From leading edge IoT Protocols to Python Dashboarding an End2End Journey

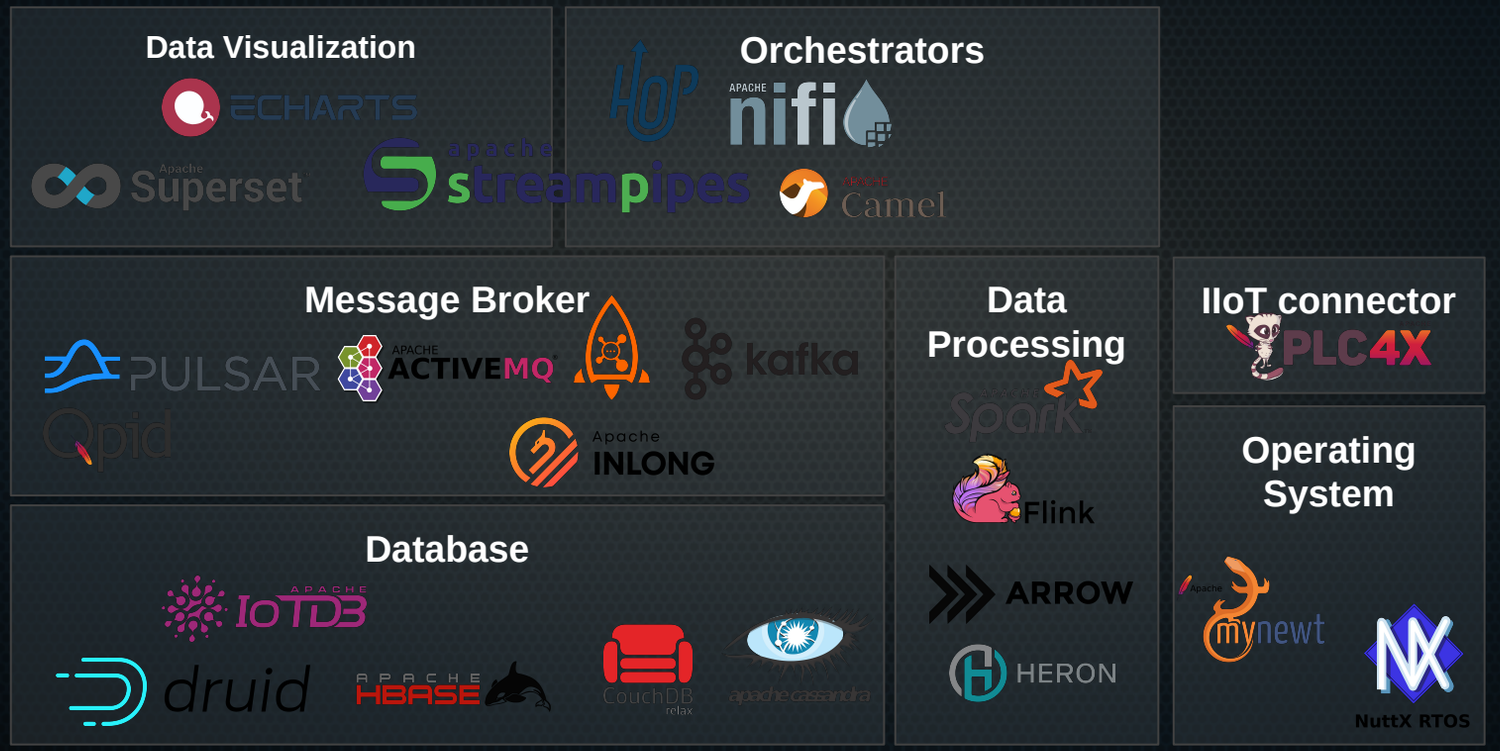
Who am I

- Part of the PLC4X community
- By Day: Domain (Enterprise) Architect
- By Night: Open Source Enthusiast
- Pythonista
- PyData Copenhagen & Frankfurt
- I connect People, Processes, Data and Machines

@ot_luk

otluk

Apache Projects in context of IoT (extract)



IoT Protocols

Connecting IoT devices – OSI Model

1. Physical (Bluetooth, Ethernet, LTE, NFC, RFID, Wi-Fi, Z-Wave, Zigbee)
2. Data link (IEEE 802.15.5, LPWAN)
3. Network (IP, 6LoWPAN)
4. Transport (Transmission Control Protocol (TCP), User Datagram Protocol (UDP))
5. Session
6. Presentation
7. **Application**

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https://en.wikipedia.org/wiki/OSI_model

IoT Protocols – Application Layer

- Advanced Message Queuing Protocol (AMQP)
- Constrained Application Protocol (CoAP)
- Data Distribution Service (DDS)
- Message Queue Telemetry Transport (MQTT)
- Lightweight Machine to Machine (LwM2M)

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Advanced Message Queuing Protocol (AMQP)

- Popular Apache Frameworks:
  - https://activemq.apache.org/
  - https://pulsar.apache.org/
  - https://qpid.apache.org/index.html
- Properties
  - Brokered
  - Publish / Subscribe
  - Direct Exchange

Message Queue Telemetry Transport (MQTT)

- Popular Apache Frameworks:
  - https://streampipes.apache.org/
  - https://activemq.apache.org/

- Properties
  - Tied to TCP
  - Publish / Subscribe
  - Brokered

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Data Distribution Service (DDS)

- Popular Apache Frameworks:
  - https://mynewt.apache.org/
  - https://nuttx.apache.org/
- Properties
  - Publish / Subscribe
  - Peer-to-Peer

And many more...

- Checkout PLC4X 8-)
  - https://plc4x.apache.org/
    The universal protocol adapter for Industrial IoT

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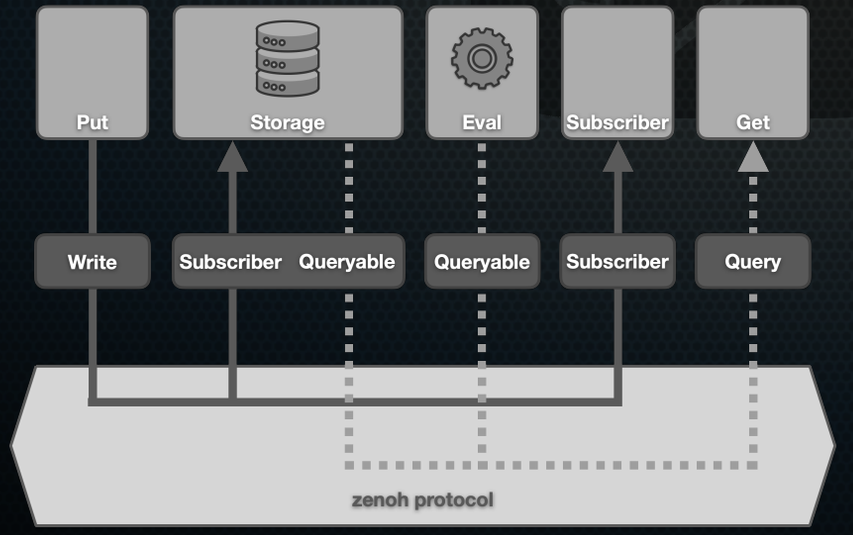
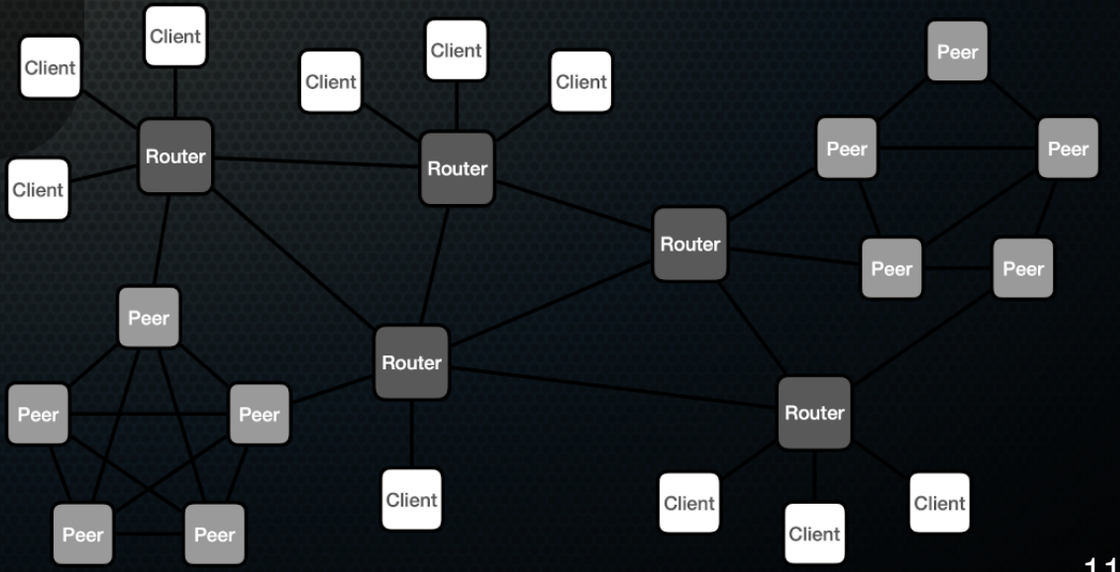
Zenoh

- Zenoh unifies data in motion, data at rest and computations.
  It elegantly blends traditional pub/sub with geo distributed storage, queries and computations, while retaining a level of time and space efficiency that is well beyond any of the mainstream stacks.
  - Zero Overhead Pub/sub, Store/Query and Compute.





Panel

HoloViz

- A high-level app and dashboarding solution for Python
  - Use the PyData tools and plotting libraries that you know and love
  - Develop in your favorite editor or notebook environment and seamlessly deploy the resulting application
  - Stream data large and small to the front end
- Integrates for instance Apache Echarts

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Apache IoTDB

- IoT native database with high performance for data management and analysis
- Checkout Apache Con Asia for more details

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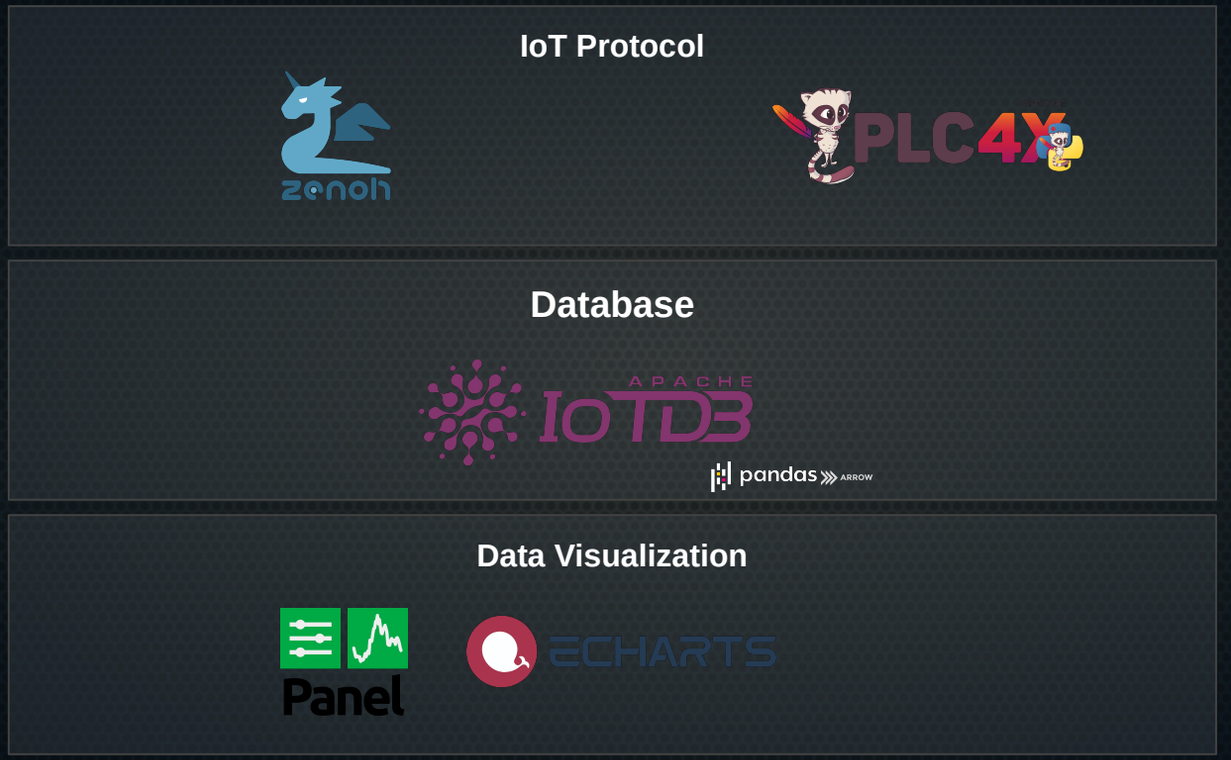
ZIP / PIP Stack



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Github Repo: https://github.com/ottlukas/ApacheCon_2022_IoT

Thank you!

Questions?

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