Applications Services Face-to-Face Meeting

Boston, MA – Jan 24-25th

Dell EMC, Cambridge

Proposed Agenda

Thursday, 9am

- Introductions/approval or adaptation of the agenda

9:30am – review of the current state, rationale for change, current high-level thinking

- Export Services Review
- Non-scalable solution and other issues
  - Can't be all things to all people
  - Too big and not easily customized
  - Copying event per client won't scale
- Application Services concept
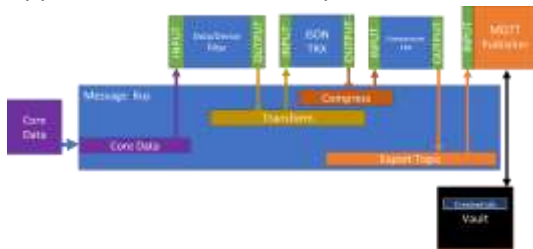
10:30am – Ideation and Architecture

- Architectural Discussions
  - Message Bus
    - Which one?
    - Requirements, tradeoffs, selection discussion
    - Message Broker or Broker less?
      - What's the allowance impact to EdgeX footprint?
    - Brokered options include: Mosquitto, Paho, Apache ActiveMQ, Apache Apollo, RabbitMQ, Qpid, NATS
    - No Message Broker options include: 0MQ, Nanomsg, GRPC, Thrift
  - Functions collected in a single "micro service" or just hang off the bus?
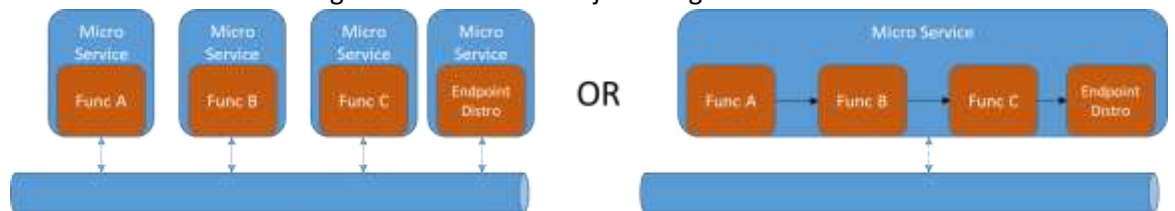
  - How do we support multiple application needs and multiple endpoints (I want to send JSON to Azure but XML to my enterprise server)?
  - FAAS (if not now, how do we prepare for possible FAAS in the future)

- What's the list of functions (long term) needed?
    - Filter (only give me readings from device A; only give me readings regarding temperature, …)
    - Validator (device ID, reading against value descriptor, …)
    - Transformation (convert C to F values, convert CBOR to Protobuf, …)
    - Enrich (add device metadata to reading, …)
    - Format (JSON, XML, CSV, …)
    - Encrypt (really different kind of transformation)
    - Compress (really different kind of transformation)
    - Custom (black box that you define what you want to happen inside)
- Security
    - What needs to be secured? (Endpoints, encryption function?)
    - How are secrets provided and managed?
- Impact to platform independence?
- Can the function micro services be language independent?

3pm – Implementation Specifics

- Design Details
    - Message infrastructure configuration
        - Preconfigured channels/topics
        - How accomplished?
        - Any abstractions to the message infrastructure needed?
    - APIs for the "functions"
        - Interface definition sufficient to let developers start work
    - Data hand off between functions – what is the schema and format of the object going through the pipeline?
    - How and what do we secure?
        - Endpoint connection security (tokens to cloud products)
        - Data encryption secrets/certs
    - Core data – any changes necessary?
        - ZeroMQ replacement?
    - Implementation tools/framework considerations
        - Go, GoKit, …
    - How do we support EdgeX internal local analytics (rules engine)?
    - How do we address CBOR payloads?
        - Is this a future consideration?
        - If so, do we need to refactor export services?
    - What is needed to integration with System Management?
    - How do we test these new functions and services as a whole?
        - Integration tests?
        - Black box testing
    - How do we containerize the infrastructure and micro services?
    - Impact to CI/CD
- What is MVP for Edinburgh

- o Add additional subscriber to ZeroMQ
- o Potential message bus containerization
- o Specific MVP micro service functions to be implemented for Edinburgh
  - Suggested: filter, transform to JSON, compress
- o Specific MVP endpoint distributors to be implemented for Edinburgh
  - Suggested: MQTT endpoint
- o CI/CD jobs
- o Blackbox tests
- Who is doing what work for Edinburgh
  - o Task assignments
  - o Immediate action items
  - o Issue creation in Github

Friday, 9am

- Pick up on any unfinished business from the previous day
- Future Considerations
  - o Which cloud providers must we support going forward?
    - Azure IoT
    - AWS IoT
    - Google IoT Core
    - ???
  - o What types of endpoints will we support going forward?
    - HTTP(s)
    - MQTT(s)
    - AMQP
    - XMPP
    - WebSockets
    - CoAP
    - Specific Cloud providers (above)
  - o What functions are next after MVP functions?
    - Is there a call for help that we can make to the community to accelerate some of these?
    - Can we call on various community application and standard providers to help if we have them well documented?
      - Haystack
      - SAP Hana
      - …
  - o Can we architect this for SDK like behavior in the coming releases? What would an SDK look like? What would it do?
    - How can we make it simple(r) for users to construct new application services from a collection of existing functions?
    - How can we make it simple(r) for users to construct new functions and include them in the pipeline?

- o Would there ever be a need for a client like we have with export services? Could an application service be dynamically programmed or configurable?
  - o What parts of this architecture are subject to change or user customization? Where do we need to provide more loose coupling going forward?
  - o How do we support inclusion of commands going forward?
    - Ex: How can we provide Azure IoT or some endpoint with command API details for actuation?
    - EdgeX Roadmap item: how to provide actuation context to the north side.
  - o Can we think about QoS levels in the future? How would that be incorporated?
- Tasks, action items review