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## Azure iot reference architecture pdf

This blog will explain what Edge Computing is and why we need this. Also, we're talking a little bit about the broader concept of Fog Computing. All this related to Azure IoT Reference Architecture.Why Edge Computing is necessary? In The Internet-of-Things (IoT), we usually need to process a large amount of data coming from sensors. We can send all this data directly to the cloud and process it there, but this might not be cost-effective (because cloud usage costs are usually monetized by the number of messages). To solve this a smart component should add me, which is able to store data for some time and make aggregations on that data. So only aggregated values (for example: minute values instead of second values per sensor) must be sent to the cloud. Filtering is another way to reduce the amount of data to be sent to the cloud. For example, when an engine isn't working, it doesn't make sense to send sensor data. When the sensor is not integrated with this engine, it does not know when it is running or not. In this case, we can filter the noise by checking if a measurement is below a certain level, so that only values above this level are sent to the cloud. The smart component to do all this is called an Edge computer, which is actually just an industrial PC. An industrial PC means that it has no rotating parts (without fan), the casing is industrially certified and has dust protection (IP40 or higher) and can be mounted (DIN-rail or rack). The processor can be AMD or Intel and the operating system will usually be Windows IoT Enterprise or a Linux distribution (such as Ubuntu Server). The memory, storage, and performance required depend on the use case, but in most use cases a PC with moderate performance features (for example, Intel i5 with 4 GB memory and 125 GB SSD) will suffice. Another use case for Edge Computing is when we want to be able to react quickly to anomalies (for example, when the alarm status is also reached and an actuator should be triggered). The latency between the sensor and the cloud may be too high, resulting in an alarm reaction time that is too long. In this case, anomaly detection and actuator triggering must be performed locally by the Edge computer itself. So Edge Computer directly changes the status of the actuator and just needs to inform the cloud about this situation at a slower pace. The third case of use is video processing (= data from a CCTV). In this case, the volume of data can be very large, which can lead to increased cloud costs to the sky. An Edge computer with special hardware (for example, a vision processing unit – VPU) is able to perform local video analysis. This may be object recognition or anomaly detection. Only the result is sent to the cloud. The last use we're talking about is the transformation of protocol. In the previous blog ( we have already talked about the variety of protocols smart buildings and industry. An Edge computer is required in this case to perform the protocol transformation. We'll talk again about this topic later in this blog. What does the Azure IoT reference architecture say about Edge Computing? An Edge computer can be applied, the Azure IoT reference architecture can be useful. The following image shows the devices can be connected to the cloud. The following components are displayed:Device: This is the sensor itself, here the data is created. Field Gateway: This is the Edge computer, after its earlier mentioned in this blog. Custom Cloud Gateway: This manages the connection to Azure data centers in a secure way (for example, via VPN) and is less and less of a connection security and management component. This can also only be a DMZ subnet with user-defined security rules. Cloud Gateway: This is the Azure IoT Hub, the entry point of Platform.It Cloud IoT displays different devices: A device that has an internet connection so that it can interact directly with the Azure IoT Hub. Devices that needs an Edge computer to do all the fancy stuff already talked about. Device that is connected to the internet (just like 1) and must be connected to Custom Cloud Gateway only for security reasons. Devices with an Edge computer (like 2) between and must be connected to the custom Cloud Gateway for security reasons only. After you can see in the image above, also the IoT Client tag is displayed. These are open source Software Development Kits (SDKs) to integrate with the Azure IoT Hub. You can make use of them to simplify development work (because SDK already implemented boring stuff). A good general description of why to use these can be found here: SDKs are available for almost every popular programming language (e.g. Java, Javascript, Python and C). Under SDK uses REST APIs, Hub's MQTT or AMQP integration points.How is connectivity managed? Here comes the concept of Fog Computing. In the real world, when the clouds are small, just above the ground, we call this fog. So Fog Computing connects the cloud-to-thing continuum. Computing is an extension of the traditional cloud-based computing model where architecture implementations can dwell in multiple layers of a network's topology. However, all the benefits of the cloud should be preserved with these extensions to the fog, including containerization, virtualization, orchestration, management and efficiency. A good example of a fog node is Custom Cloud Gateway so we talked about earlier in this blog. A good video explanation can be here: concept of Fog Computing is required only in complex cases of IoT use. For example, for an airport where a lot of different things have to be integrated with each other and with actuators. In this case, we are dealing with a different protocols and a lot of security issues. Fog Computing offers a layered approach to this, making network infrastructure more scalable and manageable. For more details about this see OpenFog Architecture Reference: now this ends this blog article. In the next blog we'll have a more in-depth technical look at what Azure can bring more to Edge.This blog is brought to you by Connect's conclusion. Conclusion Connect is the IoT company of conclusion and specializes in IoT and Smart Industrial Buildings. For more information about our IoT services, see or contact me. © 2021 - | Azure Info Hub Feedback, questions, suggestions: @hsirtl Azure Info Hub lists YouTube content. By using Azure Info Hub, you agree to comply with YouTube's Terms and Conditions. © 2021 - Azure Info HubFeedback, Questions, Suggestions: @hsirtl Azure Info Hub lists YouTube content. 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