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Internet of Things Bringing Fog, Edge & Mist Computing



Photo by Andre Benz on Unsplash

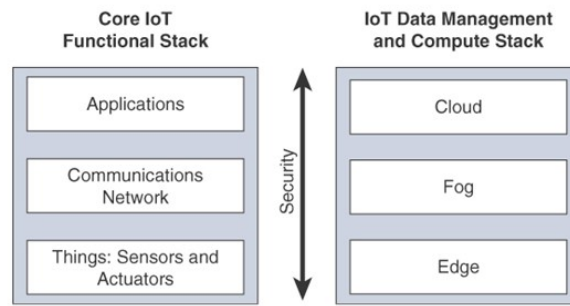
Cloud computing future is not foggy, but more and more companies are now exploring Internet of Things so there are other types like fog, edge and mist computing that are catching up.

Cloud, fog, and mist computing can be seen as application of fluid computing, now that is another term for you to remember.

How do you decide what (mist, edge, fog) to use?

Which place is best for data processing?

All depend on how quickly a decision is needed?



Simplified IoT Architecture

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Put The Brain Where Limbs Are

If your data is generated in some remote field and decision need be made quick—sending data to cloud for processing won't work

1. Ideally time sensitive decisions should be made closer to the system that is producing and acting on the data; so you can move some compute and analytics closer to the data—and you can save some cost on network and storage too.
2. Data that can wait minutes for action is passed along to the aggregation node for analysis and action
3. Data that is less time sensitive is sent to the cloud for historical analysis, analytics, and long-term storage

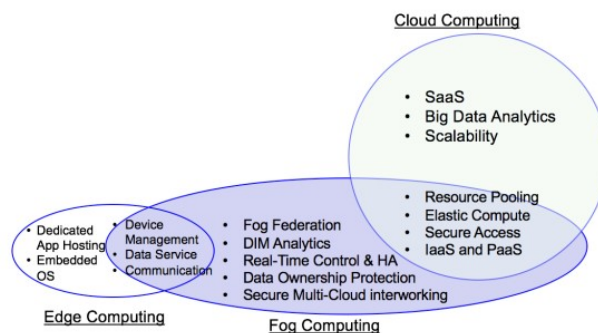
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Difference Between Cloud, Fog, Edge and Mist Computing

	Cloud Computing	Fog Computing	Edge Computing	Mist Computing
Architecture	<ul style="list-style-type: none"> Central processing based model Fulfills the need for large amounts of data to be accessed more quickly, this demand is ever-growing due to cloud agility Accessed through internet 	<ul style="list-style-type: none"> Coined by CISCO Extending cloud to the edge of the network Decentralized computing Any device with computing, storage, and network connectivity can be a fog node, can be put on railway track or oil rig. Fog computing shoves intelligence down to the local area network level of network architecture, processing data in a fog node or IoT gateway 	<ul style="list-style-type: none"> Fog computing usually work with cloud and Edge can work without cloud or fog. Edge is limited to smaller number of peripheral layers Edge computing pushes the intelligence, processing power and communication of an edge gateway or appliance directly into devices like programmable automation controllers (PACs) 	<ul style="list-style-type: none"> Middle ground between cloud and edge/fog Lightweight computing residing in the network fabric using micro-controllers and microchips Not a mandatory layer of fog computing
Pros	<ul style="list-style-type: none"> Easy to scale Low cost storage Based on Internet driven global network on robust TCP/IP protocol 	<ul style="list-style-type: none"> Real time data analysis Take quick actions Sensitive data remains inside the network Cost saving on storage and network More scalable than edge computing Operations can be managed by IT/OT team 	<ul style="list-style-type: none"> Edge computing simplifies internal communication by means of physically wiring physical assets to intelligent PAC to collect, analysis and process data. PACs then use edge computing capabilities to determine what data should be stored locally or sent to the cloud for further analysis 	<ul style="list-style-type: none"> Local decision making data Works with fog computing and cloud platform
Cons	<ul style="list-style-type: none"> Latency/Response time Bandwidth cost Security Power consumption No offline-mode Sending raw data over internet to the cloud could have privacy, security and legal issues 	<ul style="list-style-type: none"> Fog computing relies on many links to move data from physical asset chain to digital layer and this is a potential point of failure. 	<ul style="list-style-type: none"> Less scalable than fog computing Interconnected through proprietary networks with custom security and little interoperability. No cloud-aware Cannot do resource pooling Operations cannot be extended to IT/OT team 	
Misc.		<ul style="list-style-type: none"> Less sensitive and non-real-time data is sent to the cloud for further processing Fog node can be deployed in private, community, public or hybrid mode 	<ul style="list-style-type: none"> PACs (programmable automation controllers) then use edge computing capabilities to determine what data should be stored locally or sent to the cloud for further analysis intelligence is literally pushed to the network edge, where our physical assets are first connected together and where IoT data originates The current Edge Computing domain is a sub-set of Fog Computing domain. 	<ul style="list-style-type: none"> Architecture may not require Cloud

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IoT Architecture Features and Overlap Areas



Edge computing is also sometimes called “mist” computing. If clouds exist in the sky, and fog sits near the ground, then mist is what actually sits on the ground. Thus, the concept of mist is to extend fog to the furthest point possible, right into the IoT endpoint device itself

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Source :

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IoT Fundamentals: Networking Technologies, Protocols, and
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