

# IOT Architectural Patterns Applied

*Your  
company  
logo here*

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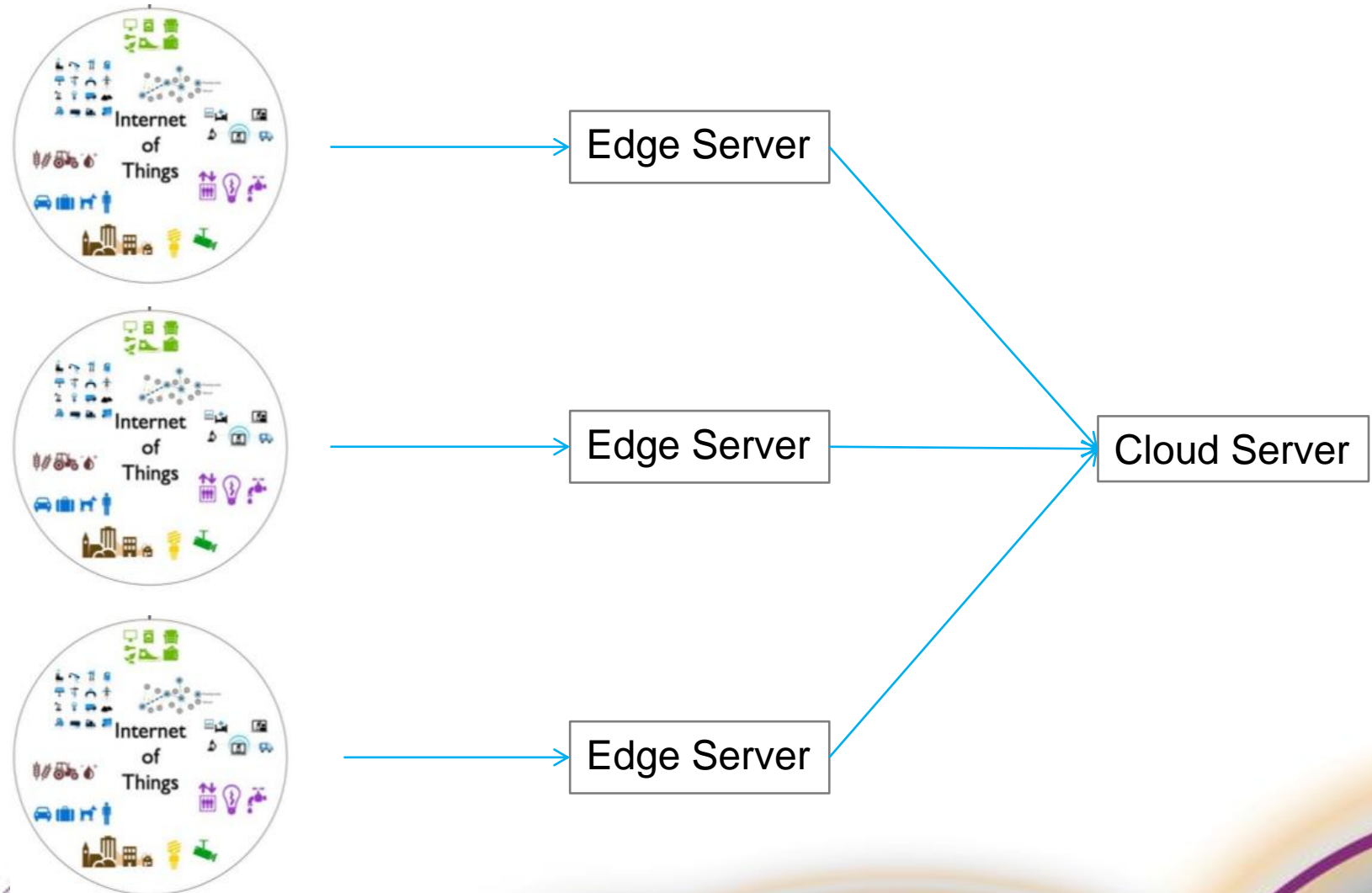
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MEDIA

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**DEVELOPER**  
**SUMMIT**





# Tiered Data Percolation & Processing



# IOT Infrastructure Services

Real time Dashboard

Plugin APIs

Machine Learning

Provisioning & Deployment

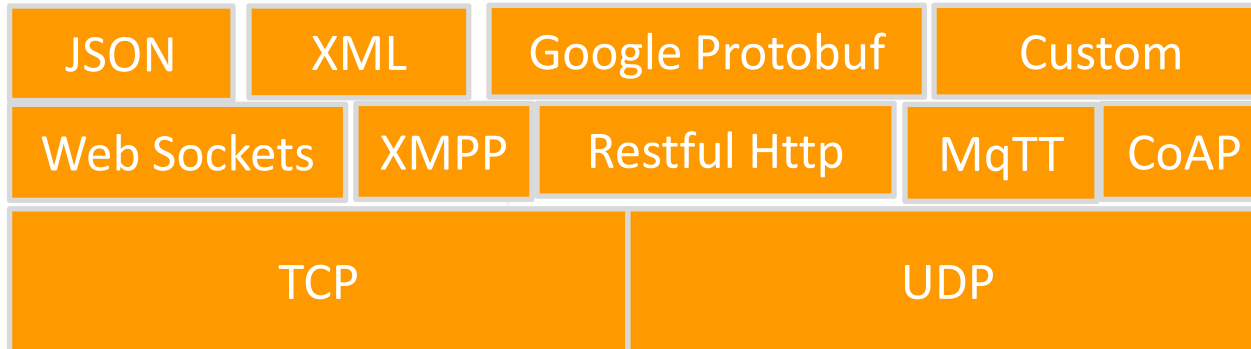
In-Stream Computing

Batch Analysis

Persistency

Data Ingestion & Lineage

# Sensors to Edge Server Communication



1. Number of Sensors Support
2. Throughput (Messages / Sec)
3. Network bandwidth overhead
4. Battery Usage
5. Resource constraint sensors/devices

# Protocol Comparison

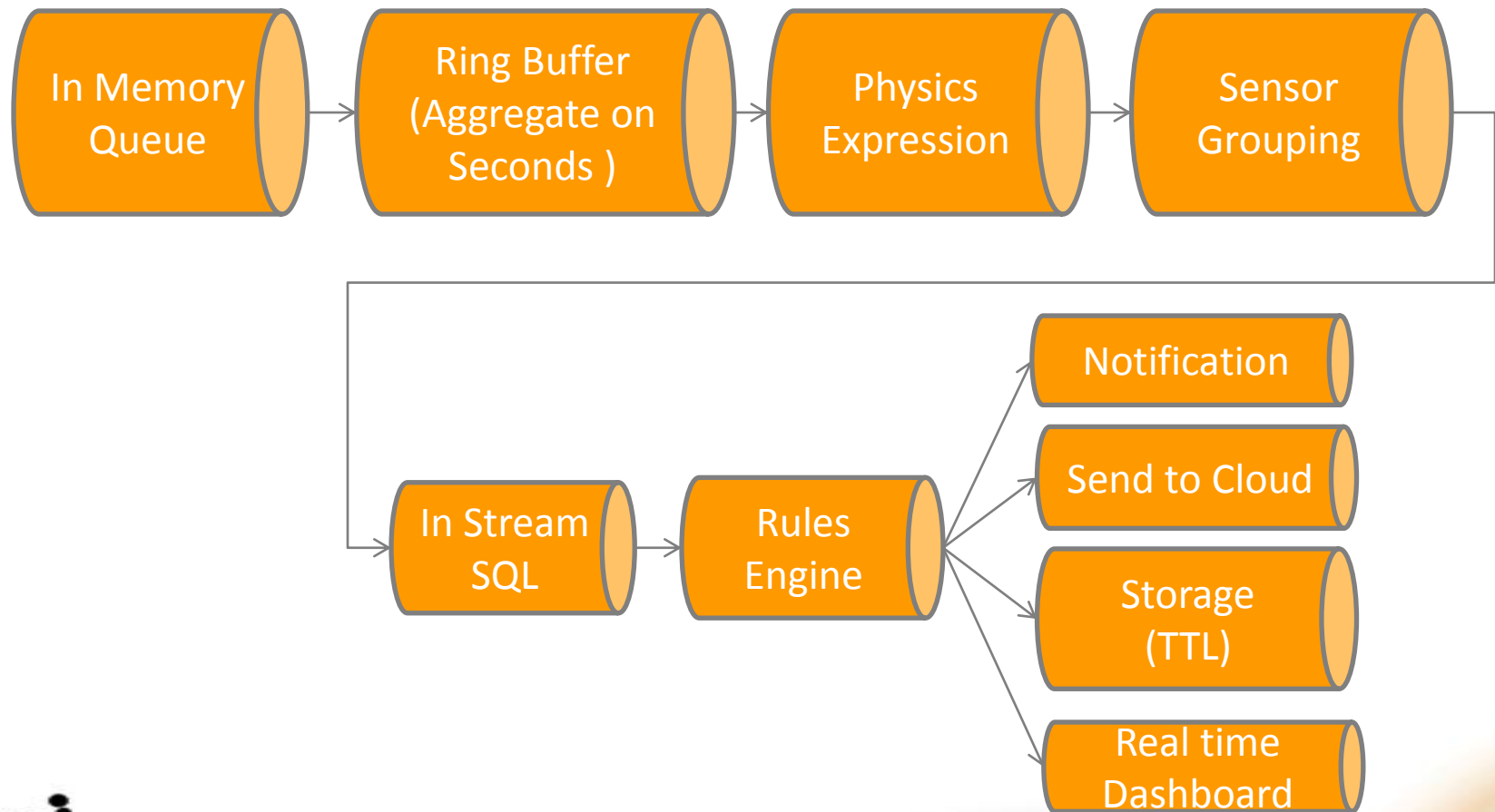
Protocol	CoAP	AMQP	Restful HTTP	MQTT
Transport	UDP	TCP	TCP	TCP (TLS/SSL)
Message	Req-Res	Pub-Sub Req-Res	Req-Res	Pub-Sub Req-Res
# Sensors	100 K	10K	10K	10K
#Messages	500K	500K	10K	500K
Sporadic Connection	Good	Reconnection overhead is high	Reconnection overhead is high	Reconnection overhead is high
Bandwidth	Observer pattern avoids http polling. Save Battery		ASCII headers overhead for small messages - Tax battery	Less Bandwidth for small message Save battery
Security	Datagram TLS	SSL/TLS	SSL/TLS	SSL/TLS

# A good broker makes it effective.

Protocol	CoAP	AMQP	Restful HTTP	MQTT
Broker	Apache Mina	Apache Qpid	Netty	Apache Moquette
Using			Netty	Netty +Ring buffer

Clients	30	100	1,000	5,000
Nginx module(1C)	1	4	32	3,047
Nginx module(Multi-core)	1	6	205	3,036
Erlang(1C)	3	8	629	6,337
Erlang(Multi-Core)	2	7	223	3,084
Java, Netty	1	3	3	3,084
Go	26	33	47	9,005

# Processing at Edge Server – Pipeline

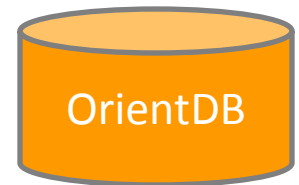
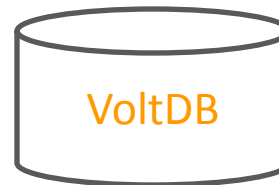




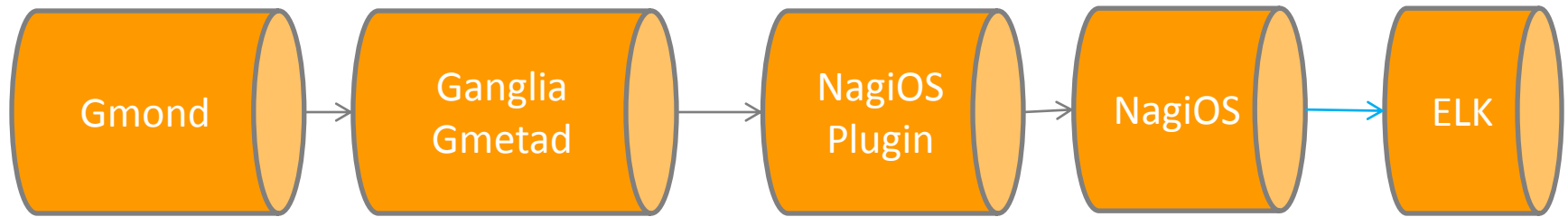
# Choosing the database

Time To Live  
Read Heavy  
Write Heavy  
SQL Support

No Transactions  
Write Once  
Single Writer (Async)  
Multi Reader



# Centralizing Monitoring



Thank you!