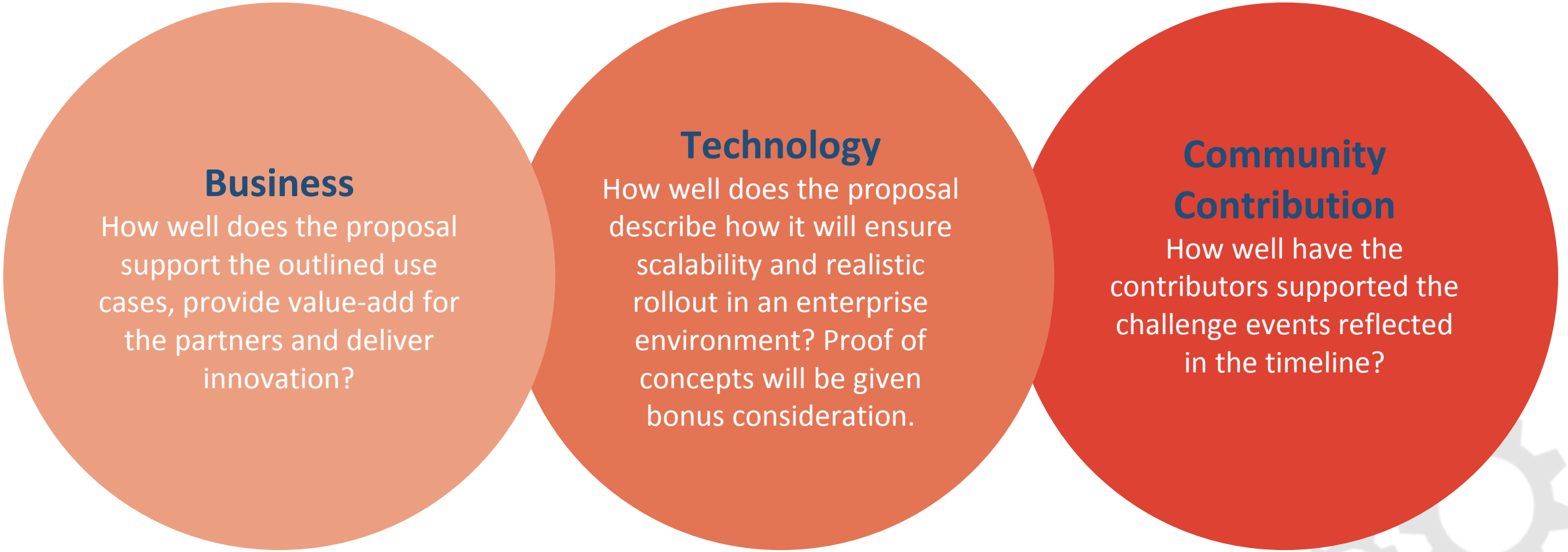
IoT Smart Buildings Challenge
aedifion.io Submission: Use Case 2
Smart Metering in Multi-Tenant Commercial Buildings

Contacts:
Felix Dorner
fdorner@aedifion.com
Johannes Schön
jschoen@aedifion.com

02.09.2019

Evaluation Criteria

The submitted proposals will be evaluated according to the following criteria:



Submission deadline: August 30, 2019

Challenge Submission

Please use the following slides to make your submission to the challenge

Use this PowerPoint template to submit your proposed concept for the challenge.

Fill out each slide from the following, using the appendix for additional material.

Optional:

- Video
  - Highly recommended
  - Should provide insights into the work you did for the challenge (not simply product advertisement)
  - Please attach or embed this into this PPT
- Code / PoC (proof of concept) Results
  - Optional, but highly desirable
  - Include high-level overview in PPT, with link to your repo

About aedifion GmbH

aedifion GmbH
www.aedifion.com

- Felix Dorner

  CFO and submitter of Contestant Agreement

  aedifion GmbH
  Hohenzollernring 72
  50672 Cologne
  Germany

- Foundation Year: 2017

aedifion
ADVANCED BUILDING AUTOMATION APPLICATIONS

Use Case Addressed: Smart Automated Buildings

- **Buildings account for the main energy consumption in western countries**
  - Increasing number of buildings is equipped with advanced automation equipment
  - Connection and control of these systems are built on proprietary solutions
  - Inefficiencies due to bad control, old processes and tools
  - Saving potential in energy and operational costs > 20%
- **Plug-and-play connection of existing building energy systems with aedifion**
  - Directly via MQTT or Edge-Device
  - Cloud-based data processing and filing
  - Alarm functions in real time
  - Cost-effective analysis with the help of artificial intelligence
  - Control functionalities
  - Documented API (https://docs.aedifion.io/)

Contributions to the Smart Buildings Challenge

- We strive to bring our solutions to a broad audience
  - Participation in E.ON :agile Accelerator
  - Participation in Beyond Convention
  - Participation in several research projects
  - Publication of our results of research projects
    - GI
    - Bädermagazin
    - CISBAT
    - Etc.
  - Publically accessible documentation of our solution and APIs
  - Social Media
  - Therefore, we would like to participate in the challenge and bring the results to the public as well

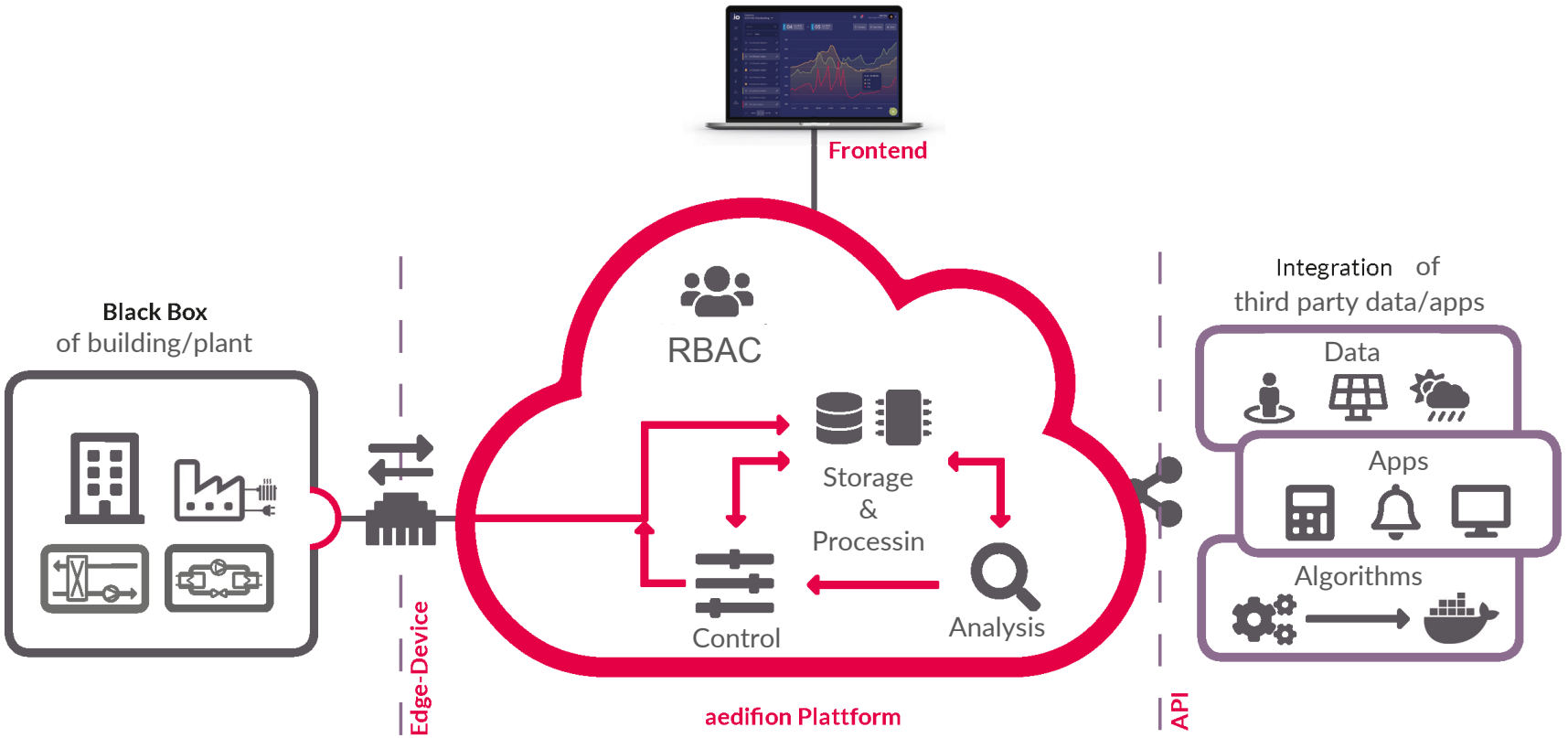
Solution Design: Business Perspective

- Manufacturer-indepent IoT-platform for efficient building operations
  - Plug-and-play connection of new buildings
    - Like an internet router, our customer can install our edge device by him-/herself
  - Comparable baseline for all buildings
    - Independent of the given system, plants and protocols, our solution offers a one-stop-shop to bring the data of your technical building equipment into the cloud
  - Efficient tools for automated analysis and control of systems
    - With the help of machine learning and AI, our system is capable to identify the type of sensors automatically
    - In a human-in-the-loop approach, all sensors/actors of a system are mapped semi-manually to set up a semantic building model
    - Automated reports and analysis help to derive recommendations for action to increasing operations efficiency
    - Our .control-framework allows to overwrite given system controls to increase efficiency and tenant comfort

Solution Design: Differentiation

- On the edge between computer science and energy systems engineering
  - 25 person years of experience in research in the respective field
  - Publically accessible documentation
  - Full-Stack API
  - Plug-and-play
  - First one to deploy a component-based analysis framework
    - Map your data points
    - Select your report/analysis
    - Receive your results

Solution Design: Architecture



Solution Design: Technology

- aedifion.io is an IoT platform tailored to monitoring and optimizing heating, ventilation & air conditioning (HVAC) systems, energy-related plants, as well as energy networks such as district heating and cooling grids.
- We introduce the main ingredients of the aedifion.io platform in the following, along the schematic overview of the aedifion.io ecosystem illustrated in the figure above.
- The core aedifion.io platform (middle) provides data filing and processing, AI & domain specific analytics, control functionalities & algorithms, data management and structuring, role-based user and access management, as well as other features, all dedicated to the operation and optimization of energy system.
- The aedifion edge device (middle left) provides plug-and-play connectivity to building automation and control systems (far left) and to automation systems of energy-related plants, such as e.g. larger scale combined heat and power plants, air handling units, heat pumps, etc.
- The aedifion frontend (top) is a browser-based human machine interface (HMI). It offers data visualization, data management, platform administration and provides access to various further features.
- aedifion.io's application programming interfaces (APIs, middle right) offer access to all mayor platform features and functionalities. You can operate the platform directly over these APIs and/or connect your own programs and scripts to it.
- aedifion.io integrates various 3rd party data sources such as weather predictions and Microsoft Exchange calendars, connects to 3rd party platforms and cloud services, such as Cumulocity, and can be integrated into 3rd party applications, such as Microsoft Excel or Grafana. Moreover, chat bots for external messaging systems like Telegram, Teams, or Slack can serve as output channels for aedifion.io's alarming system.

Solution Design: Scale

- Our solution is capable to collect and process data of buildings of any size
  - Usual pricing is for 10.000 data points
  - Biggest project is more than 25.000 data points with one edge device
  - Dedicated deployments can be set up in less than one day
  - Fastest deployment of a new building was in less than 4 days from order by our customer until first data acquisition by our edge device

Potential Issues/Challenges

- Firewall issues
  - Minimum requirements can be found here https://docs.aedifion.io/docs/system-integrators-and-it-admins/it-admins#firewall-settings
- Protocol challenges
  - Depending on the underlying protocol, some extra engineering might be necessary
  - Until now, we were able to connect BACnet, MODBUS, OPC, KNX and some derivatives
- Legal challenges
  - Concerning GDPR, but we were already able agree with DAX-companies on their data privacy agreements

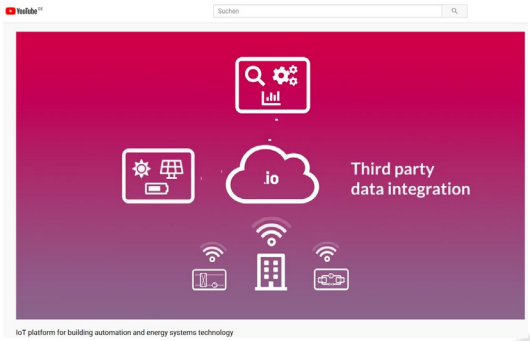
Tentative Timeline

- Identifying building (week 1)
  - Finding a suitable building to showcase all of our features & capabilities
- Connecting building (week 2)
  - With our documentation, tutorial and manual, firewall settings shouldn't be an issue
  - Connection has to be done by a customers technician
  - *Depending on the protocol and building, some adaptions might be necessary and will take some time
- Screenshare or Workshop (week 3)
  - Showing the platforms features and helping the customers team to understand the usability
- Full Usage (week 4+)
  - Customer is ready to fully benefit from aedifions solutions

Appendix

- Full documentation of our platform solution
  - https://docs.aedifion.io/docs/

- Short Video how our solution works
  - https://www.youtube.com/watch?v=vWq-Cs8RYpc



Join Us Now!

- Submit your application before August 30, 2019
- Fill in the Submission PPT Template and email it to:

Kathy Walsh
walsh@iiconsortium.org
or
Evan Birkhead
evan@trusted-iot.org

industrial internet® CONSORTIUM

TRUSTED IoT ALLIANCE