zenon Service Grid: Upgrade to IIoT platform

Right from the word go, many of our longstanding customers have relied on the flexibility, scalability, and expansion possibilities offered by zenon as core capabilities which serve the needs of project creators and users alike. Ongoing digitalization, Industry 4.0, and the new challenges constantly arising from Industrial Internet of Things (IIoT) projects have seen the advantages of zenon become basic requirements for a versatile and multi-functional industrial software. The Service Grid, a comprehensive functional expansion of the software platform, provides our customers with a future-proof solution.

VIRTUALLY UNLIMITED POTENTIAL

Integrated, seamless information flows at all business levels are critical success factors for companies within all industrial sectors. This information forms the basis for boosting efficiency in production, IT, and other disciplines. This is why it is important for companies to ensure that all the organizational measures and processes in their digitalization projects support these flows of information.

Standardizing processes opens up a whole host of new opportunities. This includes continuous improvements to existing business models or developing new business sectors. But the ever-growing number of smart machines and equipment no longer simply exchange relevant data via the Industrial Internet of Things (IIoT). In fact, components, machines, machine groups, and even entire processes are using this data to react to changing circumstances and parameters on the basis of established patterns and structures – often without any human input. This allows for distributed project engineering across multiple production lines and locations, which can now be configured and maintained more easily from a central location. The benefits of centralized control are especially evident in systems which are geographically distributed or less easily accessible, for example in the production of renewable energies, such as photovoltaic or wind power stations.

THINKING AHEAD WITH ZENON

All components of the software platform, including zenon Editor, zenon Runtime, and zenon Analyzer, had already been developed with integrated and networked configuration and use firmly in mind. The evolving requirements our users have of zenon, and the high level of demands we place on it, drive us to continuously reassess and develop the platform and its components. Our Service Grid concept is designed to meet this very aim; bolstering the evolution of our products. Simply put, the Service Grid is a functional upgrade of zenon to a distributed software platform – facilitating the integration of zenon within the IIoT. Its components – or services – are designed to fulfill specific tasks, which can be installed and operated on different systems independently of each other. Since both physical and virtual machines can serve as the base system,

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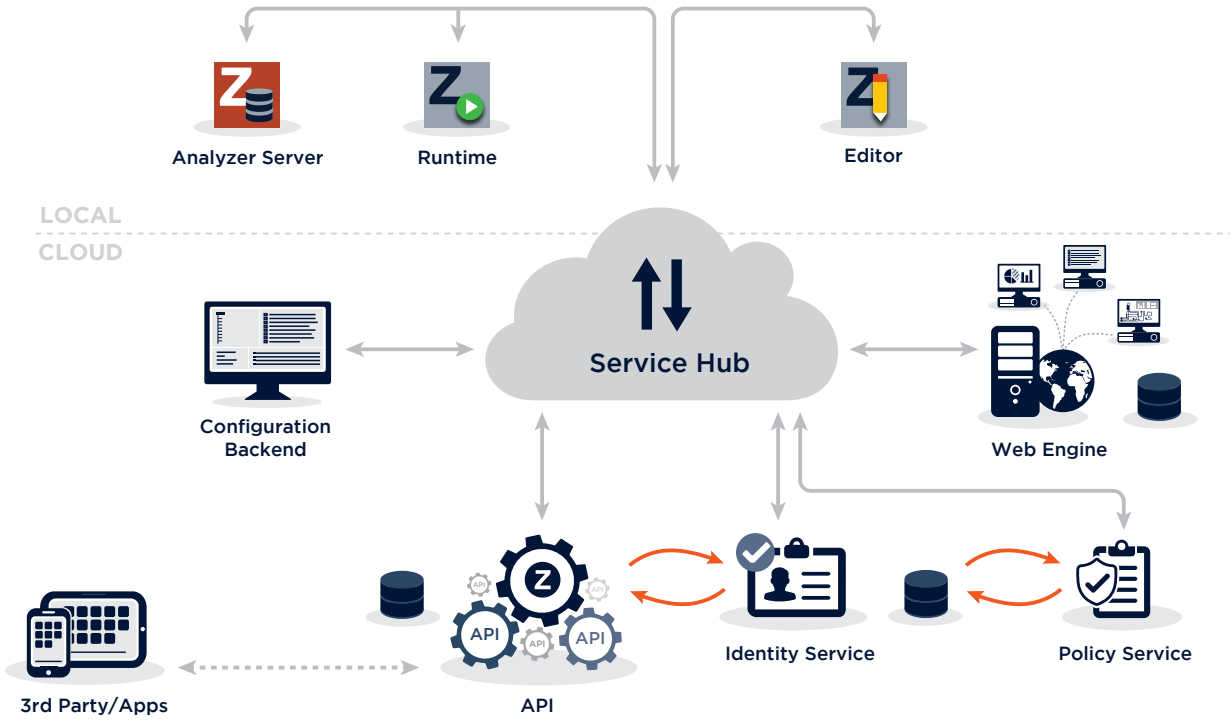

Figure 1: All components in the zenon Service Grid are connected via the central Service Hub. This also constitutes the connection between the local level and the cloud.

the Service Grid can be used on cloud platforms, giving zenon customers complete flexibility and enabling them to implement highly specialized and specific solutions. From networking systems across different locations and harmonizing processes, to simply connecting IoT equipment such as smart energy meters and wearables or integrating third-party systems – the networking possibilities are virtually limitless.

VERSION 1.0 AVAILABLE NOW

The individual services exclusively use web technologies such as Docker and Kubernetes, meaning that they are flexible in their application. The Service Grid functionalities are available from zenon 8.10 and zenon Analyzer 3.30 versions (zenon Release 2019). A core component is the Service Hub – the communication hub within the IIoT platform. The entire data exchange between all participants is controlled by it. Alongside seamless communication between zenon Editor, zenon Runtime, and zenon Analyzer via the Service Hub, the Service Grid API also facilitates a smooth connection with other communication participants for the retrieval and supply of data. All communication is encrypted and requires both access data and a digital certificate, ensuring that information can be transferred securely even when using public networks such as the internet. Integrated authentication and authorization mechanisms enable users to tailor rights-management measures to each application.

SERVICE GRID COMPONENTS

Let's take a closer look at the components and architecture of the Service Grid. In general, local installations of zenon and zenon Analyzer close to the process form the basis of a project. The data exchange between zenon Runtime and zenon Analyzer can then take place directly as before. If zenon Runtime is connected to the Service Grid, variable values and entries from the Chronological Event List (CEL) or Alarm Message List (AML) can be transferred to other services. These values can be real-time data or historical data. Processing value changes or data predictions makes it possible to control the runtime, as well as the underlying processes. Within the Service Grid architecture, zenon

Figure 2: Data can easily be displayed and controlled via the open-source platform Grafana (www.grafana.com).

Editor can provide metadata for zenon Analyzer and can also configure the runtime project contents that should be made available in the Service Grid. Connecting zenon Analyzer to the Service Grid enables report results and data predictions to be made available to the Service Hub. With the assistance of third-party applications, this results in a wide variety of scenarios for the further processing and enrichment of data.

Information can be shared and made available to other participants via the Service Hub. The Service Hub comprises two coordinated parts: the Data Hub and the Hub Controller. The Data Hub ensures that news and events are communicated to the relevant recipients, while the Hub Controller is responsible for maintaining access rights for the individual services. The Hub Controller determines the degree of access that services are authorized to have and forwards this information to the Data Hub. Individual access data must be generated for each service to ensure that only authorized services are able to consume and provide data.

INTEGRATED API

Simply connecting third-party components or clients such as web applications, mobile apps, MES, or ERP systems via the Service Grid API significantly expands the software platform's current application range. By accessing the application programming interface, variable values or even entire reports can be retrieved and then processed in external clients, facilitating easy and seamless processing of third-party data in connected zenon installations. The interface currently offers a REST interface. However, the API is designed for modular processing with different protocols and interfaces. Expansions such as OPC UA and MQTT are already in the works. The available options for displaying or using data in third-party systems are therefore extremely wide-ranging. Services such as Azure Analysis Services can be used to create customized business intelligence solutions, or open-source platforms like Grafana can be used to tailor data visualization to each business purpose.

NEW WEB ENGINE POSSIBILITIES

Use of the HTML Web Engine has also been adjusted for existing zenon users. Up to and including zenon 8.00, the Web Engine had to communicate directly with the runtime via the SCADA runtime connector. Thanks to connectivity enhancements and connection to the Service Hub, this is no longer necessary. The current functions, such as logging in users, sending value changes, or displaying variable values are, of course, still available. The planned development of the Web Engine in future Service Grid versions opens up a range of possibilities for the HTML-based representation of process data and analysis and reporting applications. Use of these applications will be made much easier, even outside of classic automation networks.

FLEXIBLE AND OPEN, YET SECURE

Despite the advantages of simply connecting third-party components, it is important to bear in mind that such connections do, of course, also carry a potential security risk. The coordinated interaction of the Identity Service with the Policy Service guarantees high security standards which can be adjusted to meet the needs of each project. The Identity Service checks all connection requests from users or clients using the Service Grid API. These requests can be processed via Microsoft Active Directory, Azure Active Directory, or LDAP (Lightweight Directory Access Protocol). After successful authorization via the Identity Service, the Policy Service establishes the exact authorizations. Highly specific read, write, and even configuration rights can be granted for individual services or users, either for specific projects or for individual variables, providing a whole host of design variants. The initial configuration, maintenance, and expansion of all settings for Service Grid components can easily be carried out via a central, web-based portal which provides the functionalities for user administration, issuing authorizations, and connecting external services and clients.

STEFAN ROBL,
HEAD OF MARKETING

HIGHLIGHTS:

- zenon as a distributed software platform
- Industrial Internet of Things connectivity
- Simplified development of new business areas
- Simple and secure connection of third-party components
- Available from zenon Release 2019 (zenon 8.10 and zenon Analyzer 3.30)