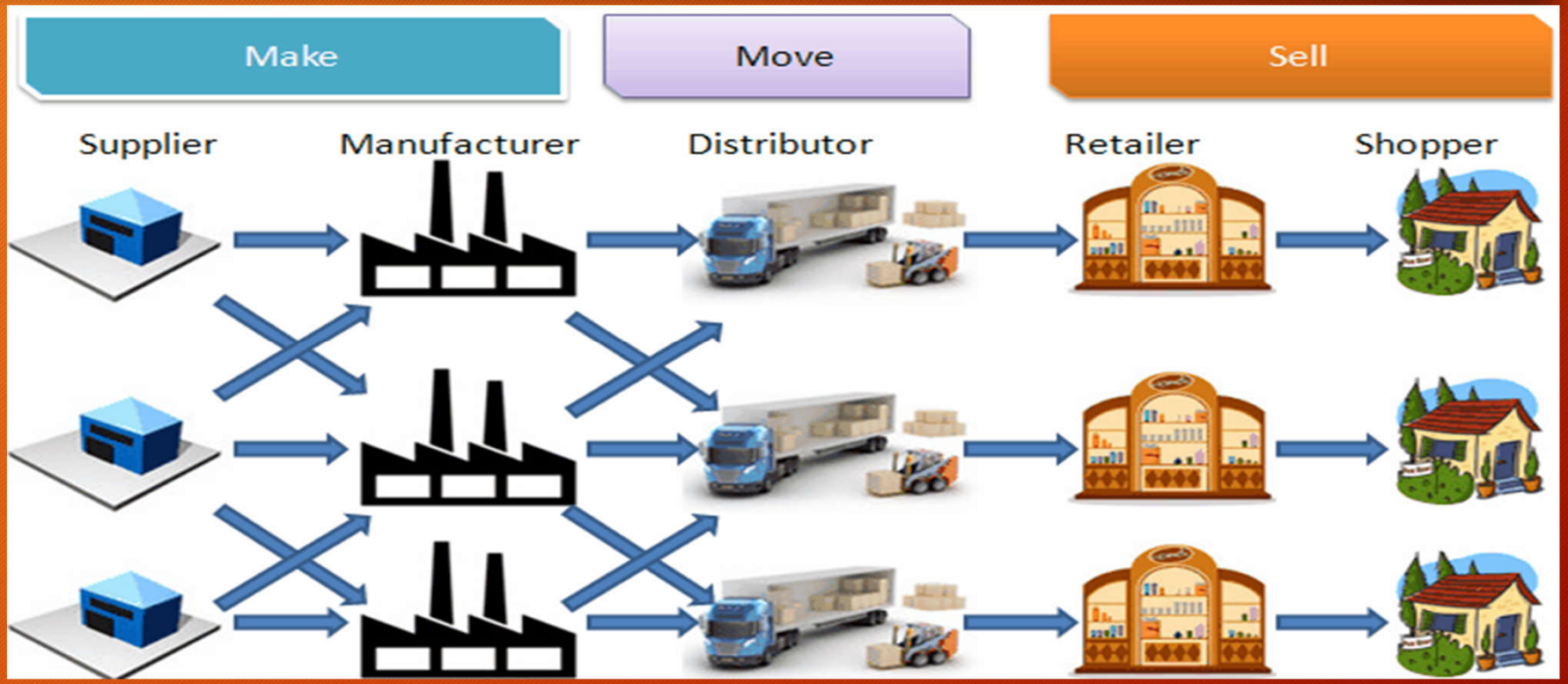
The New Frontier ?

Edge/Fog Microservices Supply Chain

Alex Pongpech

Traditional Supply Chain



Next Generation Supply Chain

Changing of Scenarios and Technologies

- Population Density
- Varied Demographics
- Consumers Behaviors
- Cloud Computing
- 5G
- Edge/Fog Computing
- AI Technology

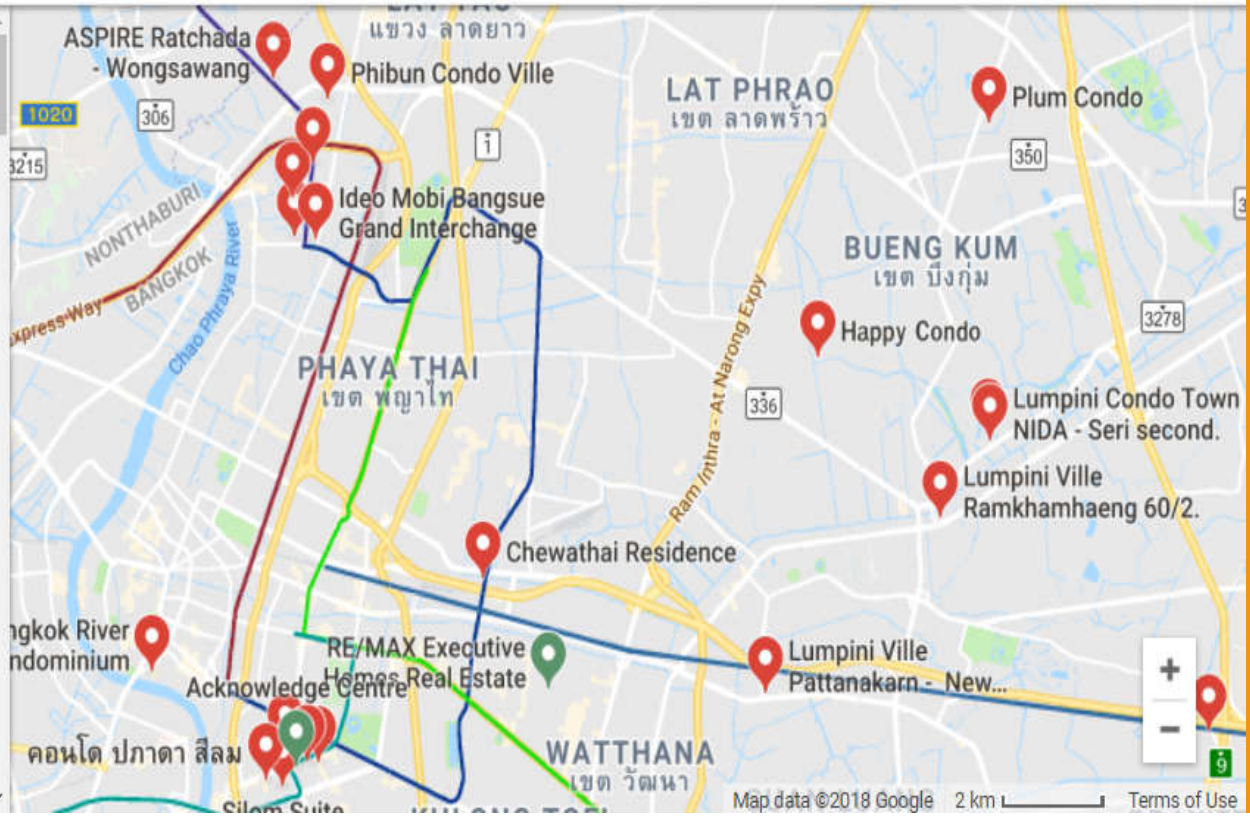
Condo

Sort by **Best match**

RE/MAX Executive Homes Real Estate
Ad 2 reviews · Real Estate Agency
9.0 km · 145 Sukhumvit Soi 39
02 018 7812
WEBSITE DIRECTIONS

Acknowledge Centre
Ad 5.0 ★★★★★ (23) · Langua...
14.2 km · 427/11 ชั้น 2 อาคารไดมอ...
081 426 7996
WEBSITE DIRECTIONS

Lumpini Condo Town NIDA - Seri second.
4.3 ★★★★★ (35)
850.0 m · 304 Seri Thai Rd
02 689 6888
WEBSITE DIRECTIONS



Betrago

Hours

A **Betagro Group**
1.5 km · 27-29 Happy Land · 02 733 0460
Open · Closes 7PM

B **เบทาโกร สาขานวมินทร์**
6.9 km · 23 Nawamin Rd
Open · Closes 7PM

C **Betagro (Organic Products)**
8.0 km · 412 Lad Prao Wanghin Rd · 02 931 6994

Tops Market

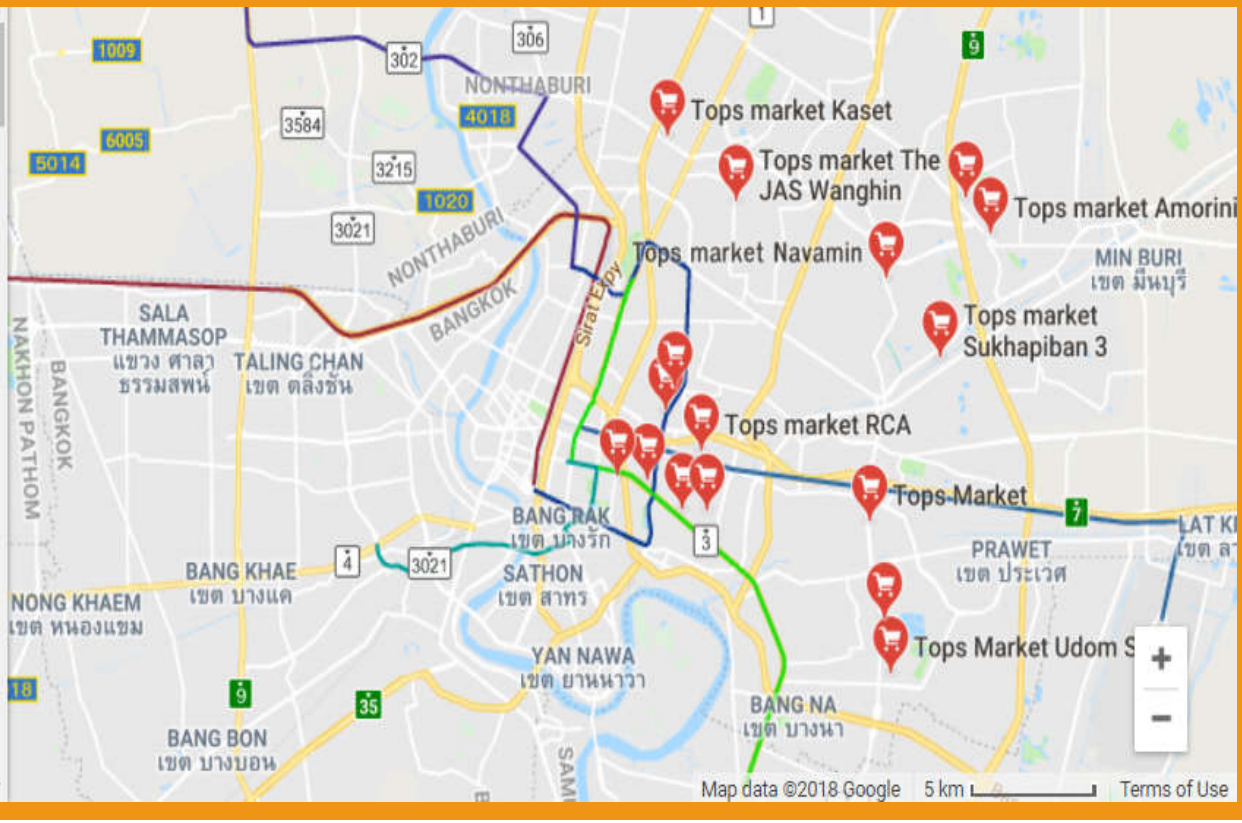
Sort by **Best match**

Tops market Sukhapiban 3
1.9 km · 59 Ramkhamhaeng Rd
02 729 4970
Closed · Opens 8AM Tue
WEBSITE DIRECTIONS

Tops market Navamin
3.4 km · 10/1300 Moo 6 Navamin ...
02 379 0452
Open · Closes 11PM
WEBSITE DIRECTIONS

Tops market Amorini
6.2 km · 1 Amorini G Fl. Suan Say...
02 919 6806
Open · Closes 10:30PM
WEBSITE DIRECTIONS

Tops Market Robinson

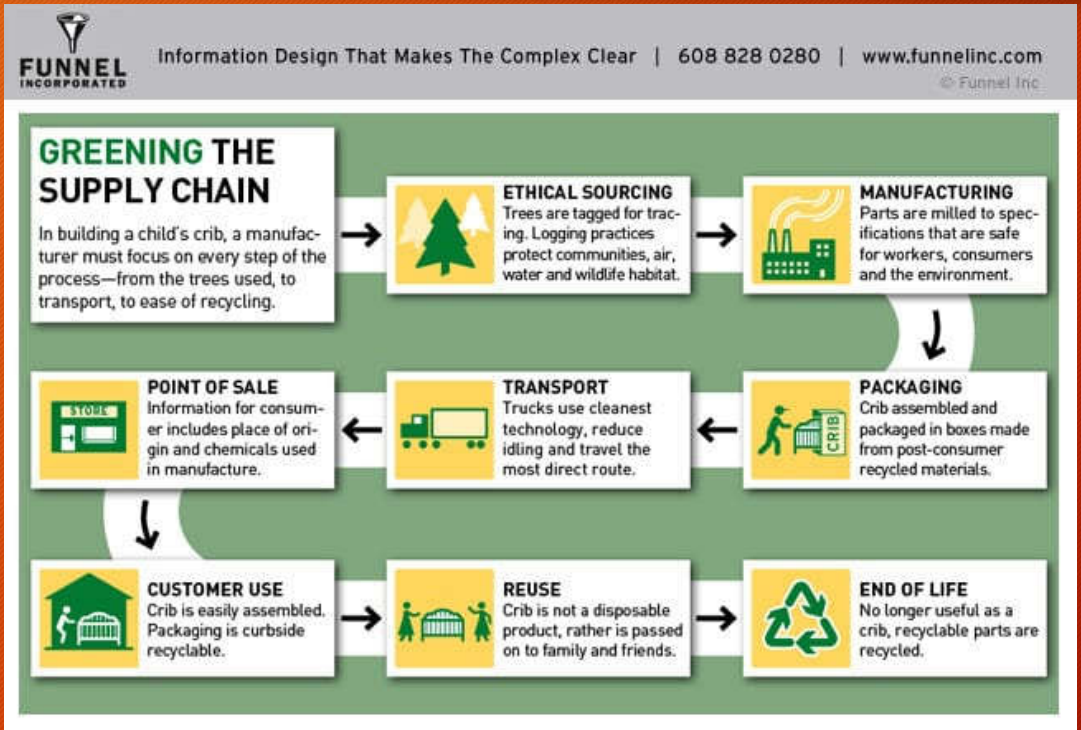


Next Generation Supply Chain

Data Driven

Next Generation Supply Chain

Green



Next Generation Supply Chain

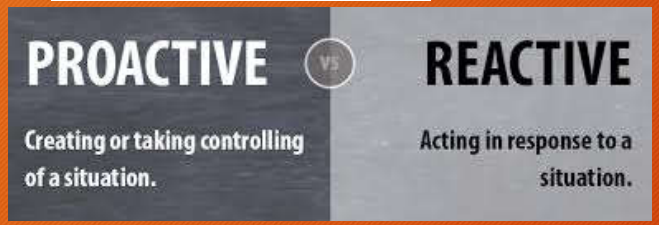
Fast

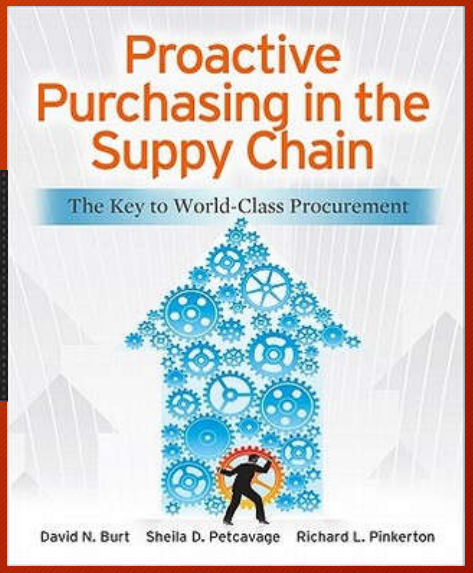
Next Generation Supply Chain

Flexibile

Next Generation Supply Chain

Proactive





Next Generation Supply Chain

- **Optimized**

What technologies would enable ?

- Data driven
- Speed
- Flexibility
- Green
- Optimized
- Proactive

Well, say hello to

- IoT
- Microservices
- Edge/Fog Computing

Internet of Things

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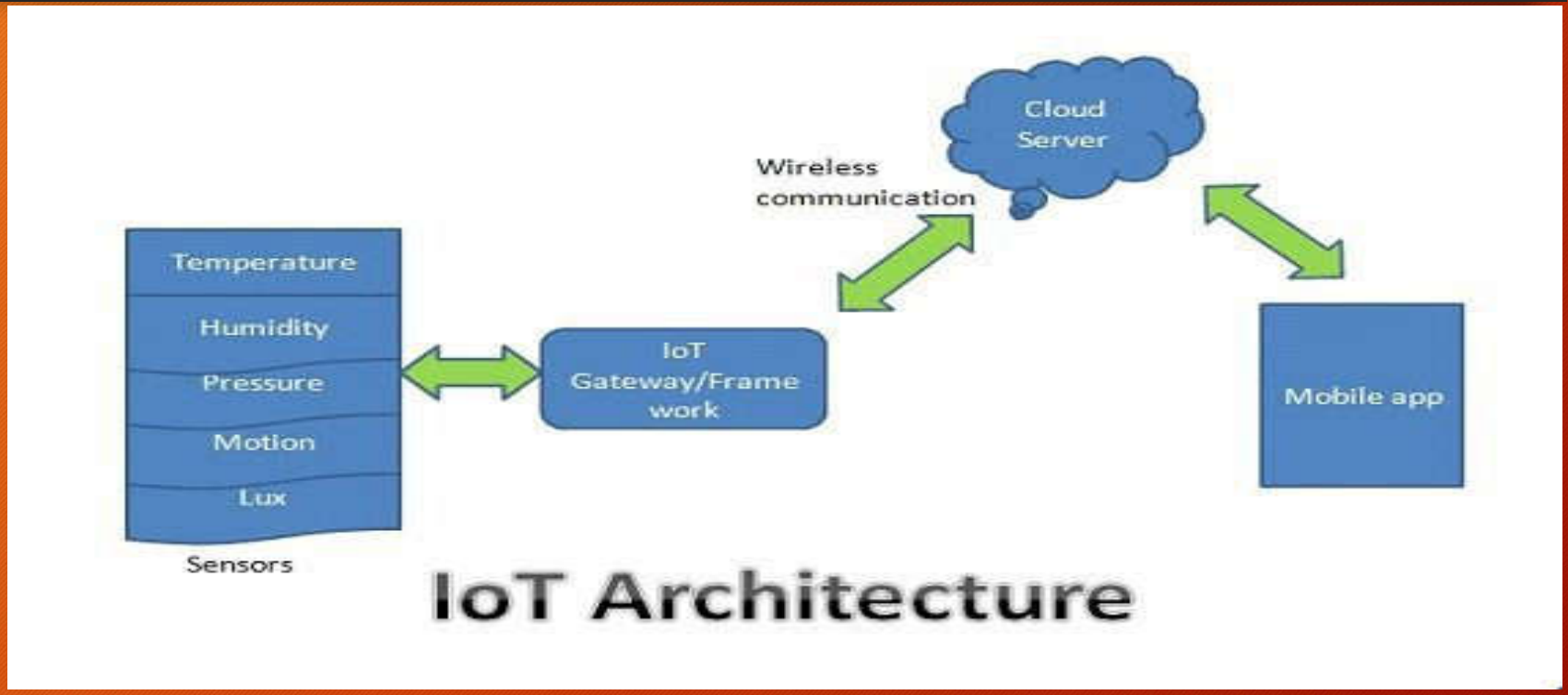
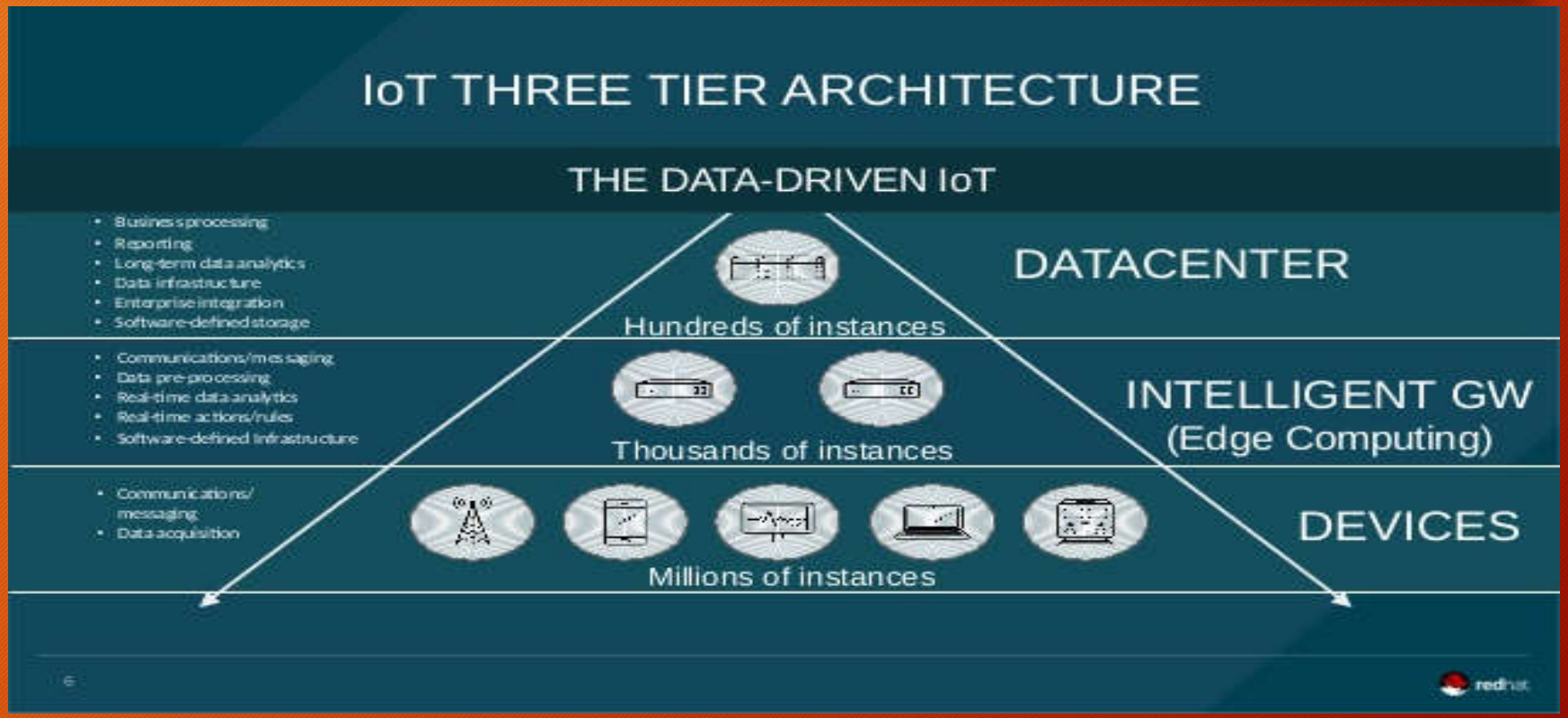
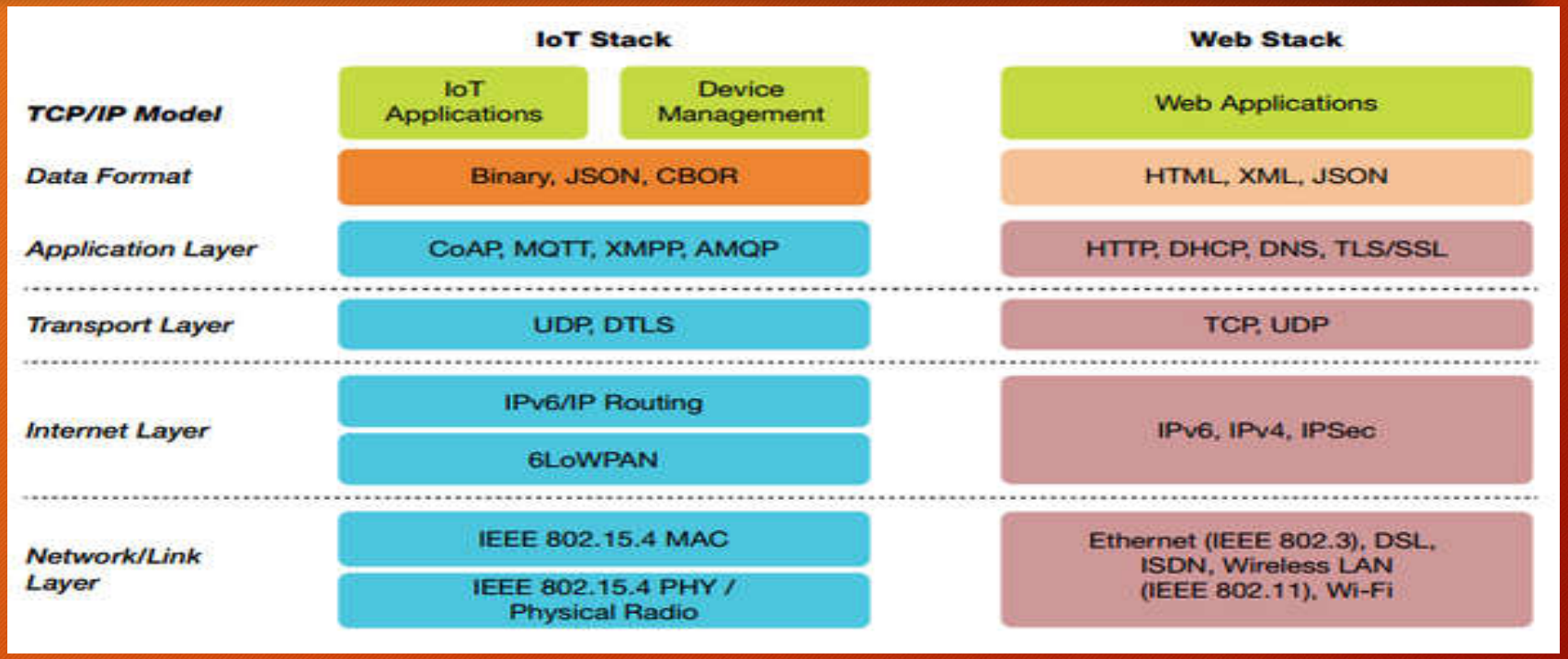
IoT Architecture



IoT Three tier Architecture



IoT Protocols



Microservices

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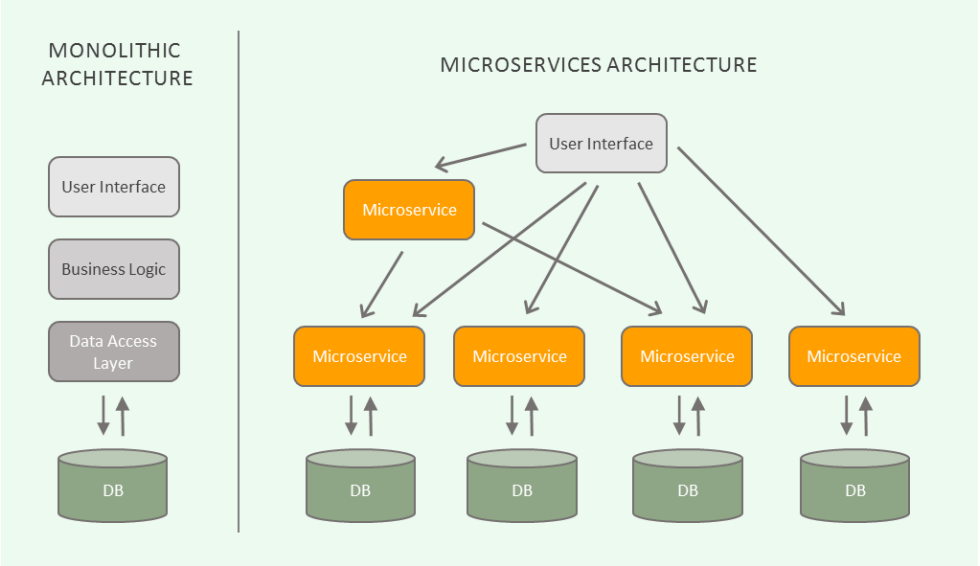
Why smaller scale/fine grained business services ?

- Data Driven Locality
- Security Containment
- Independent Manage

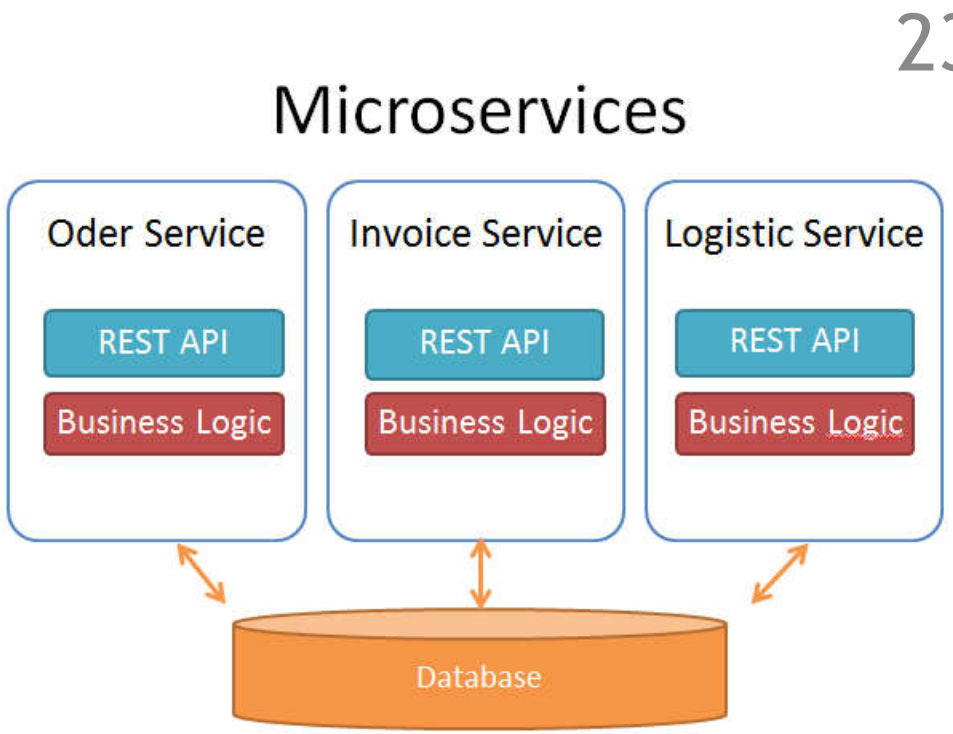
Microservices

- Microservices is a variant of the service-oriented architecture (SOA) architectural style that structures an application as a collection of loosely coupled services.

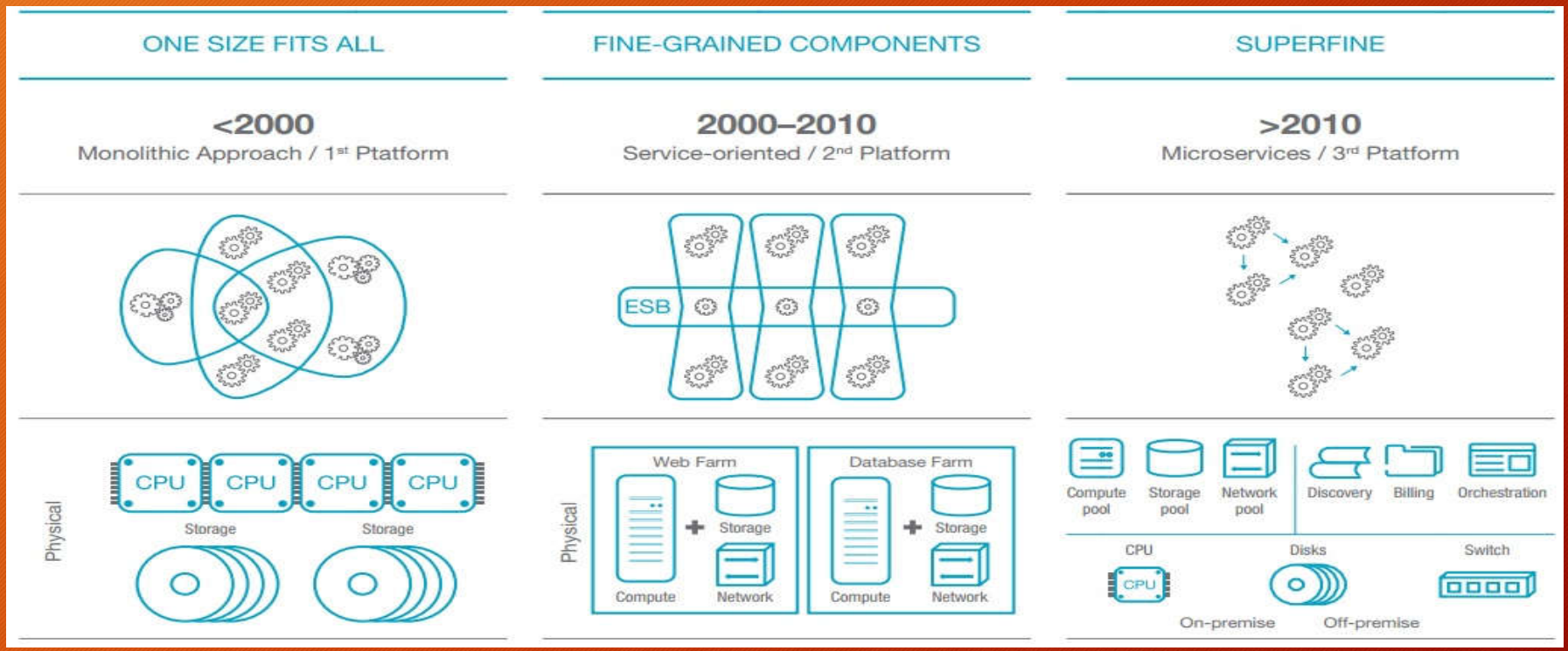


Microservices

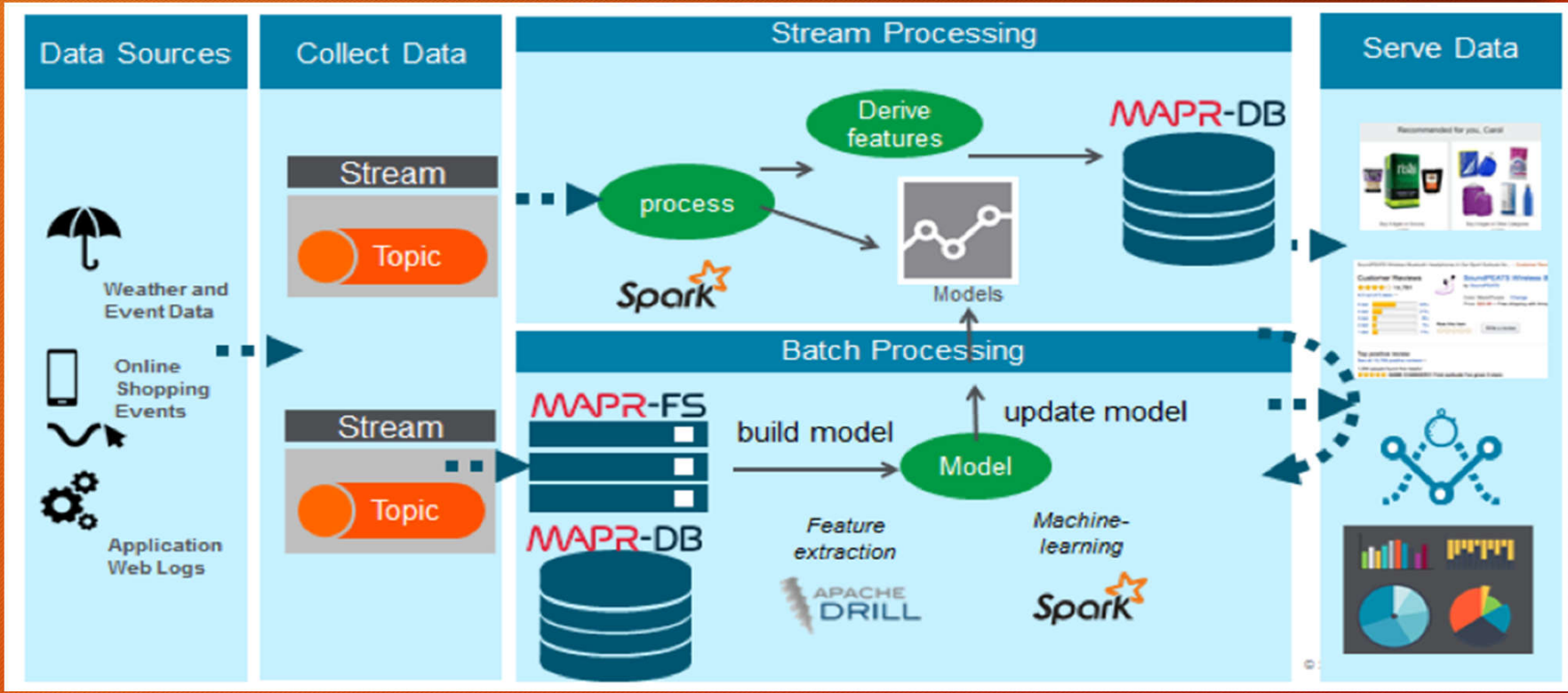
- In a microservices architecture, services should be fine-grained and the protocols should be lightweight.



We no longer need to buy one size fit all services

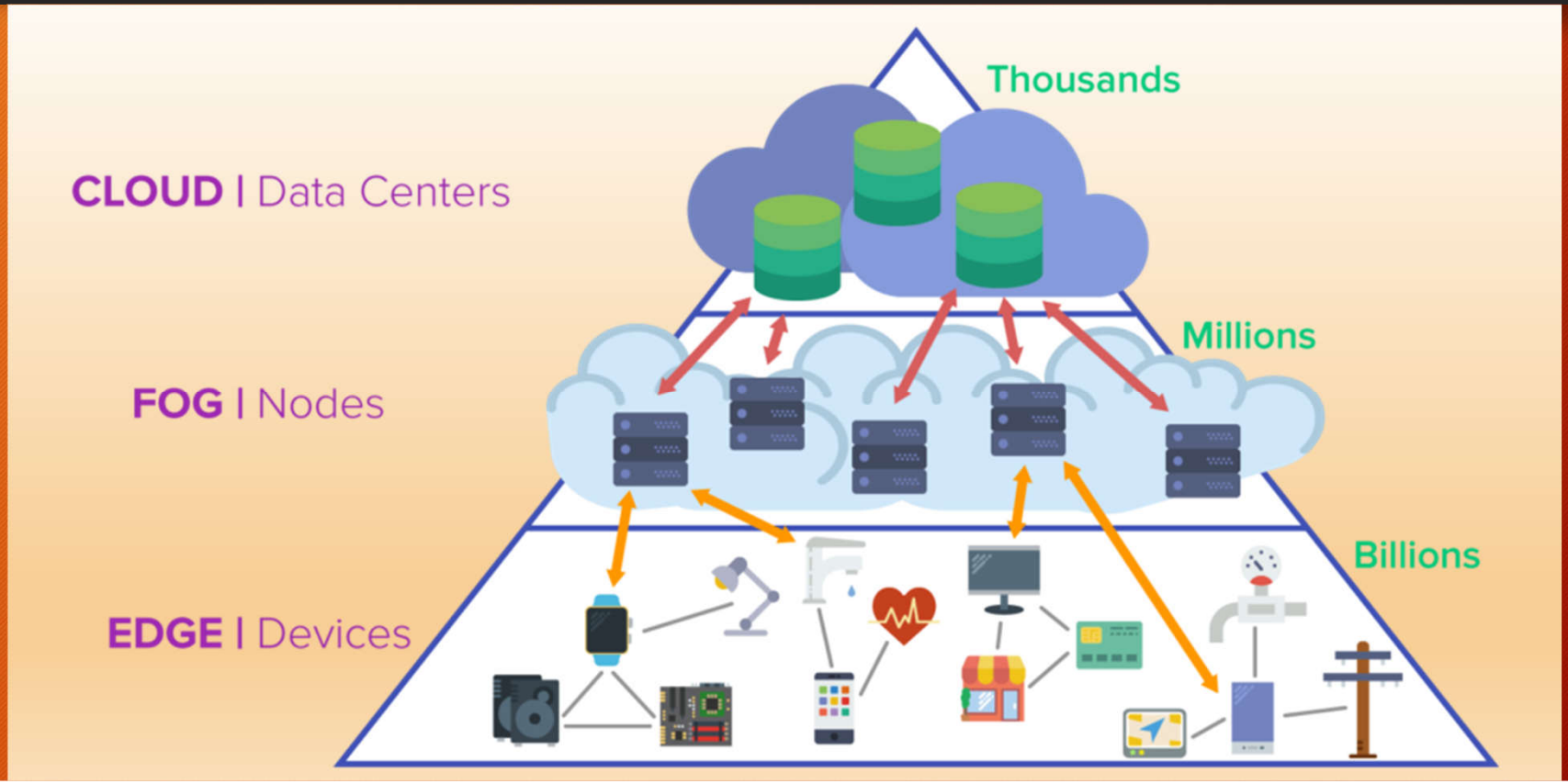


Event Driven Microservices

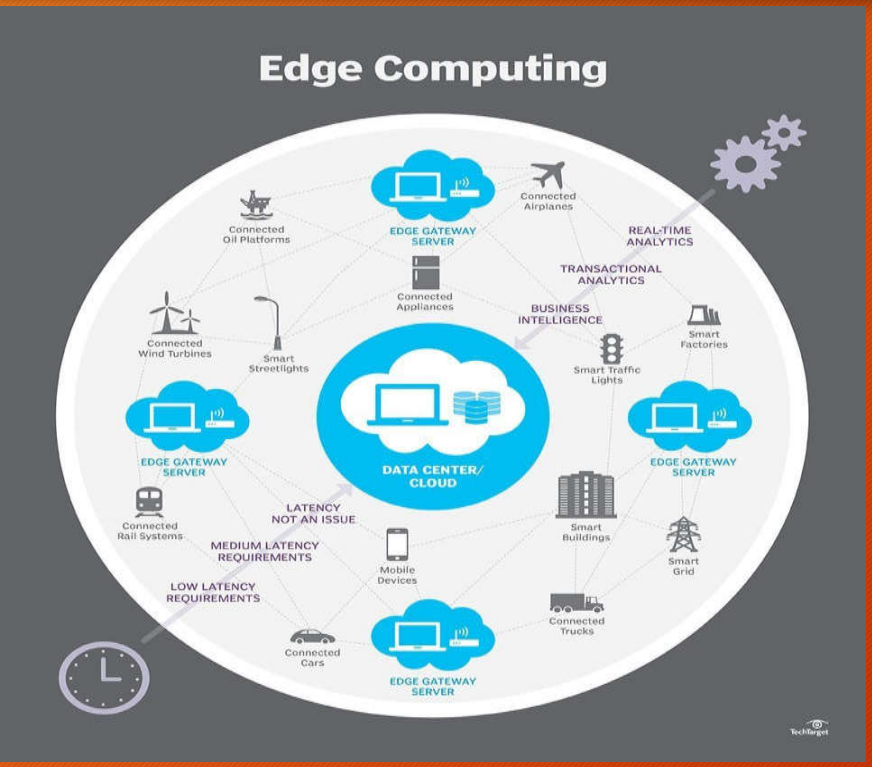


Edge and Fog Computing

Edge and Fog Computing



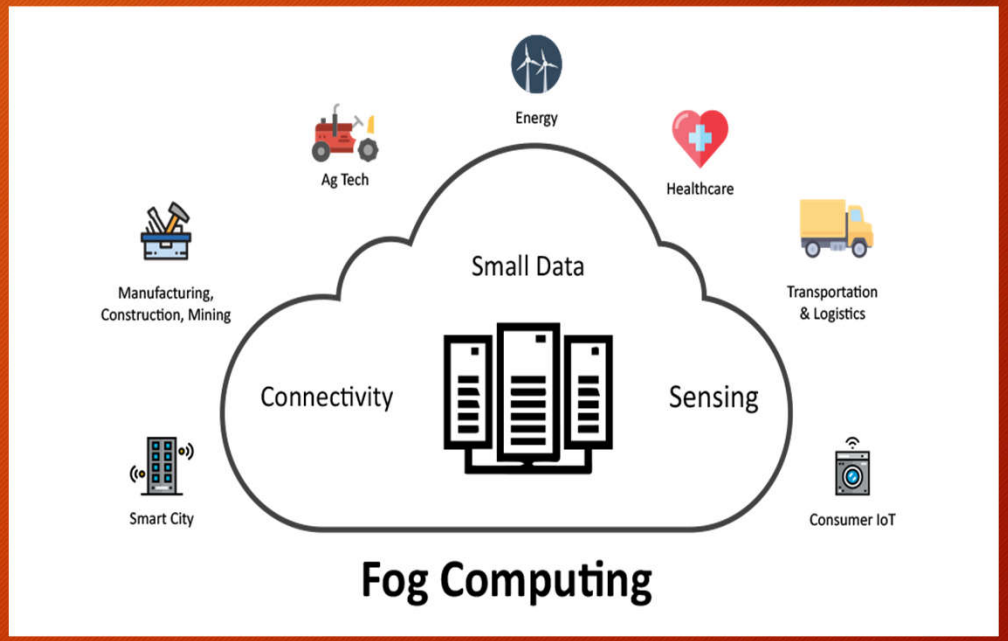
EDGE Computing



- Edge computing is a method of optimizing cloud computing systems by performing data processing at the edge of the network, near the source of the data.
- reduces the communications bandwidth needed between sensors and the central datacenter by performing analytics and knowledge generation at or near the source of the data.
- requires leveraging resources that may not be continuously connected to a network such as laptops, smartphones, tablets and sensors.

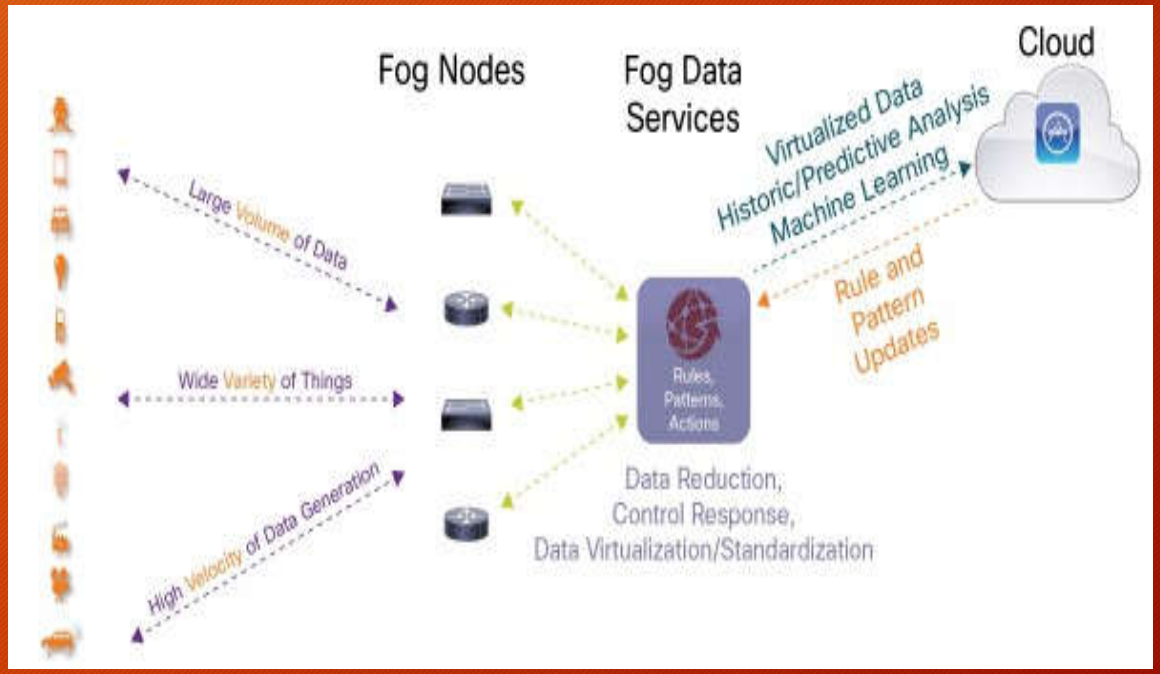
FOG computing

- Fog computing focuses processing efforts at the local area network end of the chain.
- Data is gathered, processed, and stored within the network by way of an IoT gateway or fog node.
- Information is transmitted to this gateway from various sources in the network where it is processed and pertinent data, as well as any additional commands, are transmitted back out to the necessary devices.



FOG computing

- When compared to edge computing, fog computing is more scalable as it gives a centralized processing body a more big-picture view of the network as it has multiple data points feeding it information.



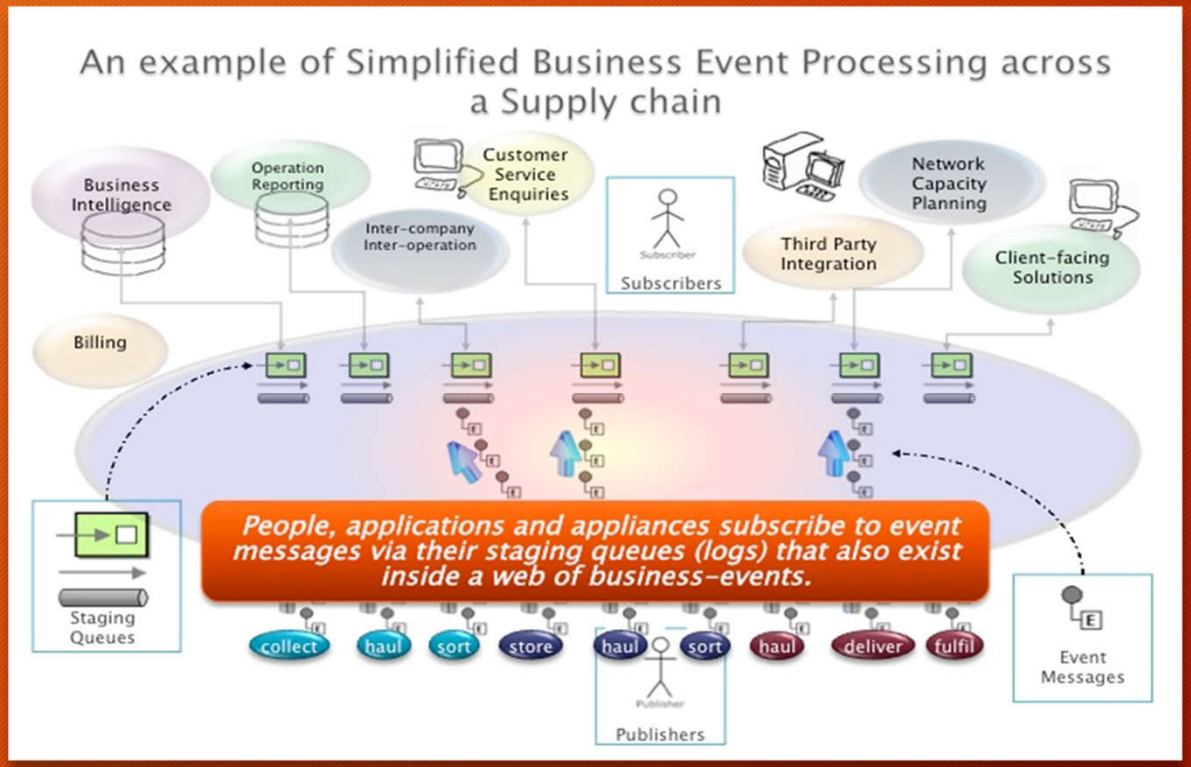
Advantages

- Edge application services significantly decrease the volumes of data that must be moved, the consequent traffic, and the distance the data must travel, thereby reducing transmission costs, shrinking latency, and improving quality of service (QoS).
- Edge computing eliminates, or at least de-emphasizes, the core computing environment, limiting or removing a major bottleneck and a potential point of failure. QUICKER SERVICES
- Security improves as encrypted data moves further in, toward the network core. As it approaches the enterprise, data is checked as it passes through protected firewalls and other security points, where viruses, compromised data, and active hackers can be caught early on. MORE SECURE
- The ability to "virtualize" (i.e., logically group CPU capabilities on an as-needed, real-time basis) extends scalability. The edge-computing market generally operates basically on a "charge for network services" model, and it could be argued[original research?] that typical customers for edge services are organizations desiring linear scale of business application performance to the growth of, e.g., a subscriber base. FINER SCALE

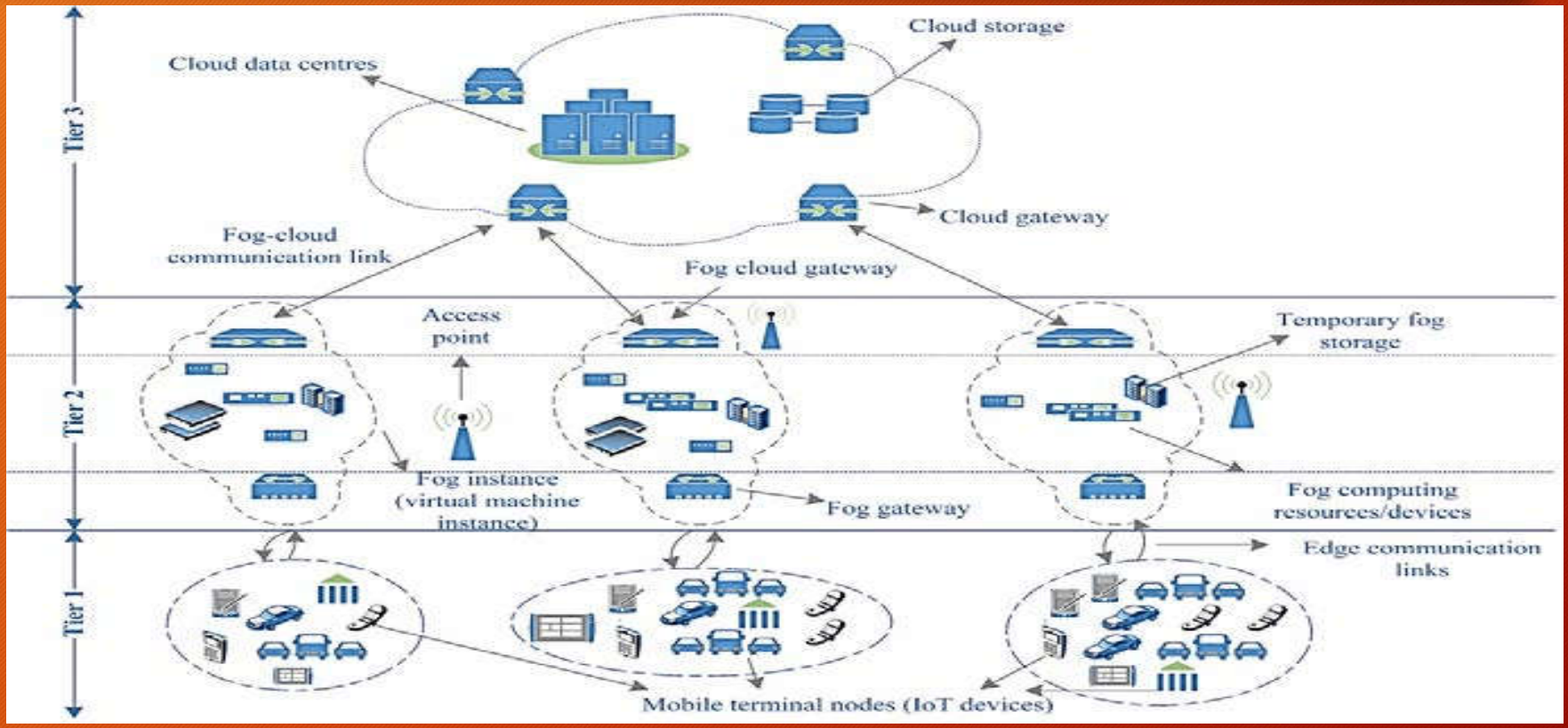
Putting them together

Traditional shop

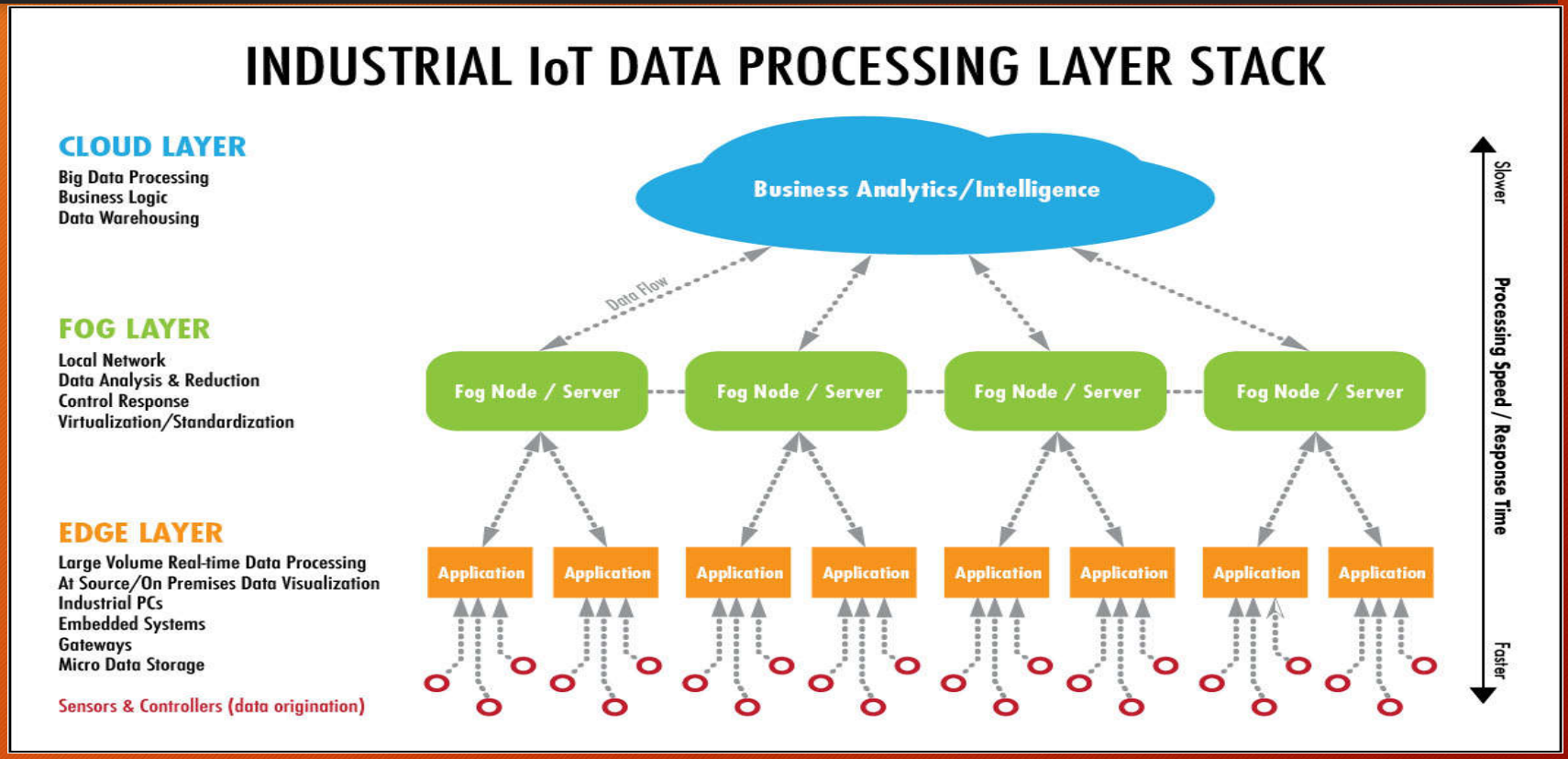
Online microservice shop



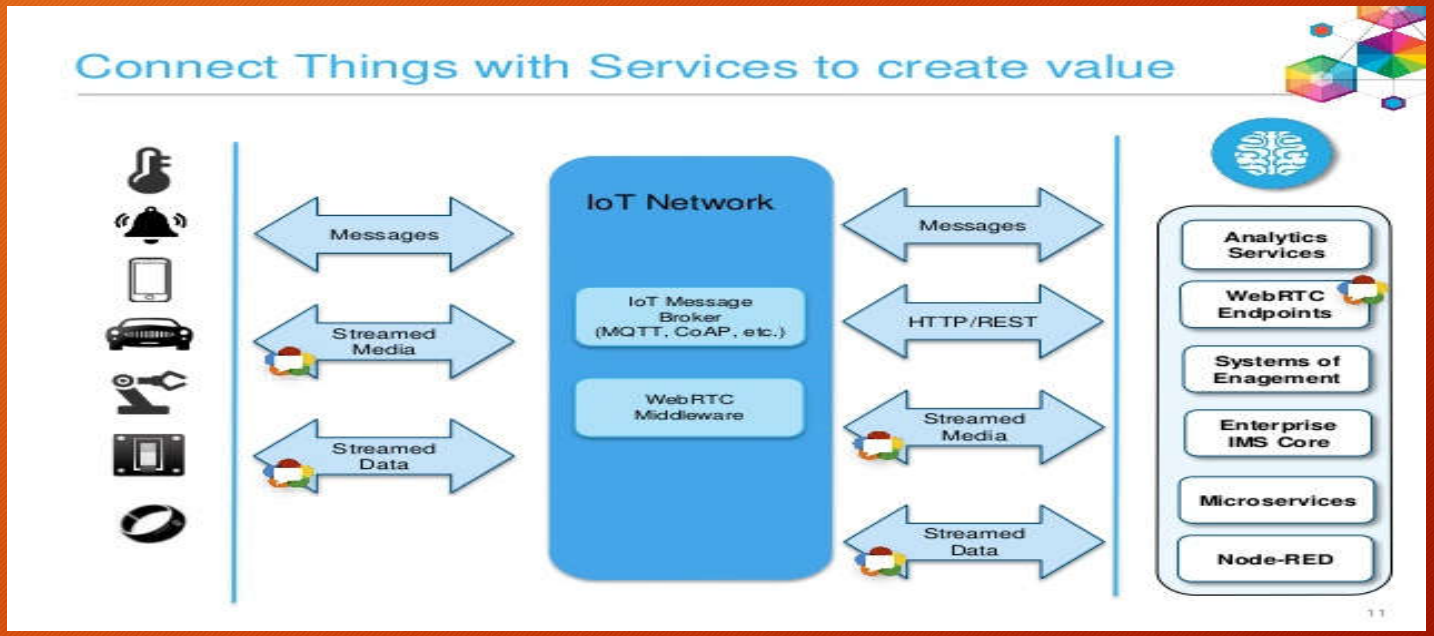
Edge and Fog Applications



Edge and Fog Applications

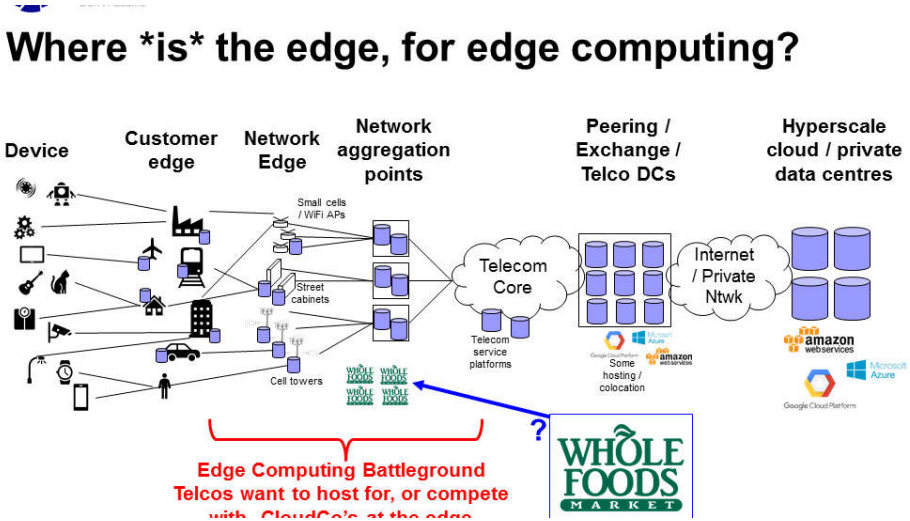


Edge, Fog, and Applications

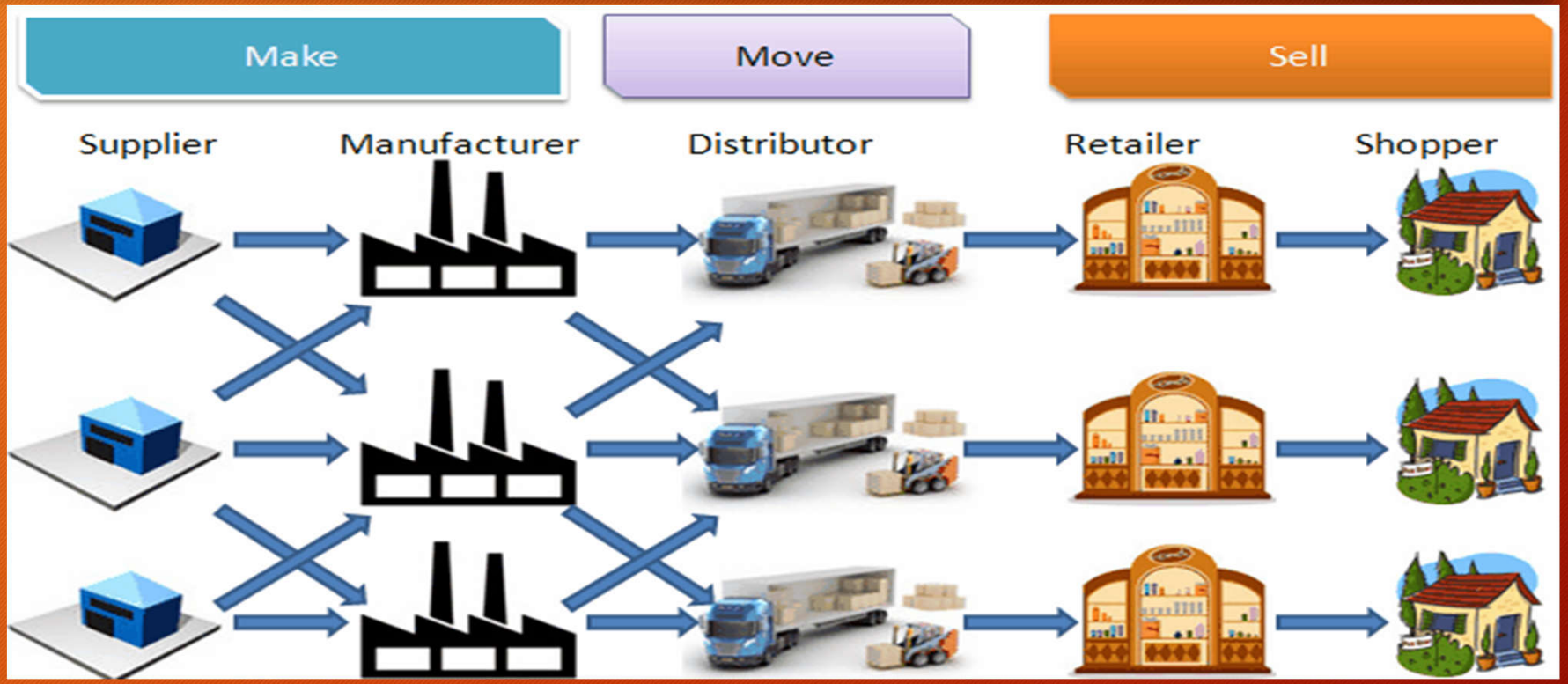


Edge/Fog Supply Chain

- From the farmers directly to customer
- From micro warehouses to customers and customers to micro
- From warehouses to micro-warehouses and vice versa
- From raw material producers to
- Everyone can be both supplier distributors and customers



Traditional Supply Chain



Where are we going?

References

1. https://channels.theinnovationenterprise.com/articles/the-7-characteristics-of-the-next-gen-supply-chain
2. https://www.winsystems.com/cloud-fog-and-edge-computing-whats-the-difference/
3. https://martinfowler.com/articles/microservices.html
4. https://hackernoon.com/learning-these-5-microservice-patterns-will-make-you-a-better-engineer-52fc779c470a
5. N. Alshuqayran, N. Ali, R. Evans, "A Systematic Mapping Study in Microservice Architecture", Proc. of the 9th International Conference on Service-Oriented Computing and Applications. IEEE, 2016.
6. https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7742262
7. https://tc.computer.org/tccld/fog-computing/
8. Alan Sill, "Cloud Native Standards and Call for Community Participation", Cloud Computing IEEE, vol. 4, pp. 56-61, 2017, ISSN 2325-6095.