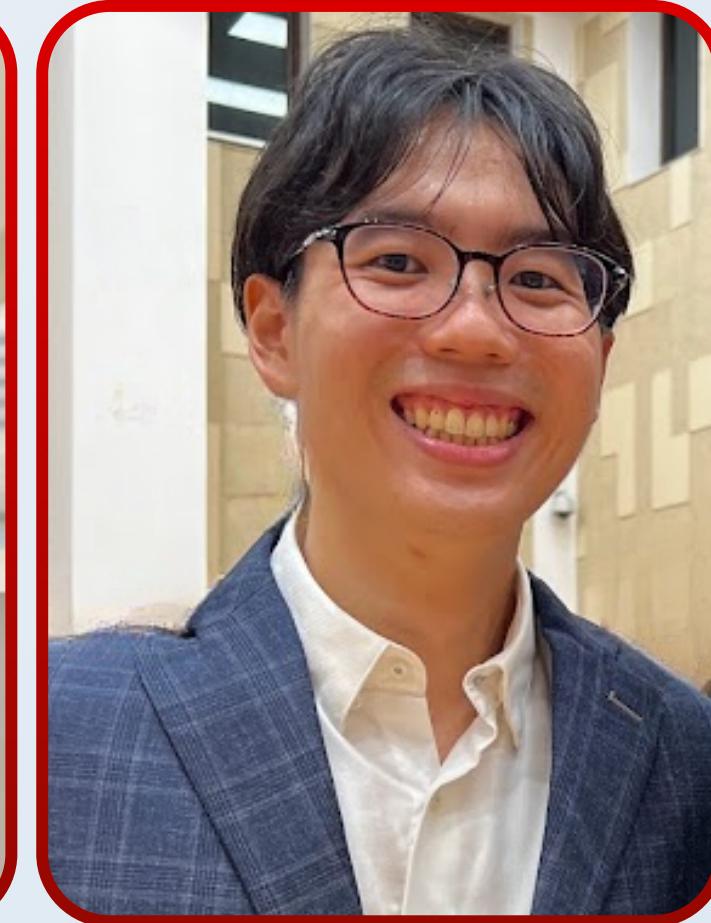
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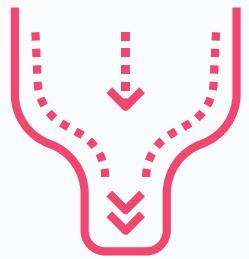
The Problem MICE* Event Organisers Grapple with Crowd-Management Challenges



Navigation Difficulties

Bottlenecks and Congestion

Managing **bottlenecks**, especially at entrances and exits of a venue, is extremely challenging without live data



Line Management

Queues for events and security gates are **unoptimised** without live monitoring and crowd control measures



Safety Concerns

Sudden Surges

Certain events may see sudden **fluctuations in crowd size** and movement, which can be dangerous without a channel to disseminate information



Emergency Evacuation

Visitors, unlike organisers, are not notified of **evacuation** procedures, making emergency situations far more dangerous



Diminished Appeal

Event Blindspots

Stalls and booths located at certain areas may be **easily overlooked**, reducing appeal of live events



Static Signages

Way-finding signages and crowd guidance tools such as queue poles **do not respond to live crowds**, leading to congregation and worsening of blindspots



Go-To-Market Key Stakeholders in the MICE industry have Specialised Needs



Event & Exhibition Organisers

- Event management companies who plan and coordinate MICE events
- Responsible for event **experience, crowd management, and logistics**



MEGA
EXHIBITION EVENTS



Venue Managers

- Estate owners/venue managers of event and exhibition spaces
- Concern with the **security** and **safety** of the venue rented out to event organisers

SINGAPORE
EXPO

MARINA BAY Sands®
SINGAPORE

SINGAPORE
FINTECH
FESTIVAL

SINGAPORE
AIRSHOW

SKILLS
FUTURE
FESTIVAL



Government & Public Agencies

- Organisers of public conferences, town hall meetings and public exhibitions
- Value **crowd control** and **safety** of the public



Event Security Firms

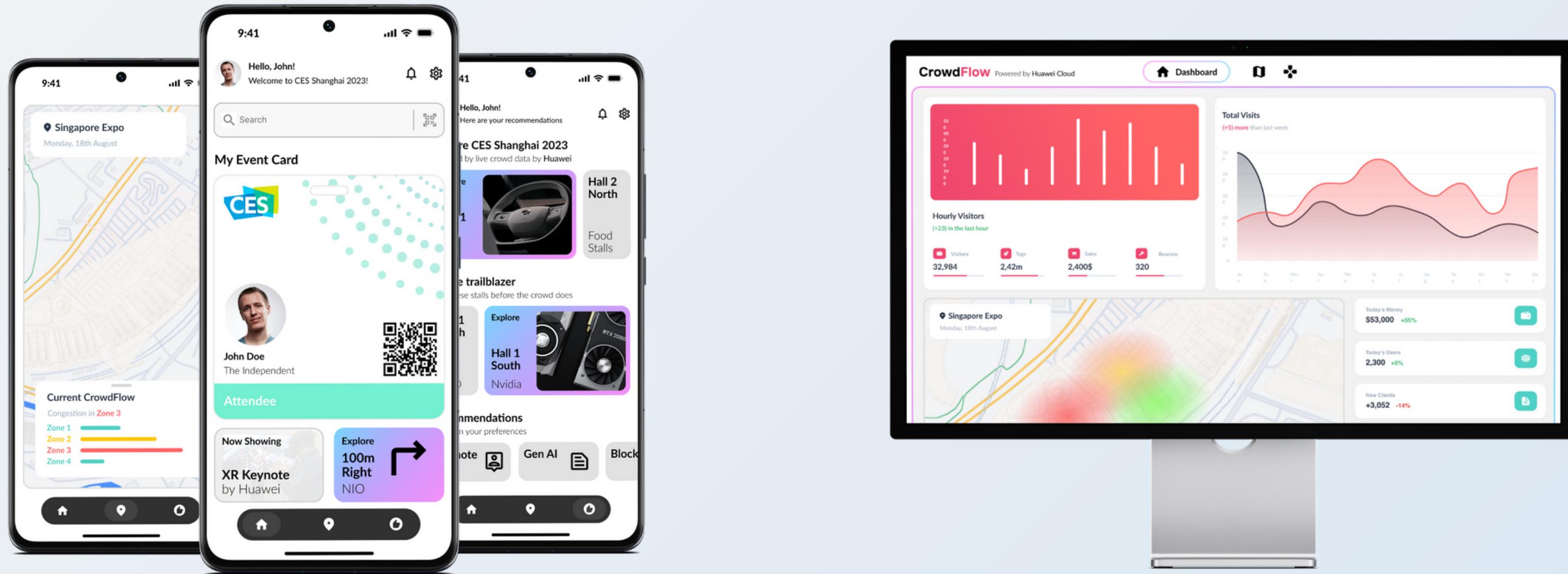
- Firms that specialise in managing crowds at events
- Concern with the **order, security, and safety** of the event

TERA

Teaching & Education Research Association

Our Product

A Cloud-Based Crowd Management System for Enhanced Event Structure, Satisfaction and Safety



Authentication, Crowd Data and Guides

Visitors will have access to ticketing services, dynamic recommendations and live crowd data to make more informed decisions on where to visit.

Dashboard, Live Data and Crowd Control Measures

Organisers can see live event status at a glance, and control crowds by pushing recommendations and areas-of-interest straight to visitors.

Our Prototypes

Mobile Prototype built on React Native with Expo, with Cross-Platform Compatibility



For Attendees

A one-stop service for attendee authentication, navigation and recommendations

Easy overview of stage events and customised recommended stalls

Live map of event space

Live updates of crowd statuses, with heatmaps for easy visualisation



Our Prototypes

Dashboard Prototype built on React with Huawei's Data Lake Visualisation, delivering Rich, User-friendly Insights for Organisers

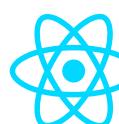
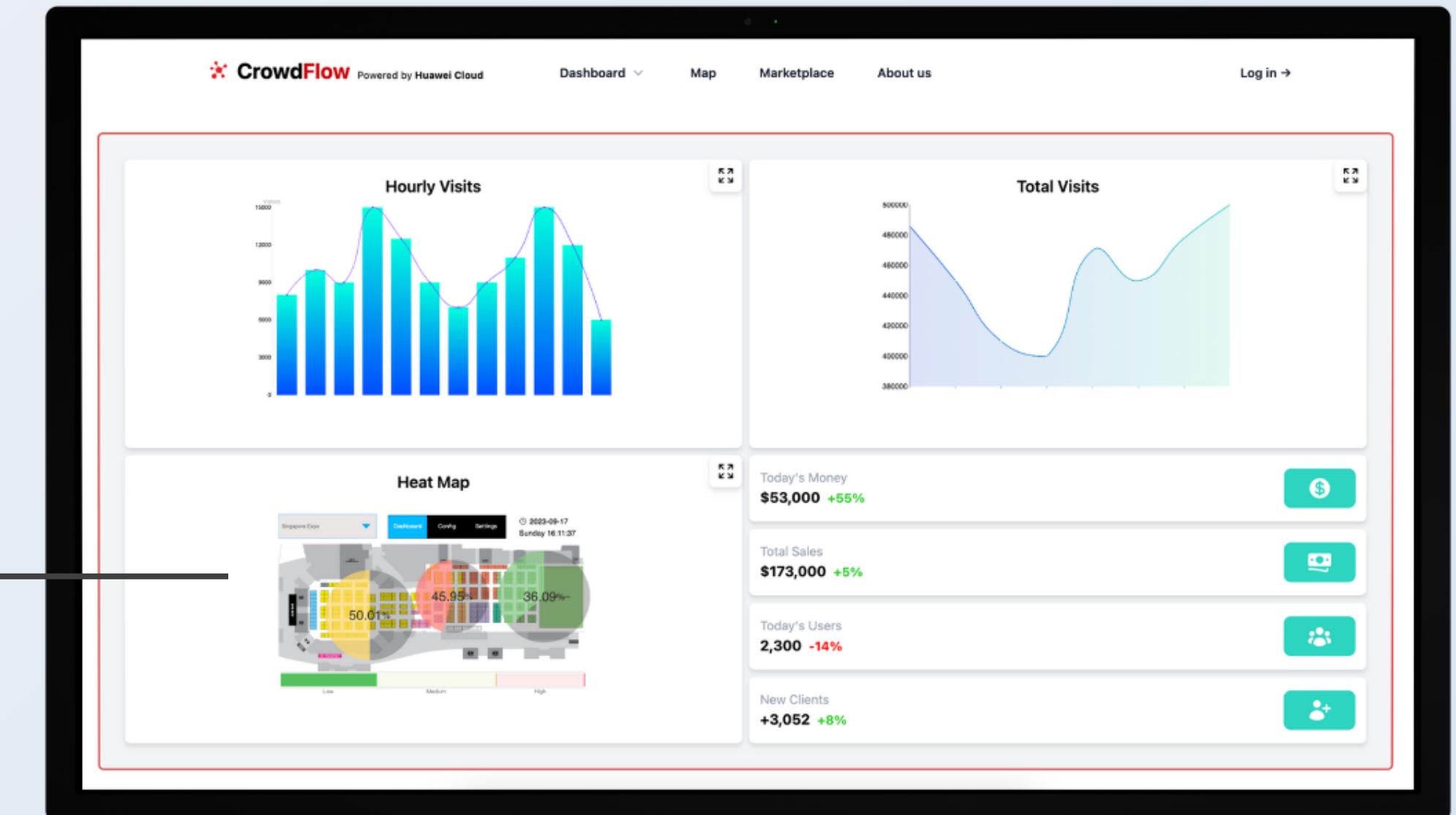


For Organisers

A one-stop service for crowd monitoring and analytics

Leveraging predictive analytics based on real time event status to provide recommendations to attendees and manage crowd flow.

Live updates of crowd statuses, with heatmaps, bar charts and line charts for easy visualisation on descriptive data



Product Benefits

CrowdFlow Creates Value by

Tackling Key Pain Points in Large-Scale MICE Events



Navigation Difficulties

Bottlenecks and Congestion
Line Management



Real Time Crowd Management Dashboard & Notifications

- Real time updates on events status and navigation assistance
- Receive alerts about congested areas to mitigate potential congestions

Safety Concerns

Sudden Surges
Emergency Evacuation



Predictive Analytics & Emergency Response System

- Proactive approach to deter potential safety risks.
- Reduce emergency response time by activating alerts

Diminished Appeal

Event Blindspots
Static Signages

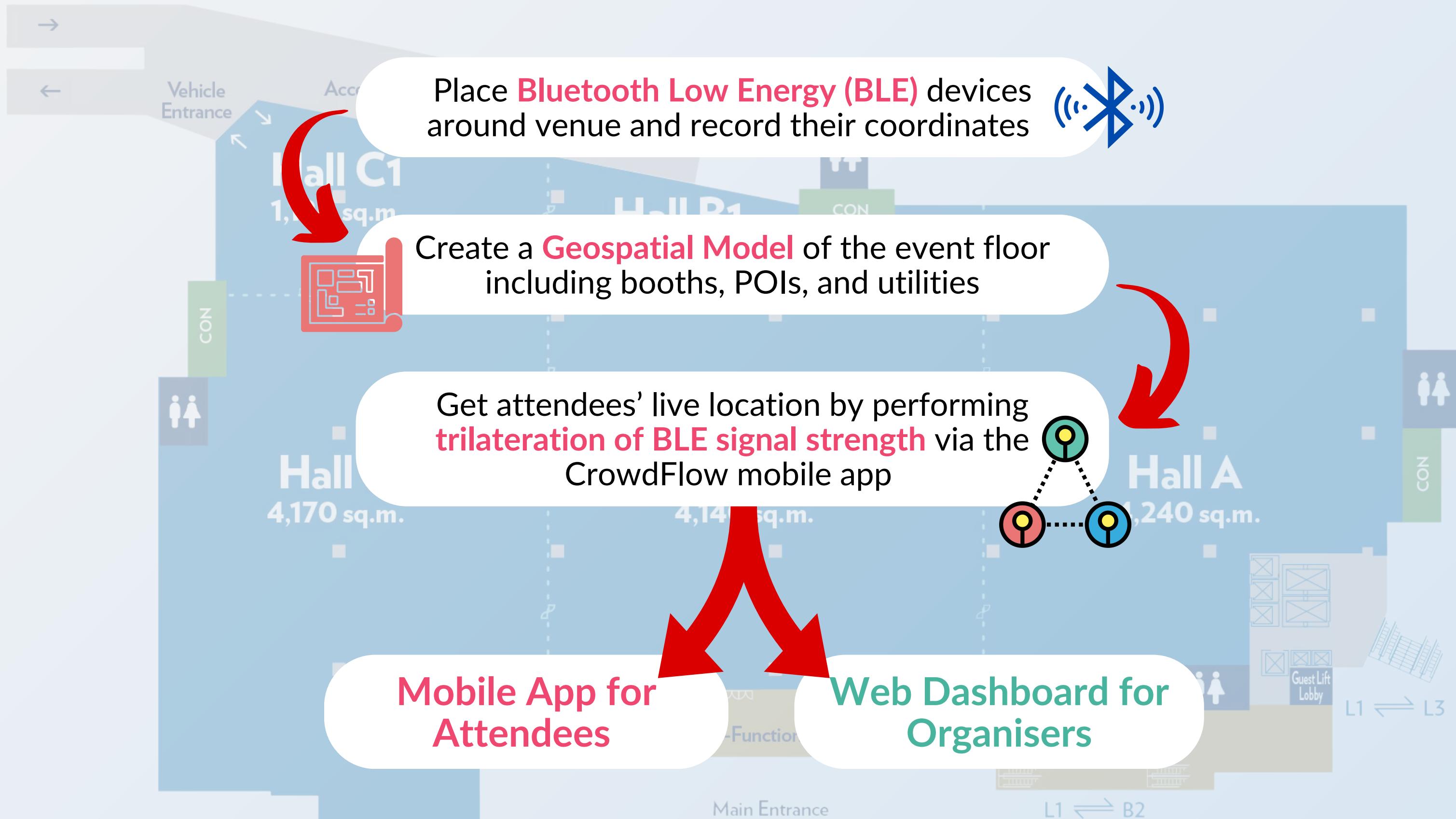


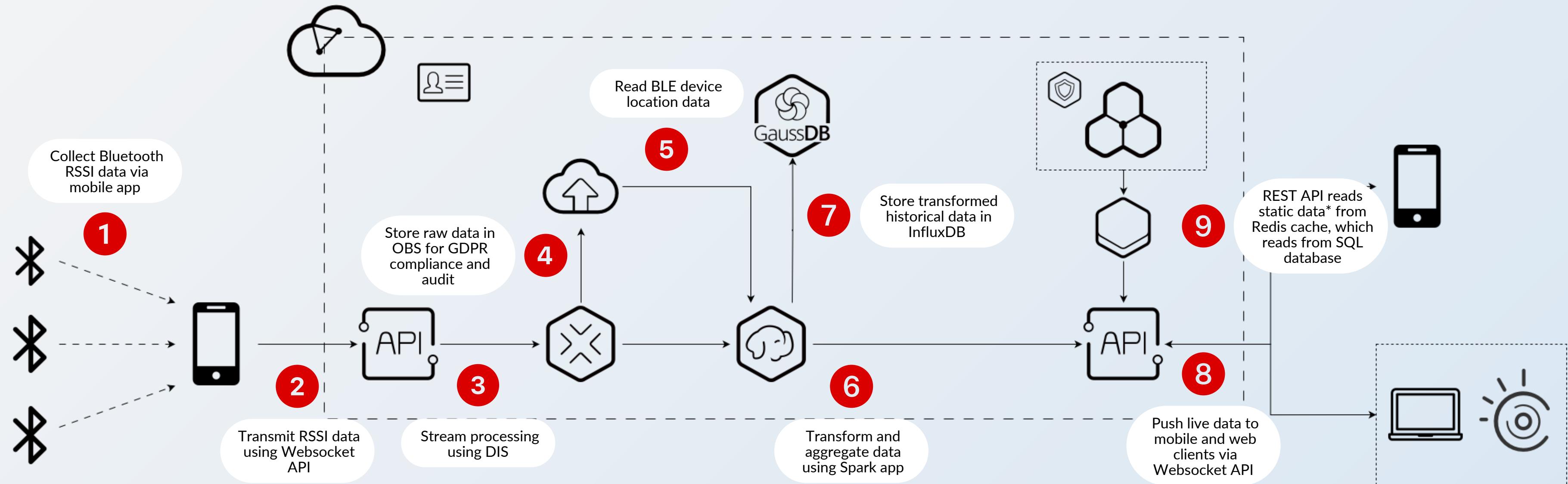
Crowd Movement Recommendation

- Send route recommendations to users to influence crowd flow, thereby reducing blindspots.

Our Product

A High-Level Overview of CrowdFlow's Operations





System Design Objectives

Security

- Bluetooth RSSI data is encrypted and untraceable to individual users
- Security measures such as IAM authentication for services within VPC and DBSS protection
- Limit public network access to only the API Gateway

Low Latency

- Stream processing using DIS
- Apache Spark for lightning-fast data processing, suitable for micro-batching operations
- Websocket API offers low latency for pushing live data updates

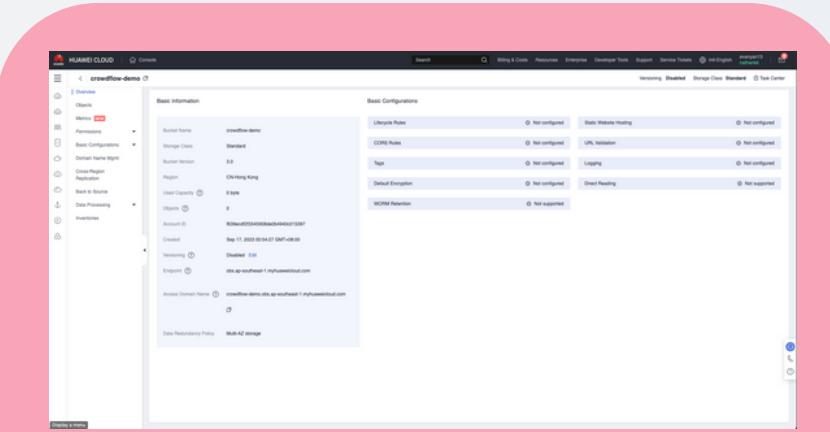
Fault-Tolerance

- MRS, GaussDB, RDS, and DCS allow for multi-node configurations, providing redundancy to reduce data loss and system downtime

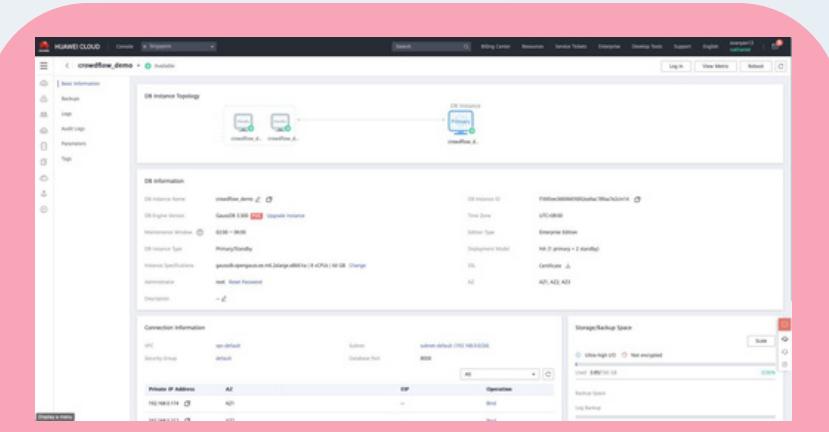
Scalability

- API Gateway load balances requests automatically
- Use of NoSQL database (Influx) is a highly scalable method of storing time-series data

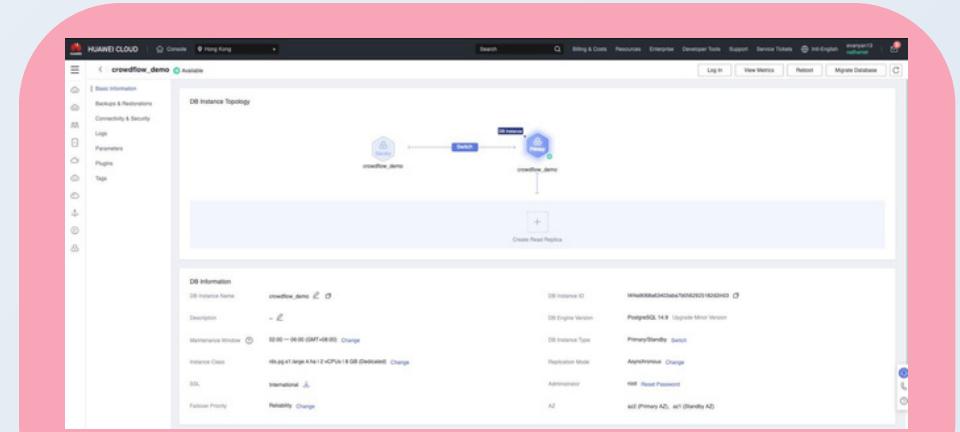
Our Product Examples of Key Huawei Cloud Services Used



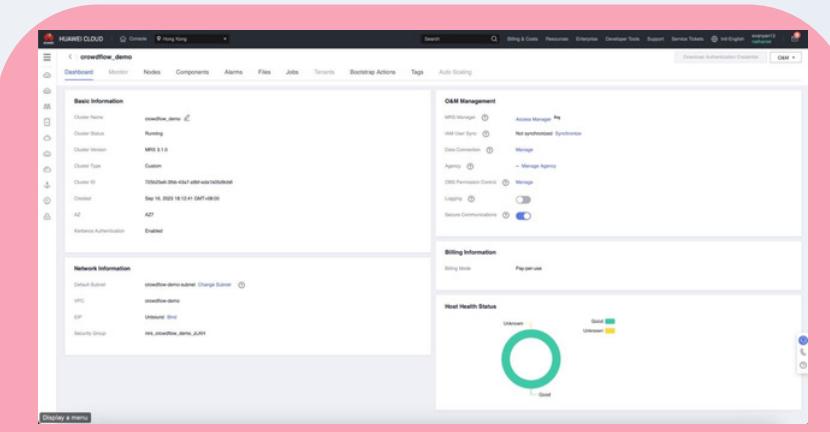
Object Storage Service (OBS)



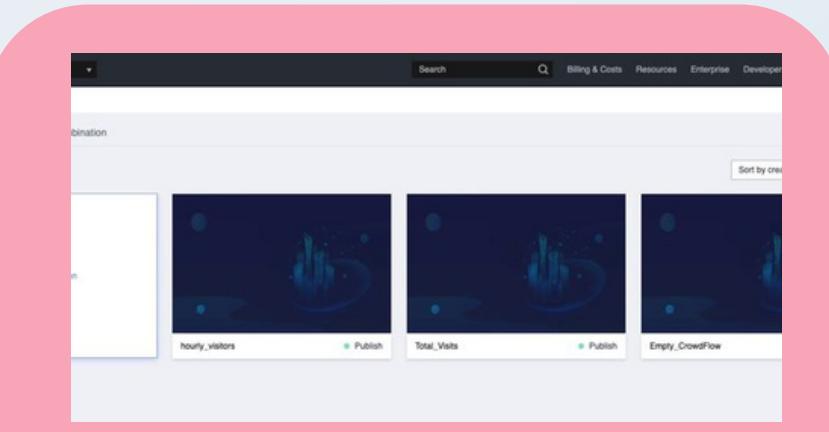
GaussDB (Influx)



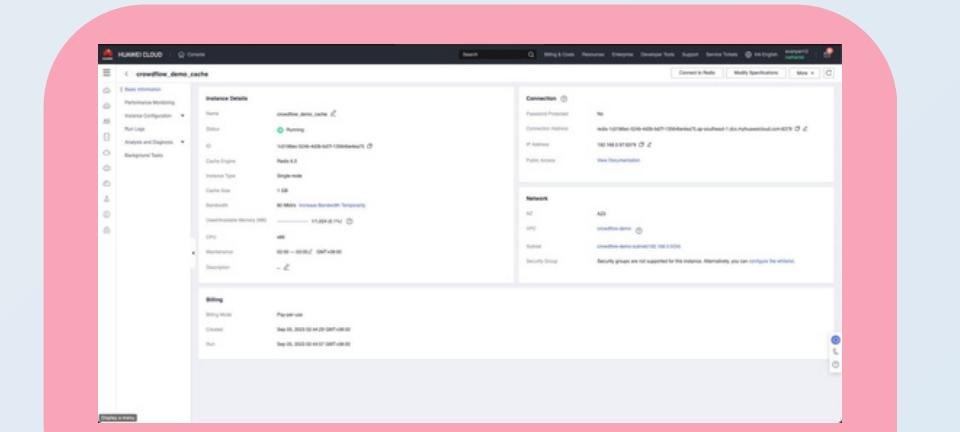
Relational Database Service (RDS)



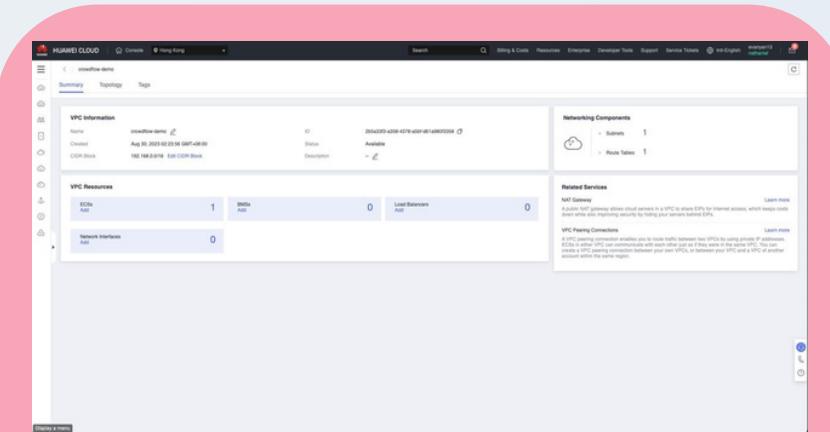
MapReduce Service (MRS)



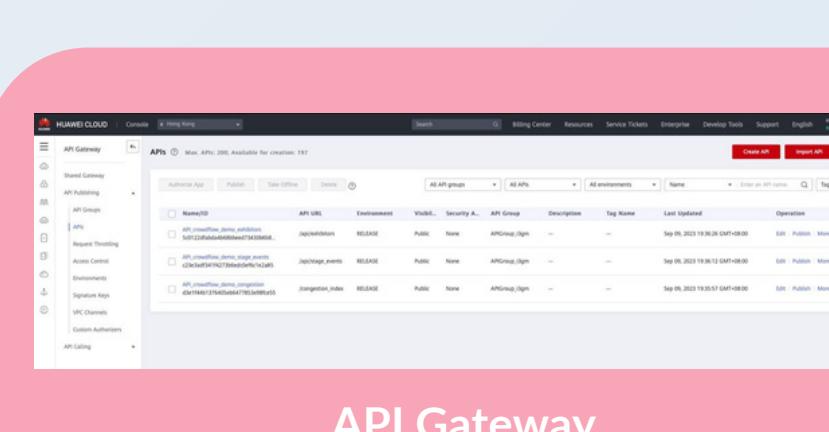
Data Lake Visualization (DLV)



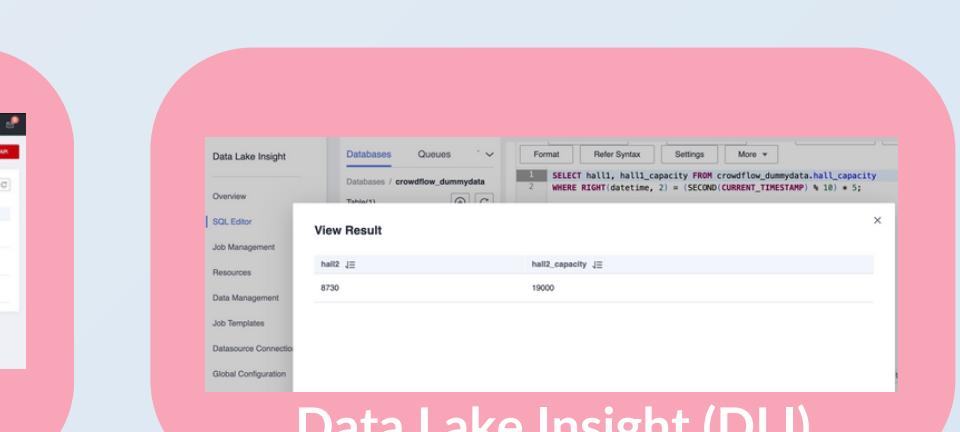
Distributed Cache Service (Redis DCS)



Virtual Private Cloud (VPC)



API Gateway



Data Lake Insight (DLI)

Business Model

CrowdFlow is a **Business-to-Business (B2B) Service** with a **Tiered Pricing Model**



Building Relationships

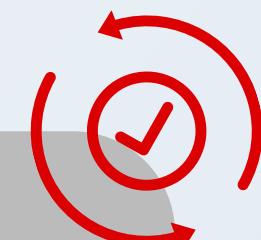


CrowdFlow's key to success is forming partnerships with key MICE players by delivering high-quality service

Long-time clients also receive preferential rates to retain customer loyalty

Continuous Iteration

CrowdFlow algorithms evolve and improve using data gathered by previous events, increasing appeal and effectiveness



Tiered Pricing Model

To allow new clients to progressively try out CrowdFlow's various offerings, services will be packaged in tiers

Basic

Pay-per-event

Service offerings

- Pre-event setup and integration
- On-site support for mobile app and dashboard

Plus+

Pay-per-event

Service offerings

- Basic features
- Real-time predictive models
- Add-on option to purchase collected data

Enterprise

Bundle deal (quotation)

Service offerings

- Plus+ features
- Advanced predictive model
- Post-event historical data insights

Business Model Comprehensive and Valuable Data Insights for Future Event Improvements



CrowdFlow brings business value by providing advanced geo-temporal analytics to clients post-event, aiding in...

Booth pricing strategies



Increase organiser revenue by accurately pricing booth locations based on historical footfall data

Efficient resource allocation



Reduce resource wastage and costs by enhancing organisers' pre-event planning with data-driven decision-making

Ensuring exhibitor visibility



Ensures consistent footfall for exhibitors regardless of location, building trust in organisers

Business Strategy

Scaling our business through Long-Term Partnerships with MICE Industry Leaders



Year 1 & 2

- Increase market visibility and branding
- Build relationships with Singaporean clientele
- Invest in upgrading product capability

Year 3

- Scale up on operations to handle higher frequency of events
- Kickstart post-event services with top clienteles, providing meaningful historical data insights

Year 4

- Become the top-of-mind choice for Crowd Management service provider in Singapore
- Focus on scaling brought by Network Effect

Year 5

- Expansion into other APAC region

There is Global Market Opportunity and Market Validation



Growth Drivers

- Large scale adoption of Internet of Things (IoT) platform
- Increase in Investments
- Development of Cloud-Based technology

Indoor Location

\$7.19B

22.3% CAGR

\$42.3B forecast for 2030

Crowd Management and
Event Security

\$1.23B

20.8% CAGR

\$10B forecast for 2035

Competitive Analysis

CrowdFlow offers a wider Variety of Features than Similar Products



Features	CrowdFlow 人海	inReality	TallyFi	crowdconnected	situm INDOOR POSITIONING
Cloud Based Solution	✓	✓	✓	✗	✓
Heatmap Visualization	✓	✓	✗	✓	✓
Digital Signages	✓	✗	✗	✗	✗
Integration with event management systems for consumers	✓	✗	✗	✗	✗
Comprehensive Analytics on crowd data	✓	✗	✓	✓	✓
Real-Time Feedback	✓	✓	✓	✓	✓

Competitive Edge

Huawei Has a **Competitive Advantage** of Being Well-Equipped for **Data Analytics** and **Cloud Services** Compared to Competitors



Comparison to Other Cloud Services

Comprehensive Solutions

IoT, AI, Computing, Storage and more...
All relevant technologies for CrowdFlow
are possible on the Huawei ecosystem



HUAWEI CLOUD

Hybrid Cloud

Local cloud can be integrated with Huawei Cloud services, providing unprecedented flexibility

Comparison to Existing Event Managers

One-Stop, Top Choice

CrowdFlow aims to generate value for both event attendees and organisers

CrowdFlow

Comprehensive Analytics

CrowdFlow focuses on gathering and analysing live data, rather than only provide ticketing and logistical services

With Huawei's existing competitive advantage in **Big Data and Cloud services**, we can target businesses and organisers by **optimising crowd management** measures, thus making CrowdFlow the **Top-Of-Mind solution**.

Web Dashboard Demo



CrowdFlow
人海

THANK YOU

Join Us in Revolutionising
Event Management



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