# EdgeX Planning Conference (virtual meeting)

Jakarta Release

June 21-25

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# Conference Agenda – Day 1

- Jun 21, Monday (all times in PST; all times tentative and fluid)
  - 7am Introductions & Logistics
  - 7:30am Business Topics
  - 9:30am Architecture topic tee-up
    - Not a deep dive on the architectural concerns
    - An overview of the topics to be discussed
    - Allow attendees to get up to speed and get context prior to the architectural debates
  - 11am day 1 adjourn

# EDGEXFOUNDRY™

## Intros

Name, rank, serial number please
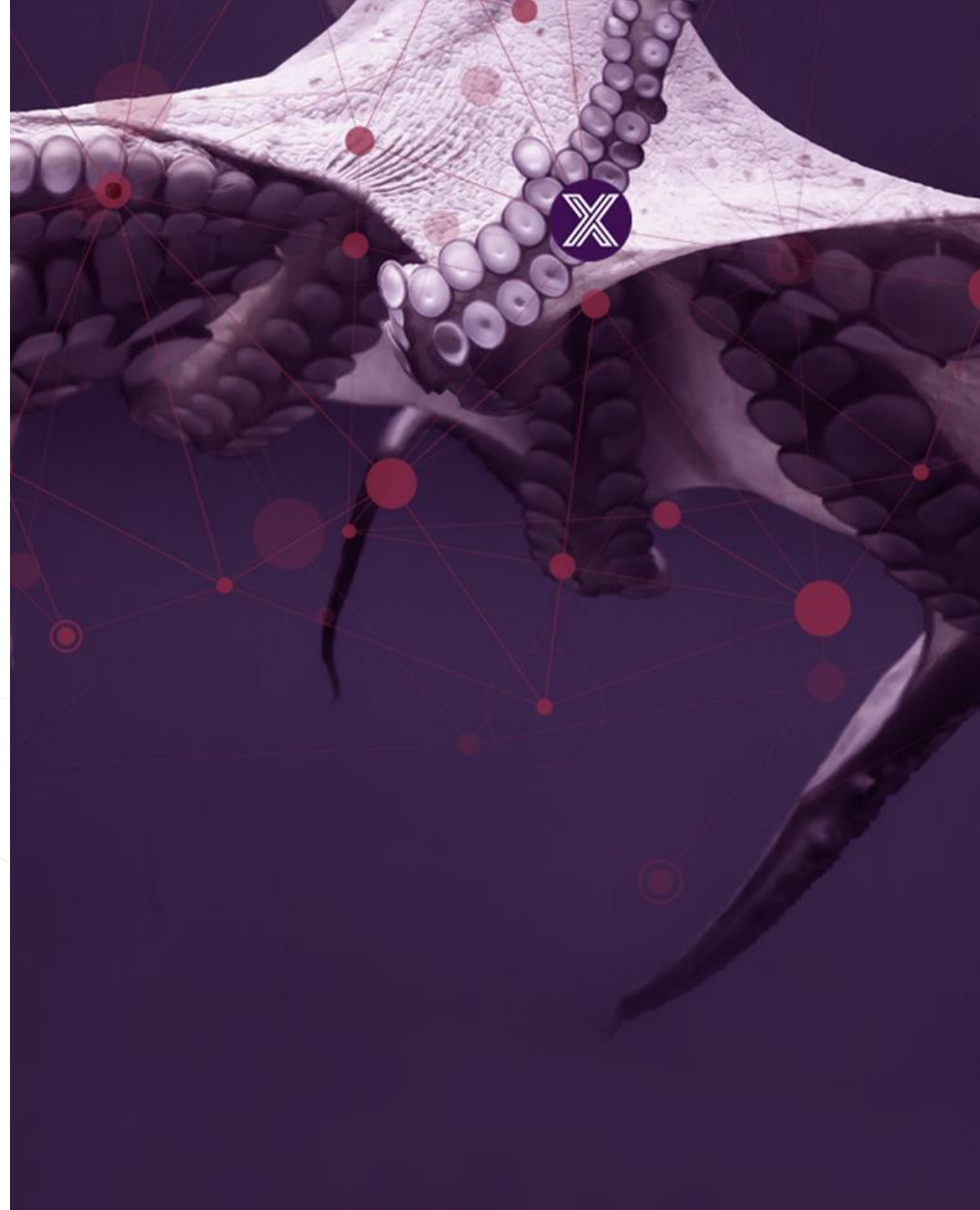
# Taking Stock – EdgeX on its 5<sup>th</sup> year

- A breath - as we complete our largest release to date
  - Much to be proud of in a challenging time
  - A turn toward stabilization for the rest of 2021
  - Figuring out what lies head in the next couple of years (22-23)
  - What features are needed
- What does stabilization mean?
- What are the high priority needs beyond stabilization of 2021?
- How do we grow the organization
  - Prepare for new leadership

Business Topics

# Business Topic Agenda

- All time approximate/all times shown in PST

- 7:30 Web site (Andy/Camilo)
  - Current status
  - Website funding for 2021
  - Website revamp
  - Chinese Website

- 7:45 Topcoder challenges (Camilo/Jean Marie)
  - What's scheduled for 2021

- 8:00 China Hackathon – summer 2021 (Camilo and Melvin)

- 8:15 Industry s Vertical Solutions Group (Jim/Henry)
  - Adopter series
  - DTC
  - AgStack
  - Other vertical liaisons we should target?

- 8:30 Endorsement & Certification program (Rodney)
  - Add support for v2 device profiles acceptance to EdgeX Ready
  - Expand supported device profiles for EdgeX Ready for which:
    - An EdgeX reference implementation device service exists
    - We have a validator
  - Continued support for v1 device profiles in EdgeX Ready
  - Improve website for EdgeX Ready approved device profiles
  - EdgeX Certified program on hold until an LTS candidate identified

# Architecture Tee Up

# Jakarta Major Themes and Objectives

- Stabilization release
  - Meaning?
- LTS release
  - Meaning?
- Additional features considerations:
  - Service list ADR implementation
  - Registry ADR implementation

# Architect's Topics list

- Tools and documentation for Ireland migration – what's needed and when

- Add interval/interval action statically (by configuration)

- Send commands to group of devices based on label

- Last connected – what's needed

- Error message standardization – do we need to do more

- SMA – what does the future of system management look like and when would we make a change

- Metrics collection – per ADR

- Unit of Measure – per ADR discussion and timing on implementation

- Revisits (based on notes from last meeting or other context)
  - Kong on all the time (secure and non-secure modes); impacts to proxy setup
  - Declarative Kong
  - Modifying device profiles on the fly (dynamically add resources)
  - Device Simulator – playback simulator
  - High availability – when, if ever, to consider again
  - Signing of Docker images for Docker Hub

- New
  - Get rid of ZMQ?  If ever - when
  - Get rid of YAML?  If ever - when
  - Message bus between app service and command and command and DS
  - Architecture decisions (from small to large) – best place to track them and announce them
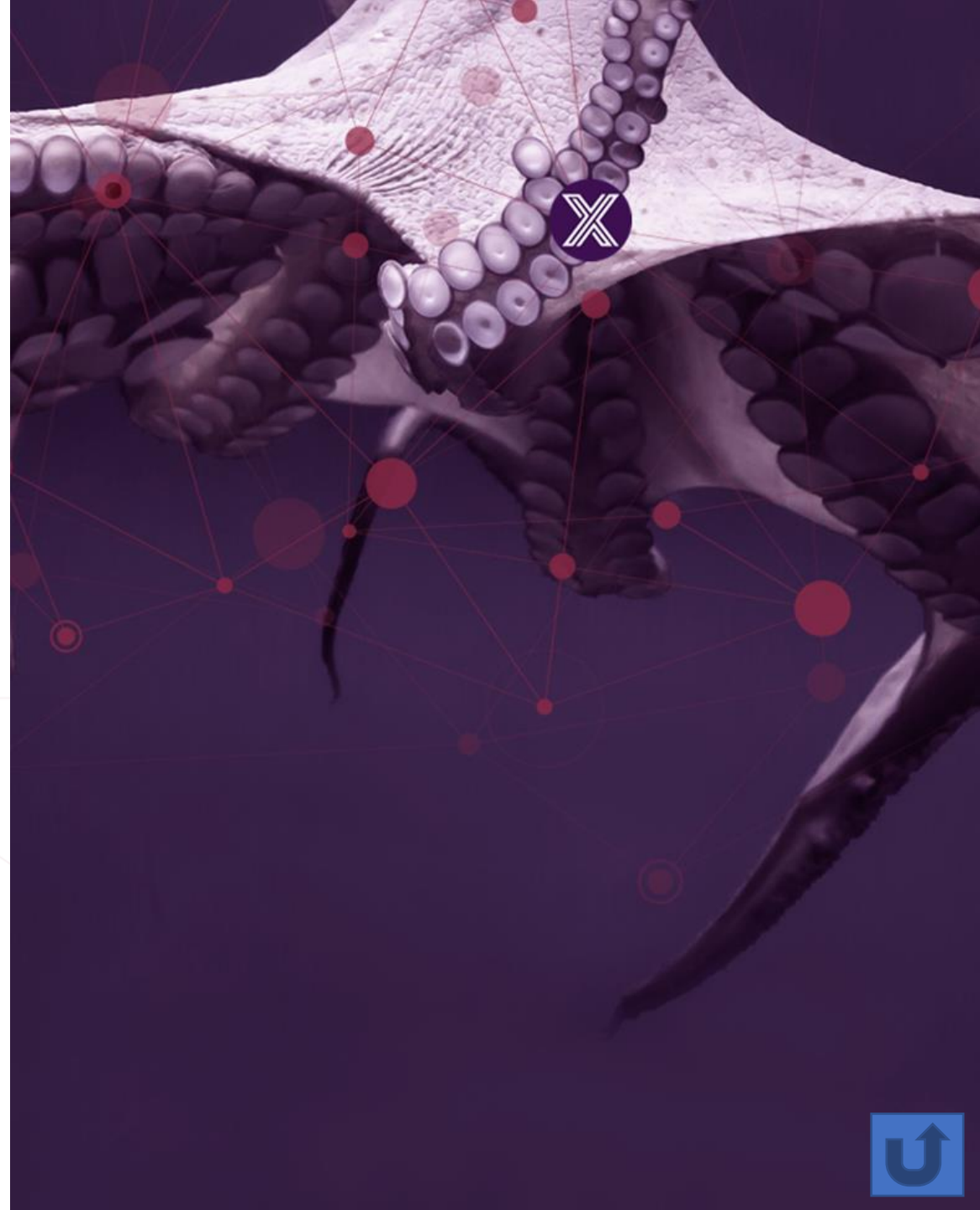
# Conference Agenda – Day 2

- June 22nd, Tuesday (all times in PST; all times tentative and fluid)
  - 10:00am Release cadence check & release naming
  - 11am Architecture topics discussion and decisions
    - Topics relevant to upcoming release having priority, discussion of architectural design - with goal of making decisions that are particularly relevant and impactful to upcoming release
  - With any remaining time, we will start to explore Jakarta scope
  - 1pm day 2 adjourn

# EdgeX Release Cadence Semi-Annual Pulse Check

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# Cadence Check

We changed for this release. Do we have a new policy?

- April & Oct/Nov remain target release months
  - F2F about <mark>1 month in advance of release</mark> to allow for some community coding opportunities
  - Jakarta release – Oct/Nov 2021
  - Kamakura release – April 2022
  - Levski release – Oct 2022
  - <mark>M</mark> release – April 2023
- Venue for next F2F Meeting (April 2022)
  - With travel restrictions lifted – everyone in favor or a F2F
  - Volunteers, suggestions on where to hold this meeting?
- Conferences – marketing committee update; any changes?
  - At least 2 x large marketing/promotional events (Hannover Messe, IoT SWC)
  - At least 1 x developer focused event
  - Virtual events?

M release named by <mark>Brett Preston</mark>

# EdgeX Meeting Times Relook

- Mondays
  - Device Services @ 8am PDT
  - Certification & Outreach/Marketing alternate @ 9am PDT
  - Architect's meeting once a month @ 10am PDT
- Tuesdays
  - Occasional Adopter series meeting @ 8am PDT
  - Often none
- Wednesdays
  - TSC @ 8am PDT
  - Security @ 9am PDT
- Thursdays
  - Core @ 8am PDT
  - DevOps @ 9am PDT
  - App Services @ 3:30pm PDT alternate with Rules Engine
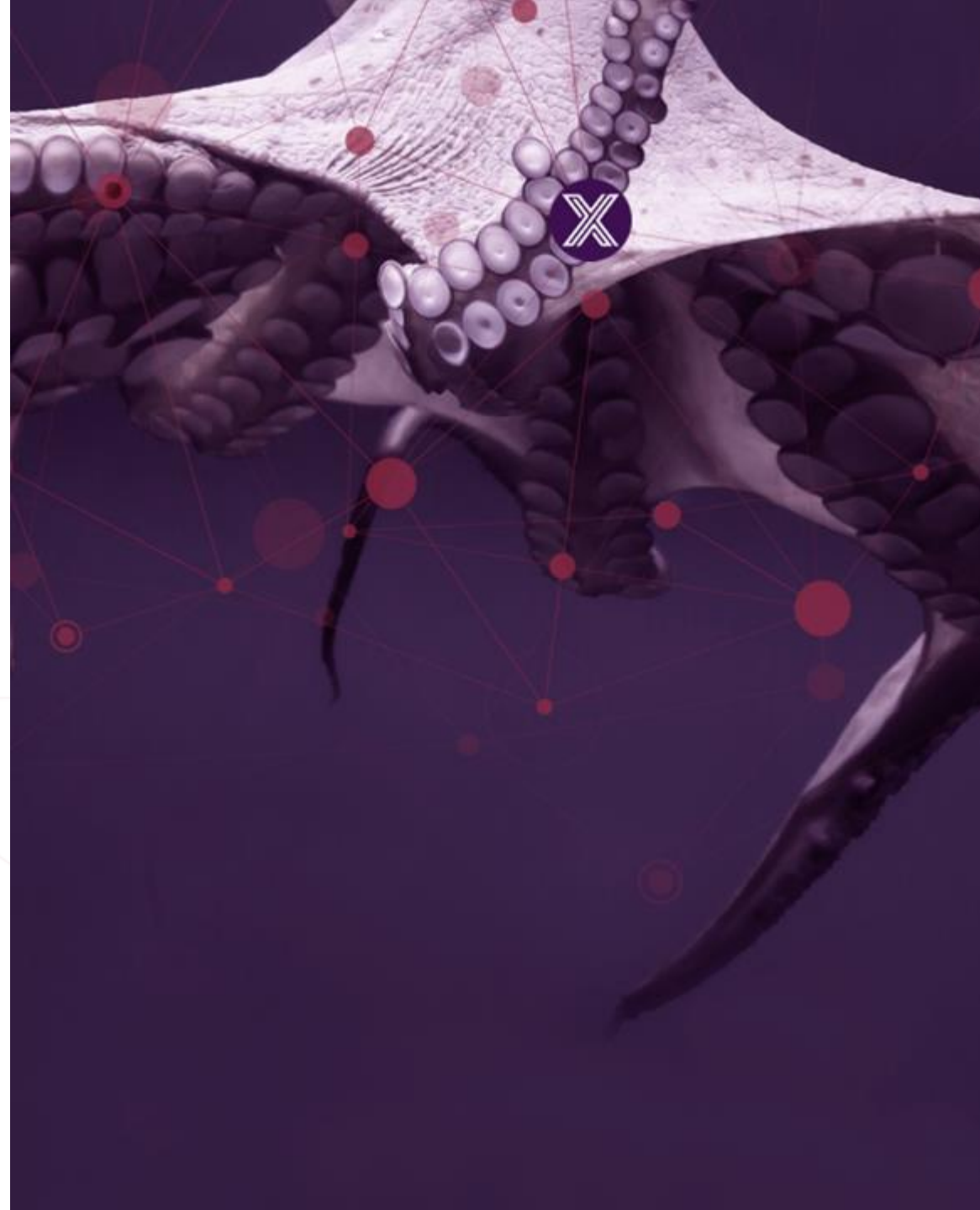- Friday
  - App Services @ 8am PDT

Any changes?
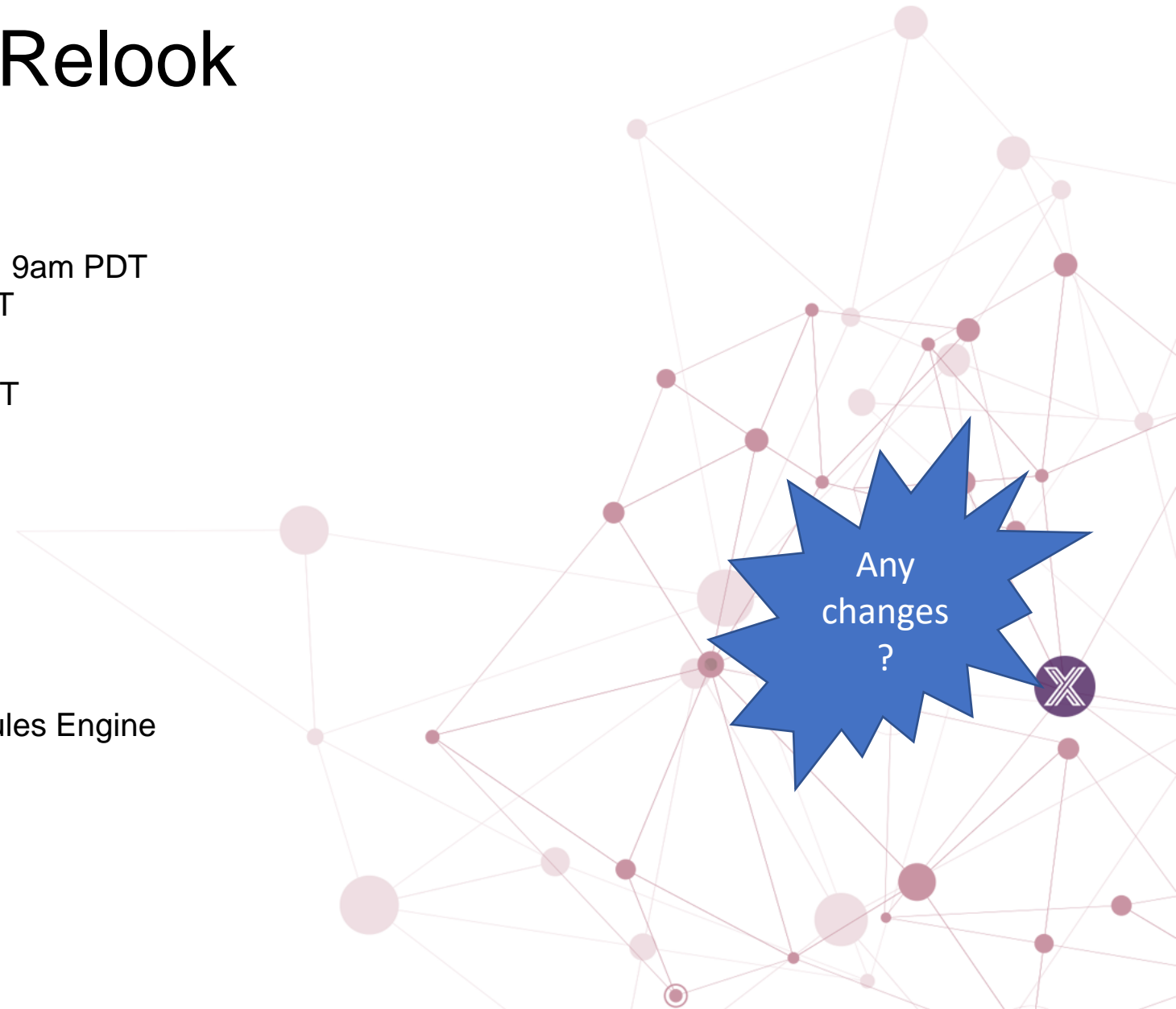
# Start, stop, continue (improve?)

- Monthly architect meetings
  - More/less frequent?
- Adopter Series
  - Bi-monthly?
- Attendance drop in TSC, marketing and other meetings
  - OK – we have who we have
- Is there a need for more "beginner" Q&A/on boarding

Architectural
Discussion/Decisions

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# Jakarta Major Themes and Objectives

- Stabilization release
  - Meaning?
- LTS release
  - Meaning?
- Additional features considerations:
  - Service list ADR implementation
  - Registry ADR implementation

# Discussion – major themes & objectives

- What does stabilization release mean? What are the rules of feature entry?
  - No major architectural changes: adding new endpoints, enhance a service (but not how a service works, not how configuration is organized)
  - Non-backward compatible features are excluded
  - More focus on testing on areas that are not the default
  - And robustness -> restarting of services, or environmental (ex OS, or hardware) conditions may show issues with 2.0
- While this Jakarta release is expected to be a "stability release", the community did agree that this release could be used to design out/experiment with new implementation features so long as they are feature flagged, could not impact the stable implementation, and do not bloat the service size.
- LTS
  - There are questions if LTS is the right term for this?
  - There are questions about how long we support, and what support means.
  - What is our LTS cadence?
  - How long we support a release
  - Do we need to archive (store in an EdgeX repo) anything so we can build in the future (availability of artifacts like Go, Consul, etc.) – Ernesto to do some research /thoughts on this for planning
  - This is documented but open for reconsideration or reaffirmation of the documented approach.
    - https://wiki.edgexfoundry.org/display/FA/Long+Term+Support
  - Links for consideration
    - https://github.com/kubernetes/community/issues/2720
    - https://nodejs.org/en/about/releases/

# Service List

- Per ADR

- A new "seed script" (aka - seed service) will come up first before all other EdgeX services (whether in secure or unsecure mode).
    - a. This seed service populate Consul (or implemenation of the registry/configuration service) with a list of potential services that EdgeX will be running when the EdgeX instance is up. The seed service will populate a "global" configuration area in the registry/configuration service with the list of potential services.
    - b. In the event Consul is not running, the seed service will populate a shared volume or other shared file. It is unlikely that EdgeX will implement this form of service list management, but it could be implemened by adopters if use of Consul is not desired or prohibited. Using a shared volume or file would also create complexities in a distributed environment and would be left to the adopter to solve.

- The original list of potential services used to populate Consul (or the shared volume/file) will come from a TOML configuration file provided to the seed service. a. Use of this TOML file to provide the seed service with the potential list of services allows environmental variables to be avoided in defining the list of potential services.

- All services (security or otherwise) can query Consul (or the volume/shared file) for a list of potential services (during the bootstrapping / init phase) or actual running services (after bootstrapping/ init phase). The registry API (defined by the EdgeX registry abstrction) will be augmented to provide the query capability.
    - a. After seeding, Consul (or the shared volume/file) is the single point of authority/consistency for the list of services (potential or running).
    - b. Additional registry APIs will be provided to add/remove services.
    - c. Services can be removed but they can also be stopped or suffer a crash. When a service is removed (via the API) it is no longer considered an EdgeX service (unless added back). A service that is stopped (for example to make some sort of configuration update) or a service that crashes (and will eventually be restore) are still registered with and considered valid services so far as Consul (or the shared volume/file) is concerned. In other words, crashed or stopped services is considered a temporary state.

- This implementation will allow some of the client configuration information defined in each service's configuration.toml to be reduced.
    - The location of the any client service could be obtained throught a registry query of Consul (or the shared volume/file). Therefore client service host, port can be removed from the service configuration files.
    - This also removes/reduces redundant/conflicting sources of service list information

- Issues to still be determined
    - Where does the "seed script" live. Is it a seed service or some existing service? Metadata, Consul setup script, a security service, etc.?
    - We must consider how this is implemented for both secure and non-secure mode (meaning using a security service to be the seed may not be appropriate)

# Registry ADR

- Per [ADR](#)
- all services will use the command line option approach with the ability to override with an environment variable.
- The new -cp/-configProvider command line option will be added to each service
- All services in the edgex-go mono repo use the new common bootstrap functionality.

# WHEN

- With these other architectural discussions, since Jakarta will be a stability release, can we identify when these are addressed?
  - Priority of need
  - Dependency for or on something
  - High demand

# Architect's Topics list

- Tools and documentation for Ireland migration – what's needed and when

- Add interval/interval action statically (by configuration)

- Send commands to group of devices based on label

- Last connected – what's needed

- Error message standardization – do we need to do more

- SMA – what does the future of system management look like and when would we make a change

- Metrics collection – per ADR

- Unit of Measure – per ADR discussion and timing on implementation

- Revisits (based on notes from last meeting or other context)
    - Kong on all the time (secure and non-secure modes); impacts to proxy setup
    - Declarative Kong
    - Modifying device profiles on the fly (dynamically add resources)
    - Device Simulator – playback simulator
    - High availability – when, if ever, to consider again
    - Signing of Docker images

- New
    - Get rid of ZMQ?  If ever - when
    - Get rid of YAML?  If ever - when
    - Message bus between app service and command and command and DS
    - Architecture decisions (from small to large) – best place to track them and announce them

# Tools/docs for migration

- Documentation is needed for changes (and migration?) on
  - configuration files (TOML),
  - device files (new configuration for devices),
  - database migration (from V1 to V2 document stores),
  - device profiles

# Intreval/Interval Action Adds

- https://github.com/edgexfoundry/edgex-go/issues/2996
- Can Intervals and IntervalActions be separated out into their own file

# Command to devices based on label/group

- https://github.com/edgexfoundry/edgex-go/issues/1884

# Last Connected

- Last Connected v LastReported
- Do we need both?
- What's the difference?
- Who updates what?

```
type Device struct {
        DBTimestamp
        Id              string
        Name            string
        Description     string
        AdminState      AdminState
        OperatingState  OperatingState
        Protocols       map[string]ProtocolProperties
        LastConnected   int64
        LastReported    int64
        Labels          []string
        Location        interface{}
        ServiceName     string
        ProfileName     string
        AutoEvents      []AutoEvent
        Notify          bool
}
```

# Error message standardization

- Med - per Core WG meeting of 4/22/21 - how much info should be put in errors and log messages.

- There is a concern about putting to much information in from those familiar with commercial products

- Temporary decision was to provide enough so that someone could debug the problem with the information provided and not to be concerned with exposing intellectual property since everything is open source.

# Future of SMA

- Service list issue (how to easily add/remove services)
- Executor (only Docker or Linux)
- Executable Metrics (CPU/Memory)
- Delivery to user (pull by REST v. pull)
- Duplication of service status (Consul)
- If we were to redo SMA, what would it look like
- When would we target a rewrite

# Metrics ADR

- https://github.com/edgexfoundry/edgex-docs/pull/268
- Unique name for metric
- All services use go-mod-messaging
- Send service metrics to appropriate topic
- Need DTO for meteric
- When would we target implementation?

# UoM ADR

-
- an EdgeX property will be optionally associated to each device resource to stipulate which unit of measure standard (or specification, code list, etc.) is applied to the unit of measure of the device resource.
- The unit of measure standard would be specified as a string in the device profile. Note each device resource could specify a different unit of measure standard.
- Not validate the existenct of the specification or standard
- When would we target implementation?

# Discussion – Kong on all the time

- Kong on all the time (secure and non-secure modes); impacts to proxy setup
  - Allow the path to be consistent
  - Adopter feedback sought
  - Requires proxy setup – that's going to required secure and non-secure forms
  - Declarative Kong (non-secure) – as default to setup the paths; proxy setup for secure part
    - Colin to provide background Declarative Kong pre planning
    - YAML configuration based

- **Kong becomes a URL rewriter**

- **Could delete a lot of test code so they go through single URL base and tests in secure and non-secure mode which could be eliminate**

- **Some rewrite – proxy setup service**

- ***Leave* for Jakarta *or stretch for Ireland***

# Discussion – Dynamic Device Profiles

- Modifying device profiles on the fly (dynamically add resources)
    - CommandResource – allow get/set
    - Other needs per LLRP
    - Modify profiles on the fly – dynamically add resources
    - What about updates & deletes?

# Declarative Kong

- Allowing us to drop Progress DB
- But can you configure groups/users ACL
- Only supports JWT users

# Other Architecture Subjects

- Device Simulator – playback simulator
  - Do we still want this? As a separate device service? When?
- High availability – when, if ever, to consider again
- Declarative Kong (Colin)
- Signing of Docker images
  - Enable signing of EdgeX images for Docker Hub (#2470).
  - Caveats:   Will need to work with the LF to figure out if Sigul supports this.
  - Issues exist with Sigul:
    - depends on python 2.7 out of date
    - new version exists, but requires a substantial amount of work from the LF to update
    - May be better to wait until the Sigul update before proceeding with this work

# New Concerns

- Get rid of ZMQ?  If ever – when
    - Who uses and why
    - Broker vs brokerless
- Get rid of YAML?  If ever – when
    - Consistency of configuration types
    - YAML hard to write/space dependent
- Message bus between app service and command and command and DS
    - When to offer message bus north to south (QoS, etc.)
- Architecture decisions (from small to large) – best place to track them and announce them

# Conference Agenda – Day 3

- June 23, Wednesday (all times in PST; all times tentative and fluid)

- 7:00am Ireland release
  - Carry over
  - Lessons learned

- 7:30 Jakarta scoping (complete on Day 4)
  - General
  - Core & Supporting
    - Client tools
    - System management
  - Testing / QA (will now move under Core)
  - Application and Analytics
    - Rules engine and other analytics
  - Device Services

- Security
- DevOps
- Outreach
  - Certification
  - Vertical Solutions
  - Marketing
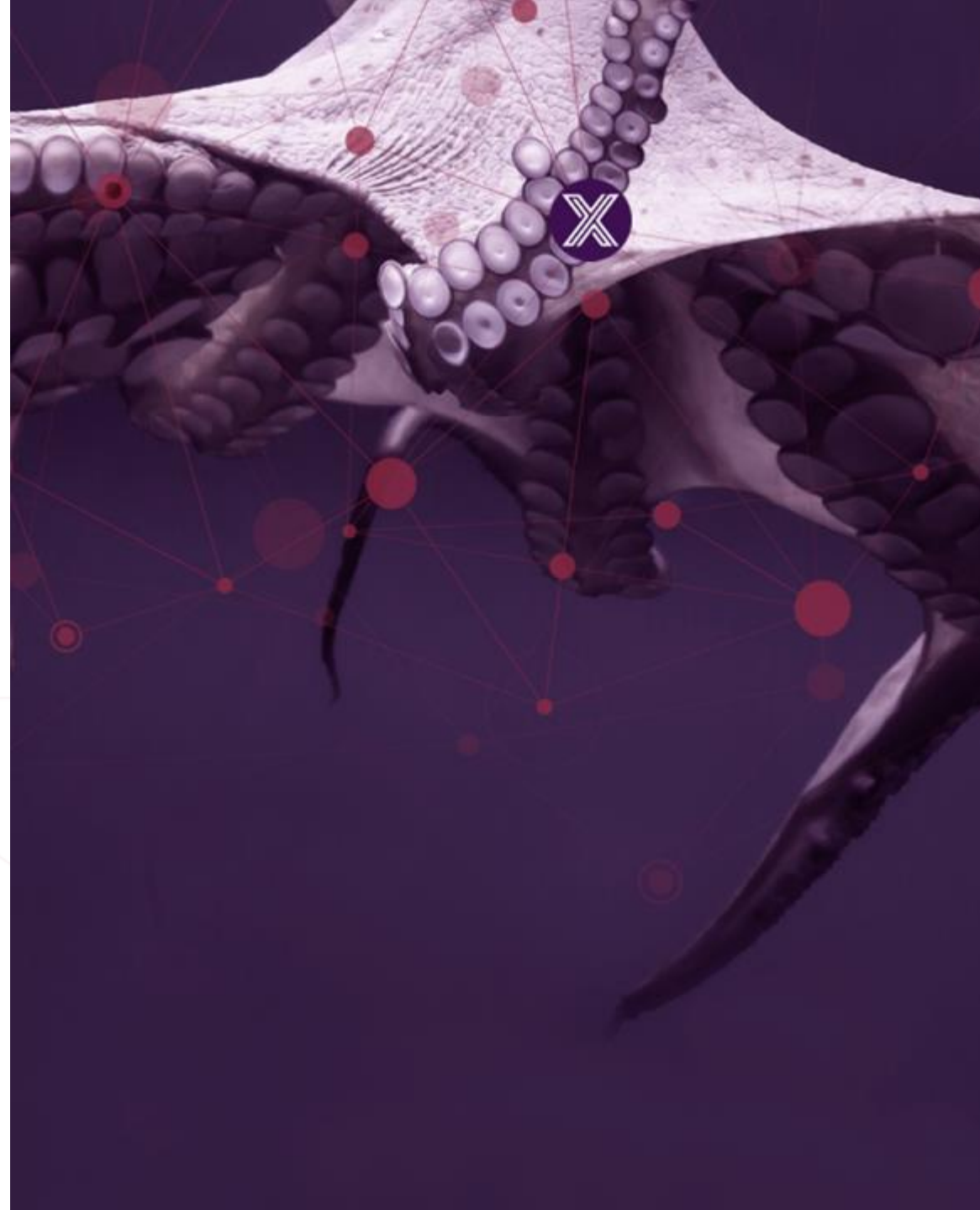
- 11am day 3 adjourn

# Ireland Release Issues

- Carry Over
  - Features we really wanted but missed & why?
  - Stuff we did that turns out we didn't need?

- Lessons Learned
  - Wins
  - Areas of improvement

# Considerations

- Is there a champion / developer to drive the solution & get the work done
  - Who
  - Timeline
  - Dependencies
- What is high priority and what is a stretch goal?
  - T-shirt size it
  - Small – one release; one WG; one service; approximately one man to complete
  - Med – one release; many services;
  - Large – one release; all services; could take someone all release to finish
  - X-Large – multi-release and probably more than one service

# General

- New
  - Tools/scripts for DB migration
    - Possible for configuration too
- Tech Debt
  - Enable CORS (for API Gateway and service APIs in general)
  - Removal of any legacy V1 code
  - Upgrade Go
  - Upgrade 3$^{rd}$ party components
    - Redis 6.2.4 @ latest
    - Consul 1.9.6 (v 1.9.5)
    - Kong 2.4.1 @ latest
    - Vault 1.7.2 @ latest
    - Which have LTS? *None that could be found*
  - Upgrade YAML library to v3
  - Replace poor 3$^{rd}$ party libs
    - ZMQ, logfmt, goburrow for modbus etc
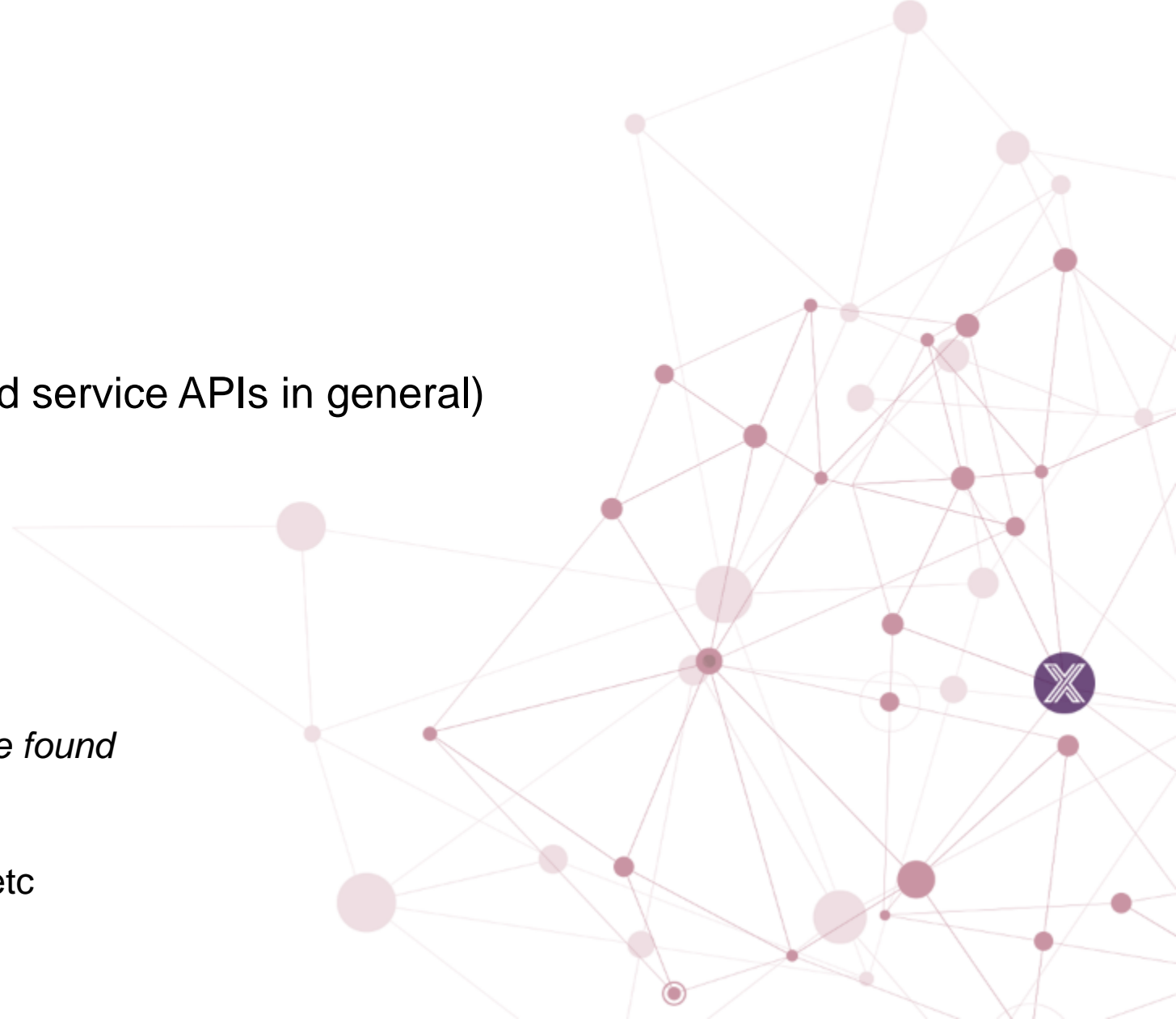
# Core and Supporting

- New
  - Improve ability to add interval/interval actions statically
  - Send commands to group of devices based on label
- Tech Debt
  - MaxEvent Size a config setting – there now but not being used (DS use?)
- Test/QA
  - Test config alternates
    - Configuration testing – testing non-default and dynamic config changes
  - Test without optional services, message bus v REST, etc.
  - Improved integration test (Kuiper)
  - Improved stress tests
  - Improved performance testing (other device types, CBOR, etc.)

# EdgeX "Clients" – GUI/CLI

- CLI – after V2 update?
  - Additional APIs
  - Address CLI working with security on - allowing CLI to work with EdgeX on a remote instance
  - Support for i18n/l10n
- GUI - Implement the roadmap
  - ✓ #0 move to new technology and V2
  - ✓ #1 priority - create a device UI "wizard" that allows adding a new device much quicker.
  - #2 priority - Add some data visualization to the UI
    - Need the ability to "click and see" the data
    - See the data in the core database
    - Perhaps peek at the messages coming from the core->app services bus
    - Integrate with something like Grafana for additional visualization
    - May require we export data to a time series database or use Redis time series database
  - #3 priority - SMA integration
    - Offer metrics visualization of memory and CPU offered by SMA
    - Get the status of the services (up / down)
    - Provide ability to call on start/stop/restart of services
  - ✓ Branding per new web site
  - Consider GUI in secure mode??
  - TAF or other testing support

- #1 - V2 API support
- #2 - TAF testing support (at least a basic start, subject to some research to know what is possible)
- #3 - add support for device and application services
- #4 - Additional API coverage (exact APIs to be determined - high priority commands not covered with version 1)
- Stretch goals - subject to additional work force, availability of time, etc.
  - Address CLI working with security on - allowing CLI to work with EdgeX on a remote instance
  - Support for i18n/l10n

# App Services & Analytics

- New
  - AI / ML example??
  - Fork the pipeline

- Tech Debt
  - Integration tests for Store and Forward
  - SDK hangs when calling docker-compose stop – can't recreate – need to disposition whether this is an issue or not

# DevOps – new & tech debt

- Documentation for more edgex-global-pipeline functions (Medium)

- Figure out if it is possible to remove Dockerfile.build (Small)

- Figure out how if it is possible to commit go.sum back with Go 1.16 (Small)

- Upgrade all DevOps Python scripts to Python 3.9 (Small)

- Address any build images that need to be updated over time.
    - Golang
    - Gradle
    - etc.

- Go 1.17 upgrade (when applicable) (Small)

- Developer Badging (Medium)

- Prep for switch to semantic-release (Large)
    - Spike: research changelog plugin
    - Spike: research DockerHub plugin (Rebuild in nexus and push to dockerhub)
    - Spike: research GitHub Release plugin (edgex-cli)
    - Spike: research Custom plugins (for edgex-compose)
    - Spike: research best way to automate release (centralized vs decentralized)
    - Spike: misc plugin research
    - Spike: Small POC cut-over sample-service to use semantic-release

- Do we need to archive (store in an EdgeX repo) anything so we can build in the future (availability of artifacts like Go, Consul, etc.) – Ernesto to do some research /thoughts on this for planning

- Signing Docker Hub images??

# Security

- New
  - Micro service authentication – ADR first; implementation is out
    - Build a secret store unsealing daemon (#1944)
    - Build micro service communication security (service to service - #1950)
    - Enable Vault identity Secrets (#2456) – another way to create JWTs
  - Static code analysis with Go code (LGTM replacement)
- Tech Debt
  - Service restarting (security services at large)
    - Address Dynamic services
    - Address stability concerns
  - Phase 3 of Consul implantation – (Security team to provide details on what this is – and how we'll do it for dynamically added services)
    - Implement the ACLs

# Snaps

- Redis in the snap triggers apparmor denials
- Modify install hook to drop usage of SNAP_INSTANCE_NAME

# Device Services

- New
  - Add record and replay function (new device service) – low impact with new device service
  - Allow for dynamic updates to device profiles
  - Implement Validation of ProtocolProperties – without breaking change??  May be hard for backward compatible
  - Support regular expressions in assertions
  - Always send CBOR for performance (test first??) – do for testing; then depending on results change the default
  - Remaining DS contributions
    - UART, LLRP, …
- Tech Debt
  - DS SDK Go – update last connected
  - Device stanza in configuration – but not implemented; should drop them (init commands and remove commands as example)
  - Archive holding DS that will not be done (Bluetooth, OPC-UA, )

# Outreach

- Certification
  - EdgeX Ready v2
  - Any other items from Biz Discussion carry over for Cert.
- Vertical Solutions
  - AgStack vertical solution group & demo
  - Digital Twin Consortium?
  - More Adopter series
- Marketing
  - Chinese Web Site
  - Blog a month/Vlog a month
- PRC evangelism – how to support, how to leverage, etc.

# Conference Agenda – Day 4

- June 24, Thursday (all times in PST; all times tentative and fluid)

- 10am Jakarta scoping – day 2
  - General
  - Core & Supporting
    - Client tools
    - System management
  - Testing / QA (will now move under Core)
  - Application and Analytics
    - Rules engine and other analytics
  - Device Services

- Security
- DevOps
- Outreach
  - Certification
  - Vertical Solutions
  - Marketing

- Conference Wrap up
  - planning meeting action items
  - Planning meeting lessons learned/changes

- 1pm day 4 adjourn

# Lessons Learned

- Release Planning Meeting
  - Any lessons learned?
  - Any thing that could be done better?
  - Start doing, continue doing, stop doing
  - What worked well and what did not?
- If we shift to F2F for the next meeting, what would we do different?
  - Would we want to attempt part F2F/part virtual?

# Conference Agenda – Day 5

- Jun 25, 8am Friday (all times in PST; all times tentative and fluid)
- Unconference (quick presentations from community at-large)
  - Mini presentations, demos, feature suggestions, feature requests, etc.
- Adjourn at 11am

# Unconference Topics

- TBD

# Thank you