SMART BUILDINGS CHALLENGE

GENERAL INFORMATION G2K Group GmbH

1 COMPANY NAME:

G2K Group GmbH

2 SUBMITTER NAME AND E-MAIL ADDRESS:

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3 LINK TO COMPANY'S HOME PAGE:

www.get2know.com

4 PLEASE SELECT WHICH SBC USE CASE YOUR TEAM IS SUPPORTING

- ✓ **Smart Space Flow Analytics**
- ☒ Smart Metering in Multi-Tenant Commercial Building
- ☒ Smart Automated Building
- ☒ Smart Building Cockpit

5 IN CASE OF A CROSS COMPANY TEAM SUBMISSION: WHO IS REPRESENTING WHICH PART OF THIS SUBMISSION

SOLUTION DESIGN: BUSINESS PERSPECTIVE

DEVELOPMENT, SELLING & SUPPORT

DEVELOPMENT

- G2K offers an IoT-platform with **standardized use cases** generating valuable insights for its customers

- Our platform solution entails **four basic modules** (e.g. Maps, Alarms, BI Dashboards, Historic Trails) which are then extended with add-ons specific to the required use case

- A strong in-house developer team of about **60 developers** serve as force behind new developments and can adapt add-ons to specific user needs

- Through years of experience, G2K was able to **integrate various algorithms, sensors, cameras, and software** from our technology partners (e.g. Bosch, Microsoft, Huawei, SAP) in our platform

SELLING

- Over the years, G2K has built a **sophisticated network of partners** eager to sell our solution to customers worldwide (e.g. Microsoft, Huawei, IBM)

SUPPORT

- G2K has developed **strong partnerships** with installers and resellers (e.g. Funkwerk) **covering installation, maintenance, and support** with high quality standards
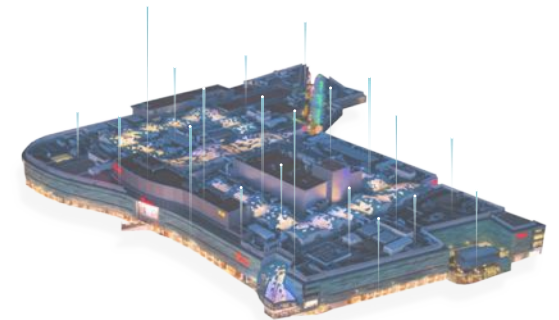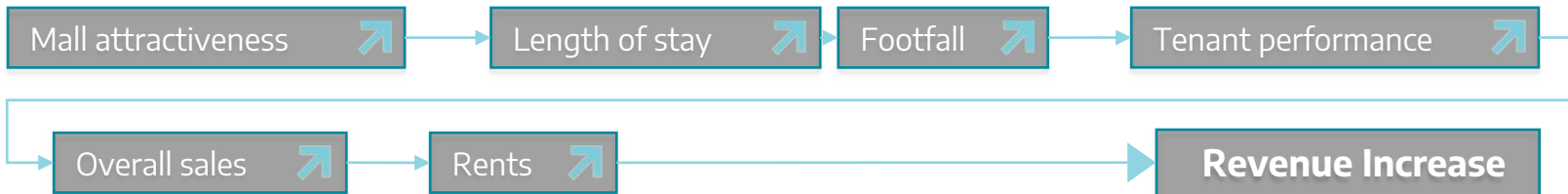
HOW DO THE SAB'S VALUABLE INSIGHTS **INCREASE REVENUES?**

VALUABLE INSIGHTS ALLOW THE MALL OPERATOR TO:

- determine the **best mix of stores** → which combinations of stores or categories yield the highest collective mall sales

- transform from opportunistically deciding which tenants to lease to and which units within the mall each store will occupy towards a systematic and **analytical approach to prioritizing, prospecting for, and acquiring tenants**

- understand and plan store adjacencies that **drive higher consumer spending** and **longer mall visits**

- understand **what types of stores best attract consumers**, who live or work in the mall's catchment area

- understand if the anchor stores are driving foot traffic and sales into the mall

- understand **which tenants are unexpected "spend engines"** (e.g. tenants that are driving cross-conversion and thus creating value despite their own low sales performance)
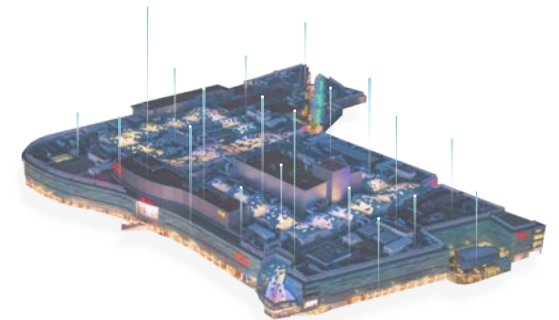
AND THUS POSITIVELY INFLUENCE THE FOLLOWING:

Mall attractiveness ↗ → Length of stay ↗ → Footfall ↗ → Tenant performance ↗

Overall sales ↗ → Rents ↗ → **Revenue Increase**

Solution Design: Business Perspective (Highlight G2K)

2. How would the fully deployed solution create value for participants in the ecosystem? (2/3)

HOW DO THE SAB'S VALUABLE INSIGHTS **CUT COSTS?**

VALUABLE INSIGHTS ALLOW THE MALL OPERATOR TO:

- use building automation and control systems to achieve potential **savings for heating energy of approx. 5-50% and for cooling of approx. 10-80%**

- employ **demand control ventilation** to **obtain energy savings of up to 40%**

- use occupancy sensors, daylight sensors, dimmers etc. to save approximately **20-50% of total lighting energy consumption**

- employ overall building automation and energy management techniques to achieve **up to 60% of annual energy savings**

- achieve added benefits of thermal comfort and safety

- use predictive / preventive maintenance methods to save cost

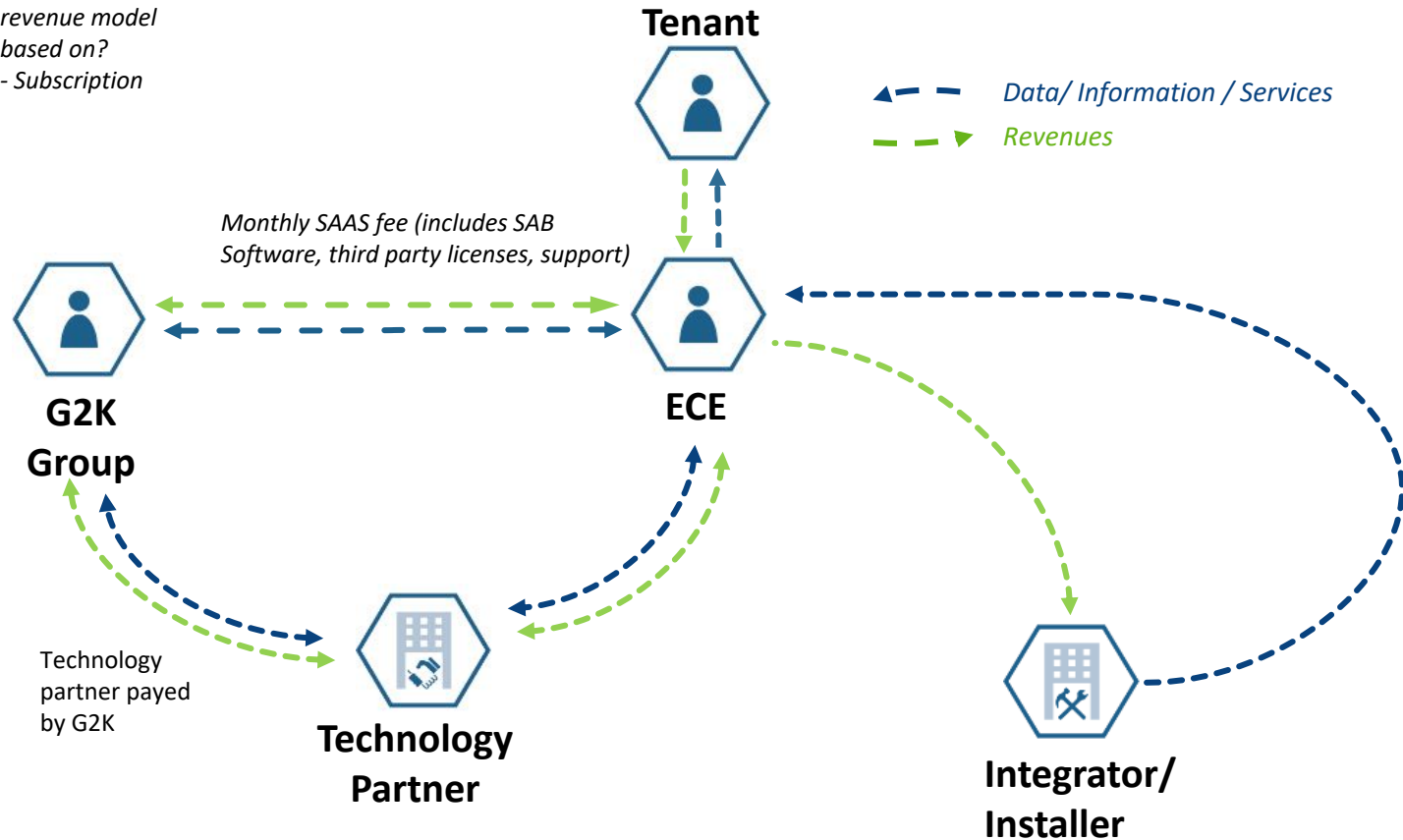- **remove third party management dependencies** through smart building automation

AND THUS POSITIVELY INFLUENCE THE FOLLOWING:

Efficiency ratio ↗	→	Operating costs ↘
Automation grade ↗	→	3rd Party Fees ↘
Abrasion ↘	→	Operating costs ↘

→ **Cost Reduction**

MONETIZATION MAP

What is your current revenue model based on?
- Subscription

Data/ Information / Services
Revenues

Tenant

Monthly SAAS fee (includes SAB Software, third party licenses, support)

G2K Group

ECE

Technology partner payed by G2K

Technology Partner

Integrator/ Installer

PROCESS EXPLANATION

1. **G2K's** provides ECE with the Software Platform Situational Awareness Builder (SAB) and the required add-ons to fulfil the use case. The business model is Software-as-a-Service.

2. G2K is cooperating with selected **technology partners** for all software related services. Software related services are part of the G2K package offering, while hardware provision is handled via ECE and its partners.

3. The **integrator / installer** will be selected by the client or by G2K on demand through our partner network. In any case, is the prime contractor for software related
4. activities.

4. **ECE** subscribes the services and receives support from technology partners. (On demand, G2K can also act as a centralized prime contractor, including hardware and software.)

5. Using insights generated by our solution, ECE is able to offer new business models to **tenants** generating new revenue streams for ECE (e.g. optimized rent models and improved shopping mall design / product placement).

PRICING OVERVIEW

The offer includes G2K's standard solution **Customer Insights Management** that covers all use case related functionalities. Above that we offer two different options of sensor implementation.

STANDARD COMPONENT

SAB Platform and Standard Modules[1]
Holistic IoT Platform that allows for integration of any sensor (e.g. camera, Wi-Fi tracker, temperature, air conditioning etc.), software platform (SAP Hana, Microsoft Dynamics, Facebook, Twitter, etc.) or contextual data (economic data, weather, population etc.)

Use-Case Solutions

Video-based add-ons
Functionality is based on Bosch cameras and people counters

> **Removed before publication.**
>
> Our sales team will be happy to advise you on individual application possibilities, price models and profitability of the use case. After agreeing the general conditions together, we can calculate a binding offer that meets your needs.

FUNCTIONALITIES

- Dwell time
- Capture Rate
- Conversion Rate

- Cross-Conversion (Customer Journey)
- Age Detection
- Gender Detection

- Analytics Dashboards

[1]**Standard Modules:** Maps (Country Map, City Map, Site Map), Alarms (Recent Alarms, Alarms Stack, Standard Operating Procedures), BI Dashboards (Live Dashboard, Historical, Dashboard, Alarms Dashboard), Historical Trail (Browse Alarms, Reports, Dashboards)

INTELLECTUAL PROPERTY

INTELLECTUAL PROPERTY

- Data sovereignty belongs to the customer

- Anonymized data is shared with G2K to provide the customer with bench marking information

- IP that belongs to the software, stays property of G2K

- IP based in Germany

PRODUCT / TECHNOLOGY

- All information and decision templates in one holistic platform → one single point of view
- Sustainable, future-proof platform through simple extension with additional use cases
- By operating several applications, the individual costs are reduced while the overall benefit of the platform is multiplied
- Proven technology based on global technology and security standards (GDPR, 1-2 ISOs)

PARTNER NETWORK

- Strong network of technology partners, hardware partners, implementation partners and consulting partners
- The strong partner network also ensures 24/7 service and maintenance capabilities

FLEXIBILITY
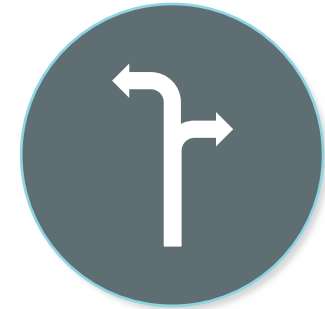
- Intelligent and modular platform that can serve multiple use cases simultaneously
- The benefit of the SAB platform increases significantly once multiple add-ons are combined in the solution (e.g. parking lot management & customer insights for in-depth demographics)
- Hardware- / vendor independent → open architecture allowing for flexible integration into any IT landscape
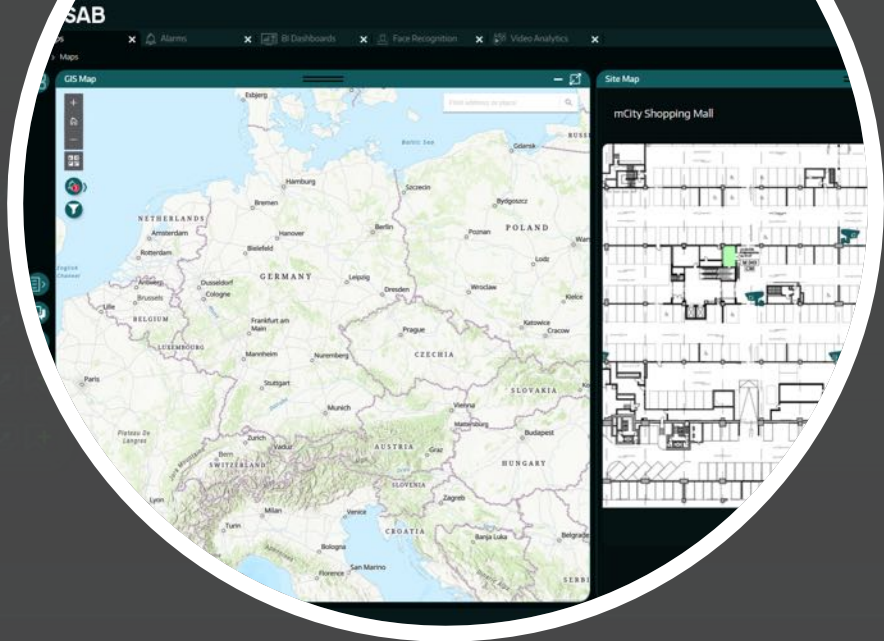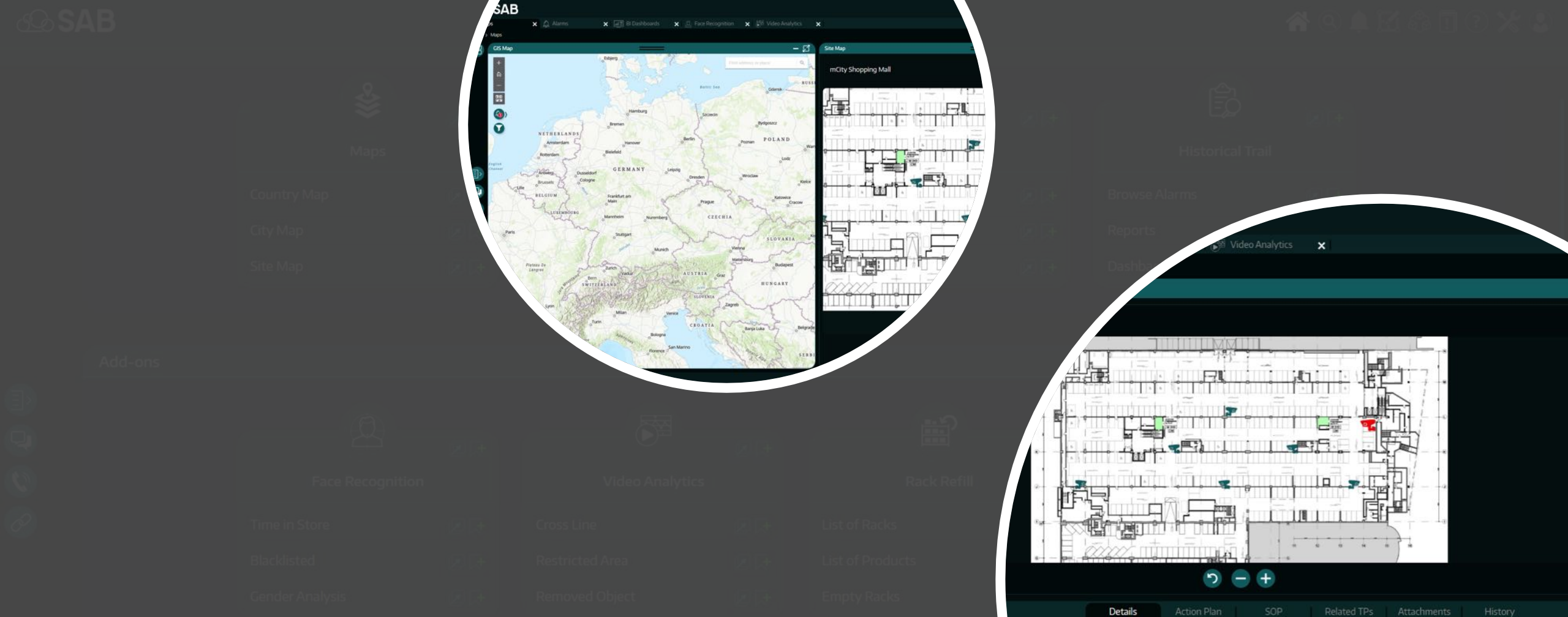
SOLUTION DESIGN: OVERVIEW / ARCHITECTURE

HOW WOULD YOUR PROPOSED SOLUTION DIFFERENTIATE ITSELF FROM OTHERS IN THE MARKET?

SOLUTION CATEGORY (PLEASE SELECT ONE OF THE FOLLOWING):

1. **Standard Product* (solution is already mature and applied in diverse projects)**
2. **Customized Product** (on demand if use case is economically beneficial)**
3. Component***
4. Technology Portfolio/Concept****

See next slide

OVERVIEW

- Please provide an overview of the proposed solution design (approx. 1 slide), e.g. using a solution architecture diagram or verbal description

*) ready to use, end2end solution - e.g. SaaS - is intended to be applied/transferred to a fast number of clients, cannot be changed to specific requirements
**) ready to use, end2end solution - e.g. SaaS - is intended to be applied/transferred to a fast number of clients, can be customized/changed for specific requirements
***) Solution, which needs to be integrated/built in in a larger scope (e.g. Iaas/PaaS, single sensor technology) - is built/integrated somewhat specific to ECE use cases
****) single components, which needs to be integrated / built into a specific solution for ECE

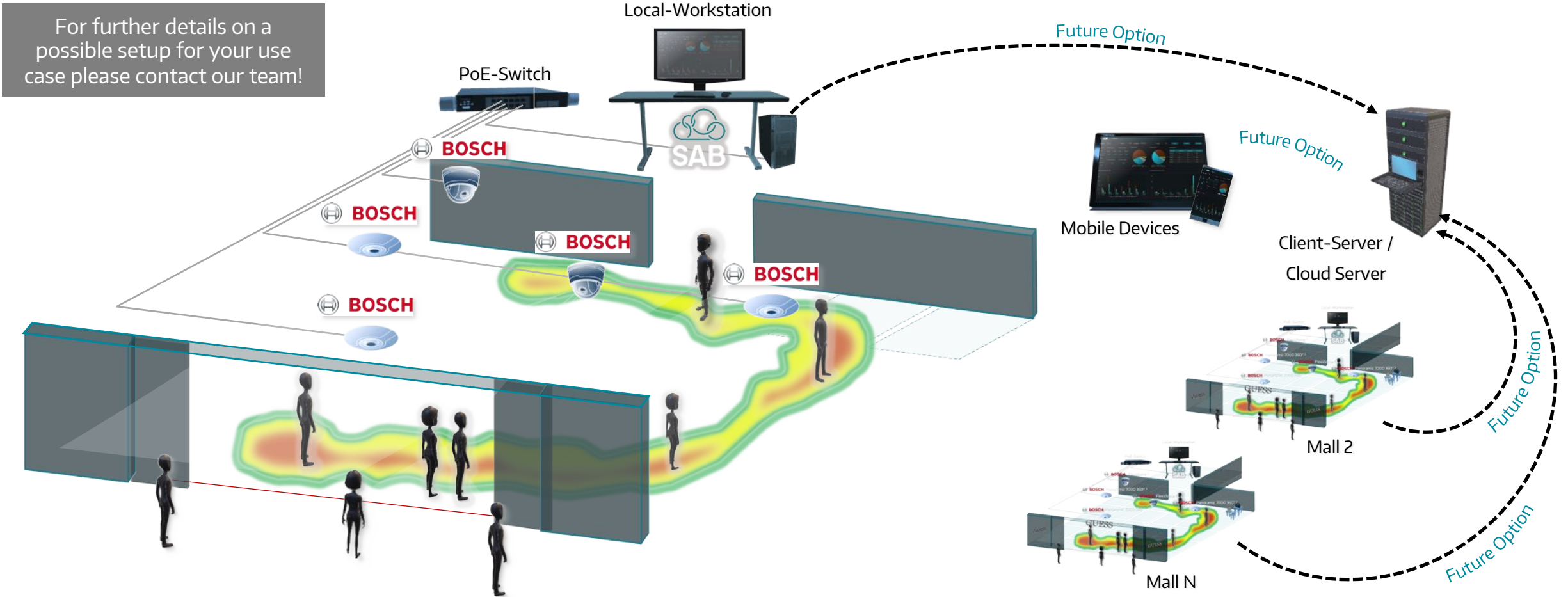**G2K ACT layer**

| Touchpoints Management | Situation Definition | Alarm Management | Smart Action Scripting |
| Risk Scenario Management | Knowledge Dashboard | Data Visualization | Data Prediction |

Data ↑ *Data* ↓

G2K KNOW layer

| Events Correlation Management | **G2K AI Algorithms** | Dynamic Integration Module |

Data ↑ *Data* ↓

G2K GET layer

| Data Extraction | Data Transferring & Simulation | Data Loading | Data Cleaning |
| Data Mining | Descriptive Analytics | Predictive Analytics | Prescriptive Analytics |

Data ↑ *Data/Actions* ↓

3rd Party

Algorithms — *e.g. intrusion detection, document authentication, restricted area, voice analysis, emotion recognition, etc.*

Sub-Systems — *e.g. video management systems, identity management, social media and web portals, or people counting, etc.*

OPTION 1: EXEMPLARY SYSTEM ARCHITECTURE FOR ETTLINGER TOR

For further details on a possible setup for your use case please contact our team!

Local-Workstation

PoE-Switch

Future Option

Mobile Devices

Future Option

Client-Server / Cloud Server

Future Option

Mall 2

Future Option

Mall N

[1] People Counting; [2] Gender classification; [3] Heatmapping; ([4] CCTV)

HOW WOULD YOUR PROPOSED SOLUTION DIFFERENTIATE ITSELF FROM OTHERS IN THE MARKET?

TECHNOLOGY OVERVIEW

1. **Describe your proposed solution from a technology perspective, listing key technologies used**
   Please refer to the detailed drawings on p. 15-16. Key technologies in our proposed solution are video analysis (option 1) and WIFI tracking (option 2). Both solutions have in common that collected data is correlated by our AI-engine and analysed by our business intelligence mechanisms to derive most valuable insights.

2. **Deployment models: Cloud vs. on-prem**
   G2K's solutions can be provided on prem / cloud-based / or as hybrid dependent on the specific client needs.

3. **Highlight use of emerging/deep tech: Please describe in how far emerging technologies such as IoT, AI and blockchain/DLTs will be used**
   Please refer to next slide (p.19 "Continuation p.17 (answer 3: differentiation IoT / AI / DLT)")

SYSTEM DEPENDENCIES

1. **Is the solution system agnostic in general?**
   Yes we are independent of hardware and software vendors. Fully flexible solution function with different other solutions. Please refer to integrated sensors in appendix C.

2. **Mobile: App required?**
   App is not required for our solution to run properly. However, if a client requires an app to be integrated into the use case, the SAB can be easily implemented.

3. **Describe potential hardware dependencies (backend, field components)**
   Our solution generally is agnostic and independent of specific types of hardware, however for analysing situations with a certain level of complexity, image quality is required to reach certain standards for optimal results.

CONTINUATION P. 18 (ANSWER 3: DIFFERENTIATION IOT / AI / DLT)

IOT

We consider the SAB to be an IoT Platform as it uses several physical and digital sources of information (e.g. cameras, microphones, sensors, subsystems) as „sensory organs". Our platform facilitates communication, data flow, device management, and the functionality of applications. Additionally we supply a centralized User Interface.

AI:

The platform has a **strong degree of artificial intelligence** as it is logically linking the information retrieved from various touchpoints, to achieve a comprehensive awareness of its entire operating environment. The platform understands how to handle different types of data and analyse them in order to independently initiate corrective or improving actions.

DLT:

The suggested solution **does not require Distributed Ledger Technologies.** However DLT can be used if wished by the client e.g. to create a tamper-proof audit trail for log files.

SCALABILITY

AT WHAT SCALE DO YOU EXPECT THE SOLUTION TO WORK

- **Number of clients:**
  ~30.

- **Throughput:**
  No limitations ascertained in prior projects.

- **Transaction execution / avg. response times:**
  <0,5s.

SLAs

- **What kind of SLAs will be supported?**
 We offer first-, second, and third-level support

QUESTION	ANSWER
Is the solution GDPR compliant?	Yes
Which mechanisms are implemented to secure sensors?	The recommended cameras are featured with Intelligent Video Analytics (IVA). By deploying these, the cameras security policies are applied.
Does the solution have effective protection against corrupt sensors?	From our experience, integrated sensors have protection included internally (e.g. Bosch cameras). Our SAB platform is also fulfilling all required IT security standards. The data transfer can also be encrypted using our partner technologies.
What kind of mechanisms are implemented to secure the interfaces?	We secure communication with HTTPS and authentication with access token

QUESTION	ANSWER
How flexible is the platform basis?	The solution is based on scalability concepts. Therefore, the amount of touchpoints/sensors and data/events can be easily increased. Furthermore, the solution can be functionally upgraded
Is multitenancy supported?	Yes, the backend supports multitenancy while communicating with sensors. Each sensor requests tenant ID and credentials.
How complex is the installation of hardware (sensors)?	Bosch IP Cameras need to be connected to a Windows PC via Ethernet cable. The software comes with an installation package.
Is a rollback possible at any time?	Yes, regarding the cloud mode we can switch off the VM or the subscription. Regarding on-premise mode we use the installation package for uninstalling.
Are different storage paths available? (hot, warm, cold)	Yes all of them are supported (real-time, semi and historical)
Are analytical methods and models described?	No
Is it possible to terrain analytic models?	No

G2K

QUESTION	ANSWER
Is a detailed description of the APIs available?	Yes
Are API definitions available (Swagger, Odata, etc.)	Yes, Swagger API
Are standard protocol like HTTP, MQTT, AMQP, CoAP or WebSockets supported?	We communicate with the Bosch cameras using Bosch SDK
Is the data exchange format described?	Yes, as we integrate with the camera using the Bosch SDK (data streams)
Are standard formats for the data exchange supported (JSON, XML)?	Yes, we use JSON formats
Which fieldbus-protocols are supported? (OPC UA, BACnet, M-Bus, Modbus, KNX/EIB, Profinet, Profibus)	n/a
What kind of standards for wireless communition is supported? (LoRa, WiFi, NB-IoT, Bluetooth, EnOcean, 5G, Thread)	The suggested cameras do not support wireless connection

QUESTION	ANSWER
What kind of logging is implemented (info, warning, fatal, etc.)?	System errors and warning, user actions, system actions, system evets.
What kind of monitoring solutions are implemented or supported?	MS-Access is used for logging
Is it possible to implement logging and monitoring into existing solutions?	Yes
Does the concept describe a general exception handling?	Yes
Does the solution still work (at least partially) while an exception executes?	Yes

Tentative Timeline & Deployments

1 **PROJECT START (APRIL 2020 EARLIEST)**
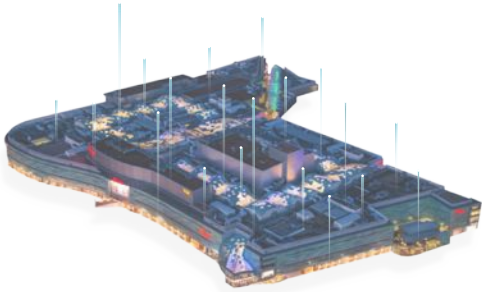
2 **TECHNICAL ASSESSMENT (2 WEEKS)**

- System definition and specifications
- Procurement of hard- and software
- Ends with accepted specification and receipt of hard- and software

3 **INTERNAL SET-UP & TESTING (2 WEEKS)**

- Set-up and testing of the SAB
- Ends with successful Factory Acceptance Test (FAT)

4 **SET-UP AND IMPLEMENTATION (2 WEEKS)**

- Sensor/camera installation
- SAB installation (if on-premise)
- Integration of cameras / sensors
- Ends with successful Site Acceptance Test (SAT)

5 **COMMISSIONING (2 WEEKS)**

- Handover of the system
- Training of the user
- Pilot- and test phase by the client
- Ends with acceptance by the client

POTENTIAL RISKS AND CHALLENGES

What do you see as the potentially biggest risks / challenges to successful deployment in this project?

- Lack of information about the infrastructure and existing IT landscape (preinstalled hardware, cabling) could delay project implementation

What do you propose as mitigation strategies?

- Side inspection and kick-off workshop with client to gather information and clarify open question

G2Ks CONTRIBUTIONS TO SMART BUILDINGS CHALLENGE

Please describe the contributions your team has made to help building the challenge community:

- Participation in workshops and networking events
- Refinement of use cases together with the team
- Proactive engagement with other teams e.g. building minds, limitless insight
- Promotion of challenge activities on social media
- Raising awareness for partnerships between companies (e.g. G2K / Bosch)
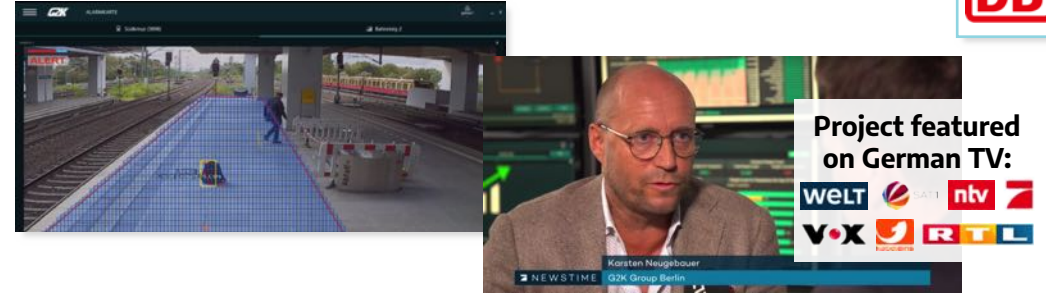- Scheduling calls with other teams for future collaboration
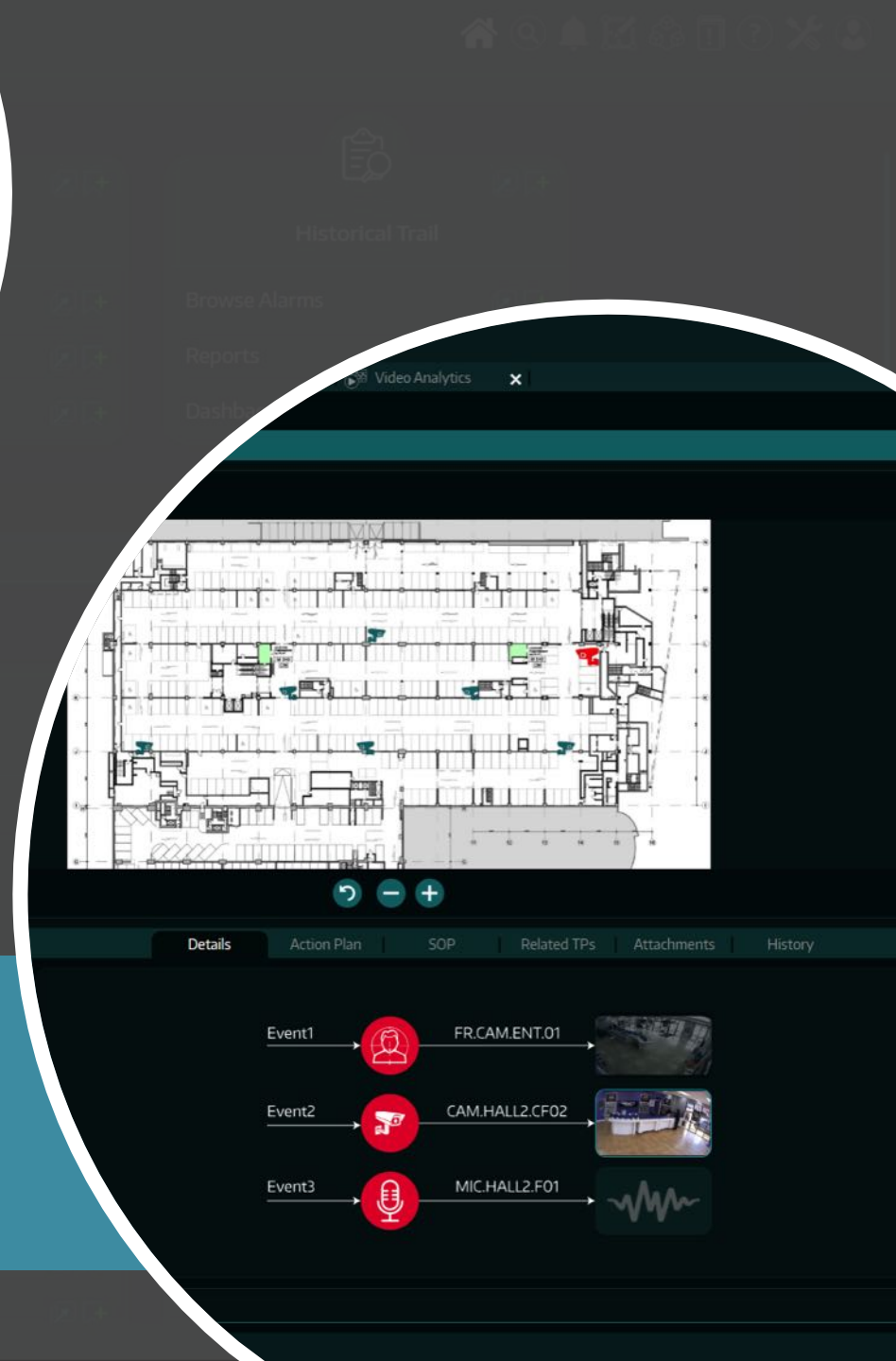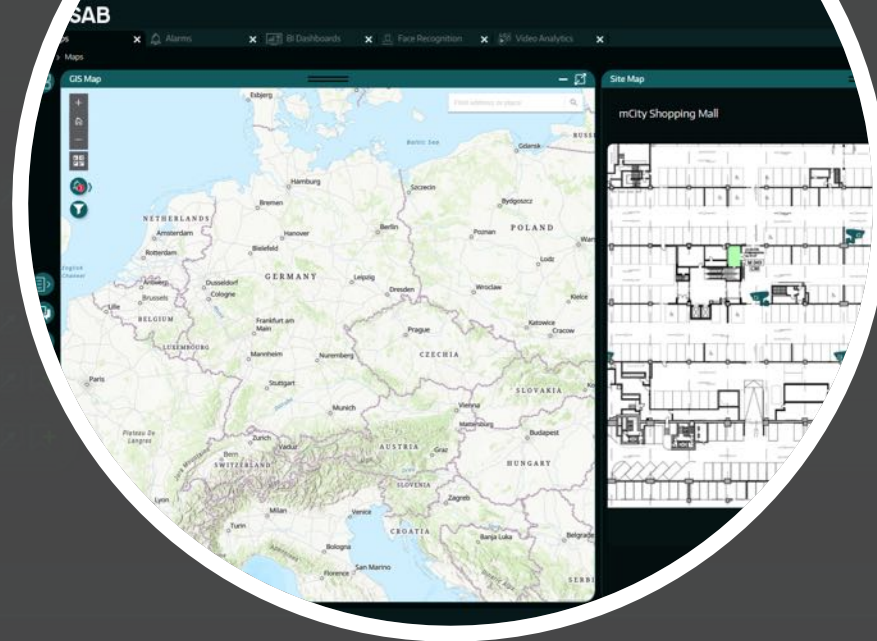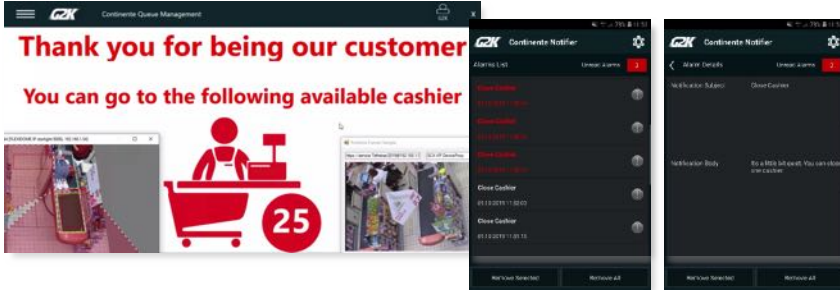
APPENDIX: CREDENTIALS G2K

FORUM SCHWANTHALERHÖHE: AI-based security solution

HBB

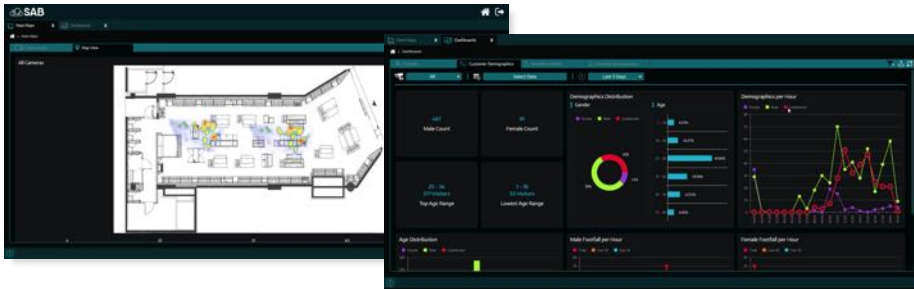**DEUTSCHE BAHN:** AI-based passenger safety solution at train stations

DB

Project featured on German TV:
WELT · ntv · 7 · VOX · RTL

CONTINENTE SUPERMARKETS: Intelligent queue & cash desk mgmt.

CONTINENTE

Thank you for being our customer
You can go to the following available cashier

MAX-SCHMELING-HALLE: AI-based security solution

VELOmax
MAX-SCHMELING-HALLE
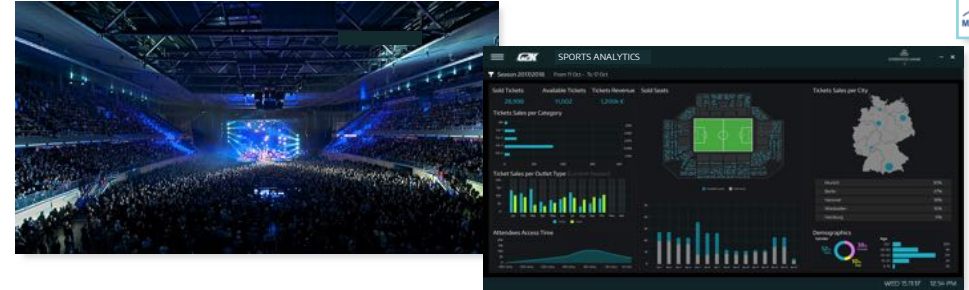
GUESS: Holisitc customer insights mgmt.

GUESS

GRAND EGYPTIAN MUSEUM: E-ticketing & identity & access mgmt.

GRAND EGYPTIAN MUSEUM
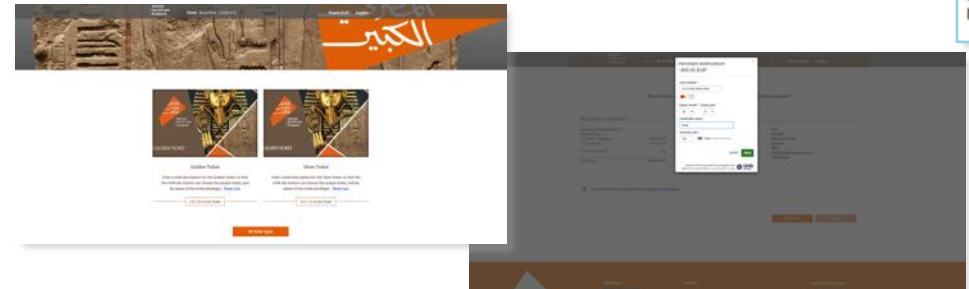
CLIENT	MARKET	PROJECT DESCRIPTION
Madinaty Luxury Compound Development of city with 600,000 inhabitants near Cairo	Smart & Safe City	SAB-based intelligent integration of smart city infrastructure
Zed El-Sheikh Zayed Central Park Entertainment & living compound with 693.000 m2 area in Cairo	Smart & Safe City	SAB-based intelligent integration of parking structure
Africa Smart City Eco-Alliance Initiative to accelerate the development of Smart City projects in Cairo	Smart & Safe City	Provision of software solutions for the digital transformation of public safety

Project (Impressions)

Image 1-3: command centre

Bild 4:
system screenshot