EdgeX Planning Conference (virtual meeting)

Kamakura Release

Nov 1-4, 2021

Conference Agenda

- Nov 1, Monday, 7am
  - Business Topics
  - Architectural Tee-up
- Nov 2, Tuesday, 10am
  - Cadence & Process
  - Architectural issues
- Nov 3, Wednesday, 7am
  - Kamakura Scoping
- Nov 4, Thursday, 10am
  - Finish scoping and architectural issues
  - Jakarta lessons learned
  - Long term road mapping
- Nov 5, Friday, 8am
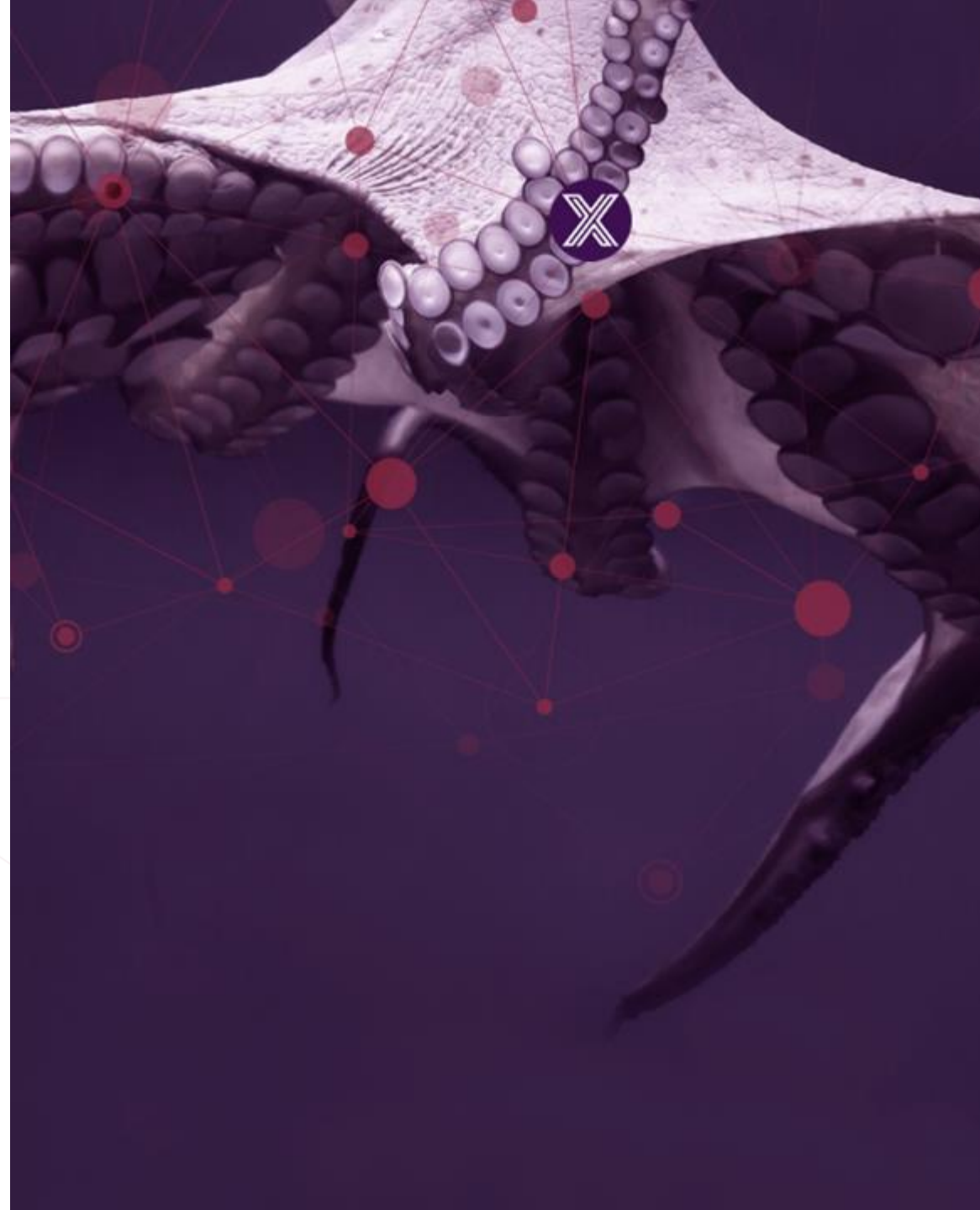 - Unconference & Training

Intros

Name, rank, serial number please
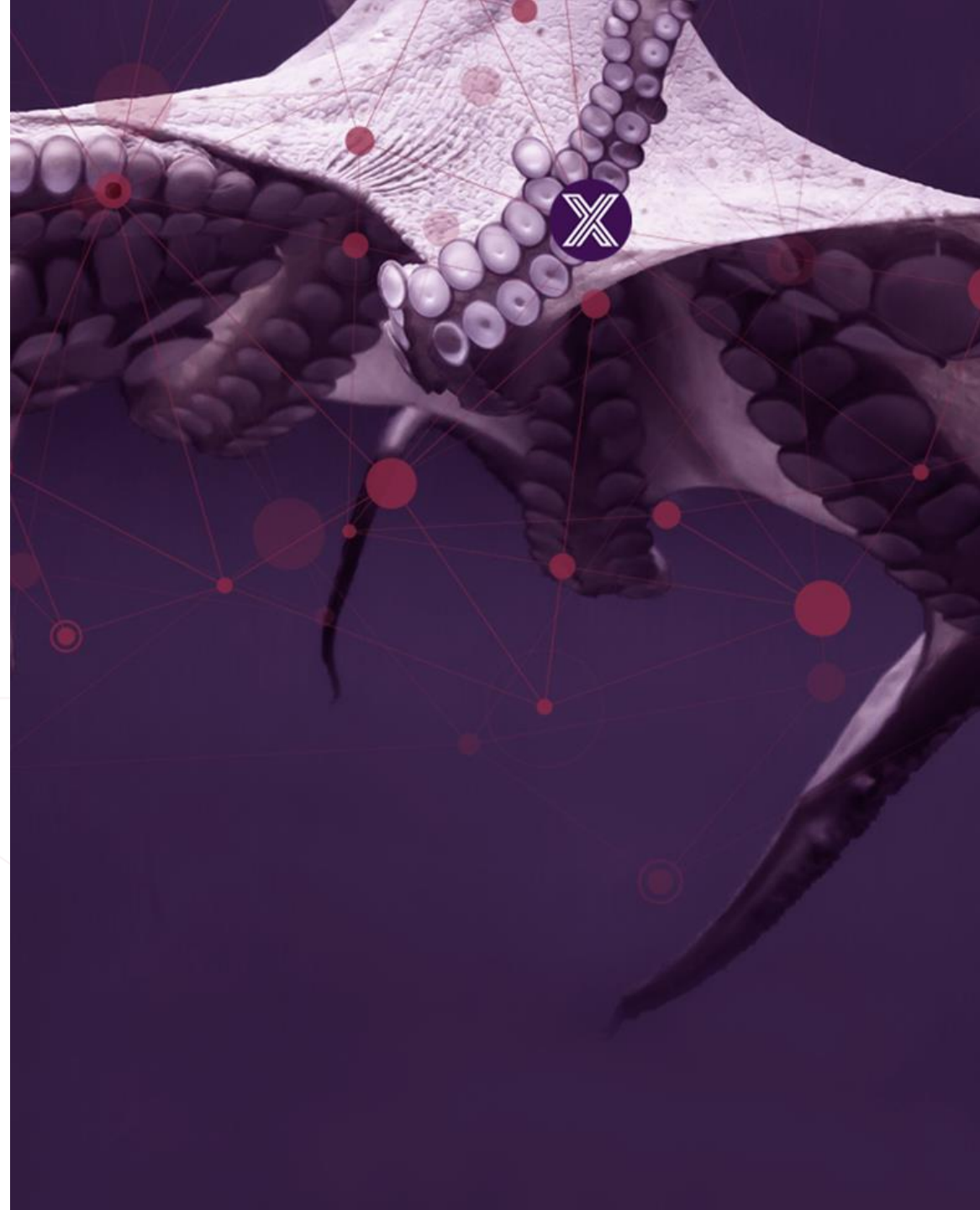
EDGE X FOUNDRY™

Day 1

Nov 1

Conference Agenda – Day 1

- Nov 1, Monday (all times in PDT; all times tentative and fluid)
- 7am PDT Introductions & Logistics
- 7:15am Jakarta release (unfinished business, issues, etc.)
    - Issues
    - Docs
    - Testing
- 8:15am Kamakura release
- 8:30am Business Topics
- 10:00am Architecture topic tee-up
- 11am day 1 adjourn

Jakarta Release

- Still be done
  - [#281](#) Enable CORS access to EdgeX microservices
    - Cloud's research on Options implementation and use of [CORs lib](#)
    - Do we go forward with this feature?
    - Do we pull insertion of headers but keep code in place?
  - Dependabot PRs
    - Add edgex-go PR for the Notifications config to have the secrets file settings
    - Add ASC PR for the secrets file settings to all the profiles.
    - Update the dependencies for Device Rest, Device Virtual and Device Modbus (Used in TAF tests)
    - Add the CORS and secrets file settings to Device Rest, Device Virtual and Device Modbus
    - Other device services will get these updates later in the cycle.

Jakarta Docs to-do

- Device service clean up/adds
  - Device service restructuring and adding undocumented features
  - Documenting the API (like discovery)
- Getting started guide – replace HiveMQ with EMQ Xbroker
- GUI with Snaps (https://docs.edgexfoundry.org/2.1/getting-started/tools/Ch-GUI/#snaps)

Manual Testing for LTS

Test	Owner/Actions
Test any configuration not already handled by new TAF tests	
Test reboot of the system. Make sure EdgeX can come back up	
Test device services (with real hardware where possible)	
Working with service authors to identify minimal tests	
Test different combinations/permutations of app functions in app services	
~~Test on Windows~~	
Test running with multiple services of same type (device service and app services)	

Kamakura Release

- Version 2.2?
  - Must still be backward compatible
  - Can add, but not remove deprecated items yet
  - Not LTS, but must consider we have LTS now on the books
- Major additions under consideration
  - North to south message bus
    - App service to command to start??
  - Metrics (per ADR)
  - UoM
  - Record and replay DS
  - Better (native) Windows support

Business Topic Agenda

- Web Site (Andy/Gavin & Melvin on China site)
  - Website funding
  - Stats from Chinese site

- Developer Evangelism (Rodney/Jim)
  - EdgeX Ready
  - Developer Badging
  - EdgeX Smart * Challenge 2020

- Project and community offering promotion
  - EdgeX Certified

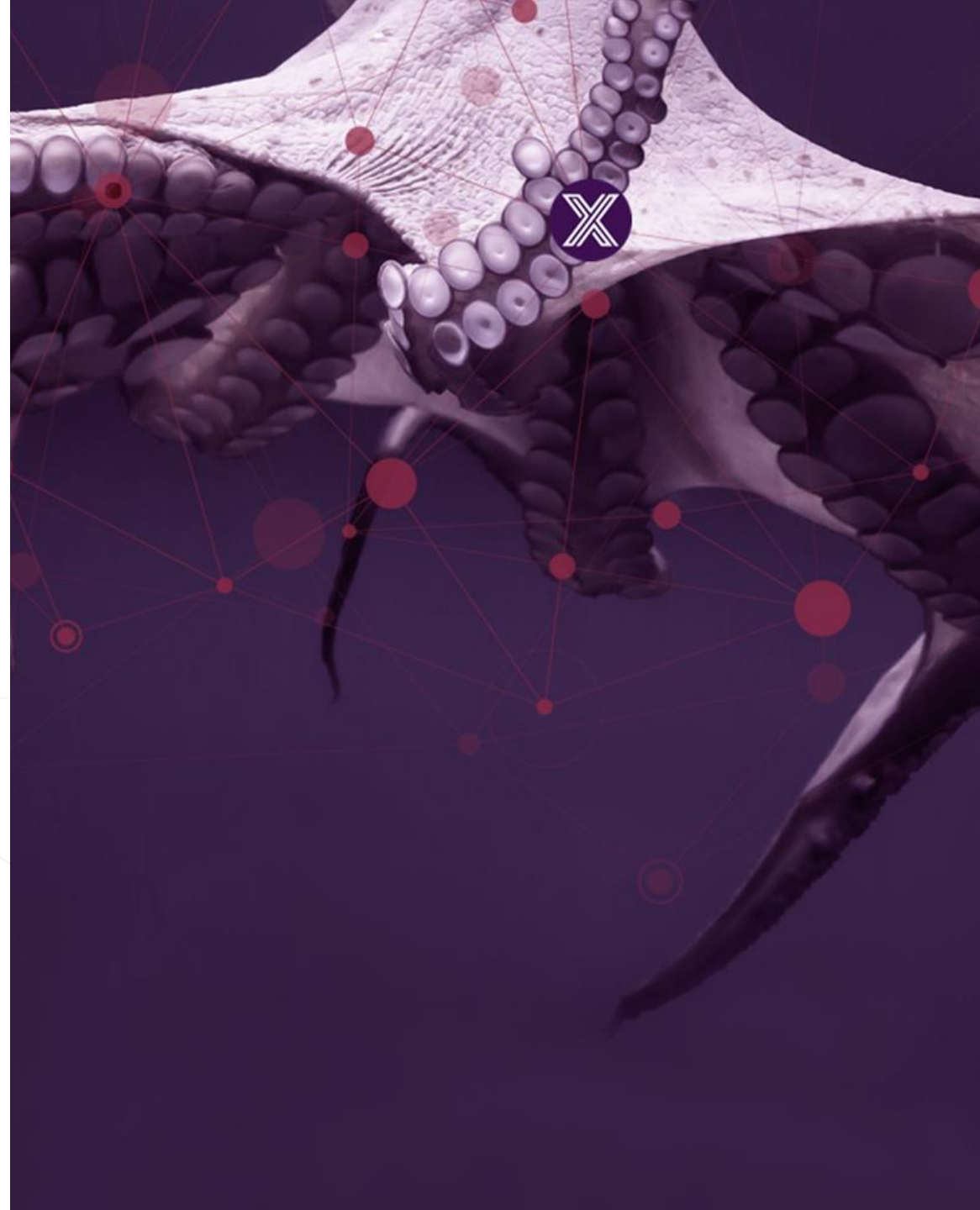- Vertical Solutions and Liaison
  - Adopter Series

Outreach

- EdgeX badging – trial and eval in 2022
- EdgeX Ready – eval by early 2022
- EdgeX Certified – on hold
- Regular Web site and download stats production
- Hackathon (English)
- Regular blog/vlog posts
- Adopter series – time to make it ad hoc

Architecture Tee Up

Kamakura Major Themes and Objectives

- Dot release

- Major additions under consideration
  - North to south message bus
    - App service to command to start??
  - Metrics (per ADR)
  - UoM
  - Record and replay DS
  - Better (native) Windows support

Scoping

- Categories used in our pre-wire
  - In scope
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Architect's Topics list

- In scope
  - Dynamic profiles (ADR)
  - Metrics collection (ADR)
    - Control plane events too?
  - UoM implementation (ADR)
  - Tracking project decisions (small to the large)
    - To be discussed in full on Monday time permitting

- Under Consideration
  - North-South message bus
    - Allow cloud or north side system to message command
    - Allow command to message device services
  - Moving Command API into Metadata service
  - K8s what's next
  - Things provisioning
    - More autonomous
    - Better device services

- Windows Support
  - ZMQ prohibits native support (how to provide option to remove ZMQ)
  - Package support (MSI)
- REST/SOAP inside a device service
- Global configuration
  - Remove duplication across configuration

- On the fence
  - Reducing EdgeX Size
    - Research only this release
  - Getting rid of SMA (already deprecated)
    - What replaces start/stop/continue, config, service metrics
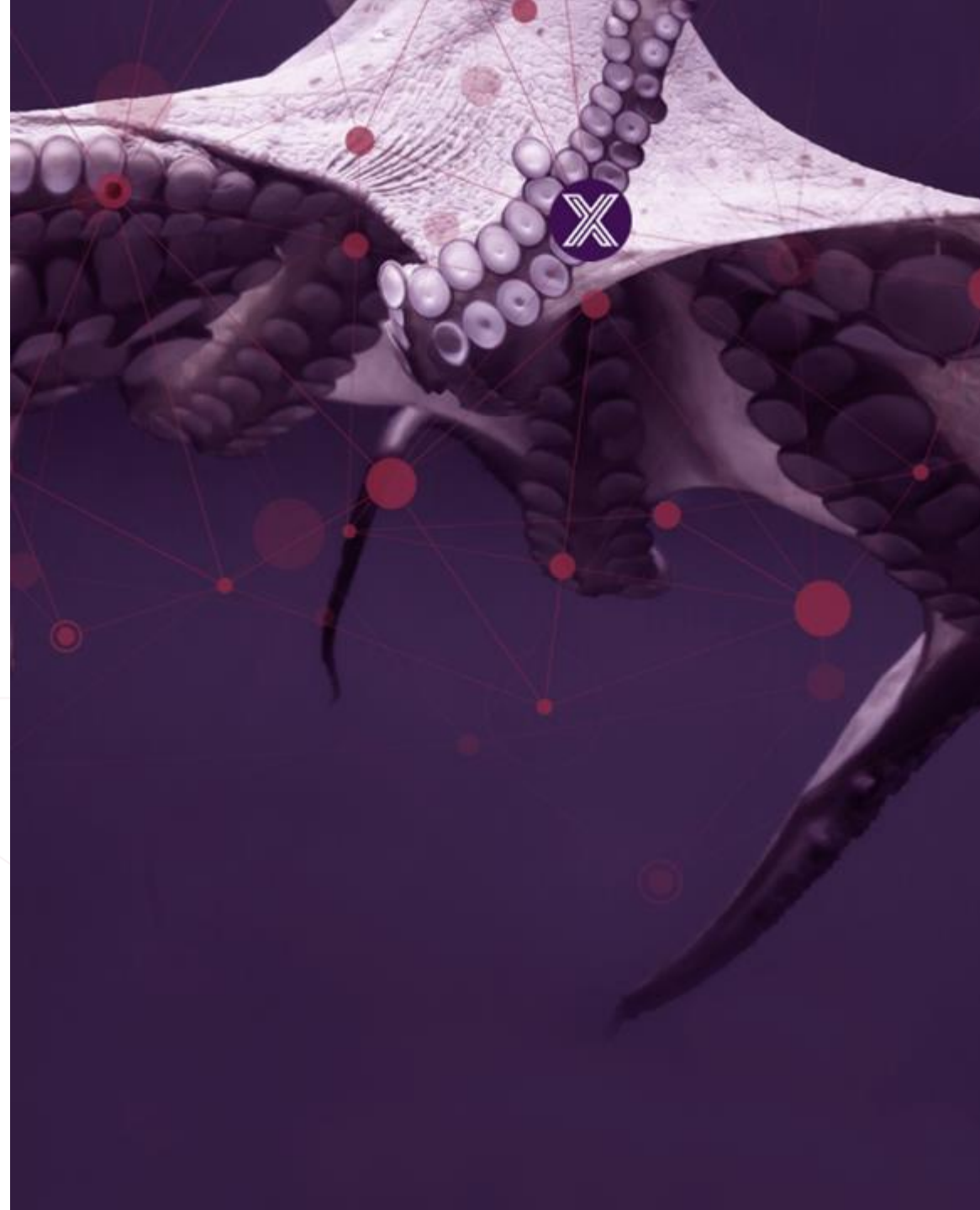 - Expand notifications
    - Allow other protocols (SMS, messages, websockets)
    - Alarm based on metrics/resource usage

Details in slides for Day 2

# EDGE X FOUNDRY™

Day 2

Nov 2

Conference Agenda – Day 2

- Nov 2, Tuesday (all times in PDT; all times tentative and fluid)
- 10am PDT Meeting Start
- 10:15am 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 Kamakura scope
- 1pm day 2 adjourn

Cadence & Release Naming

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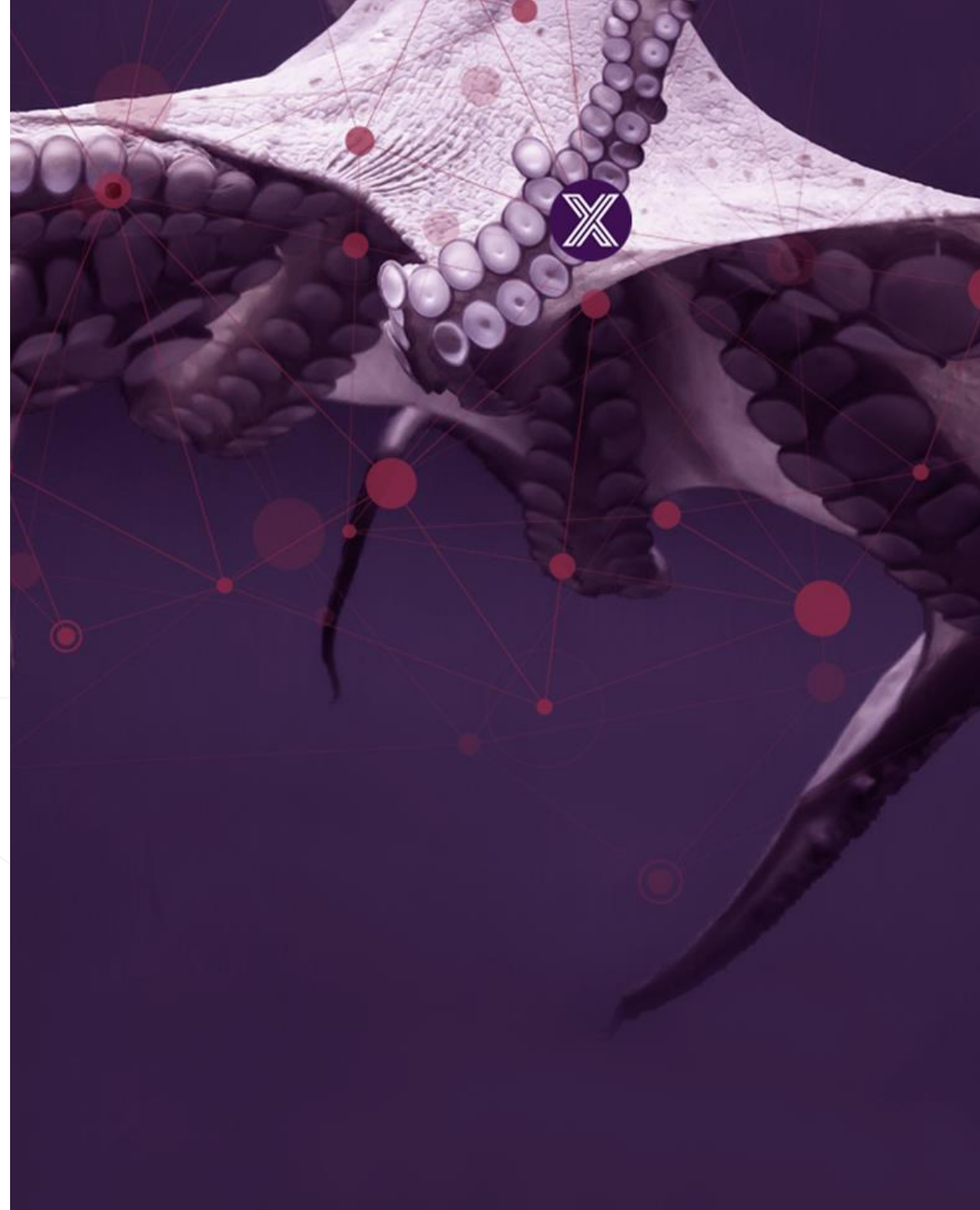
Cadence Check

- April & Oct/Nov remain target release months
  - Kamakura release – May 2022
  - Levski release – Oct 2022
  - Minnesota release – May 2023
  - N release – Oct 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
  - Per Outreach planning, looking at mid-2022
  - On hold for now

N release named by ?

Release Detail Timing

- Given circumstances of the last few releases, we have been flexible
  - Should we try to standardize the release timeline a bit for everyone's expectations and planning?
- Formalizing this for future releases (**<u>Proposed</u>**)
  - Release date selected (attempt to select 2 months in advance of release)
    - Wednesday / mid week target
    - September for fall
    - March for spring
  - Freeze date selected off the release date
    - Wednesday target to match release date
    - 3 weeks prior for substantial major release or LTS
    - 2 weeks prior for minor release
  - Planning meeting
    - Monday – Thursday virtual or Tuesday/Wednesday when in person
    - 2.5 weeks prior to a major or LTS release
    - 1.5 weeks prior to a minor release
  - Pre-wire meeting
    - Wednesday or Thursday prior to the Freeze date

Formalized Planning (Proposal)

Example Calendar for Major/LTS Release

Example Calendar for Minor Release
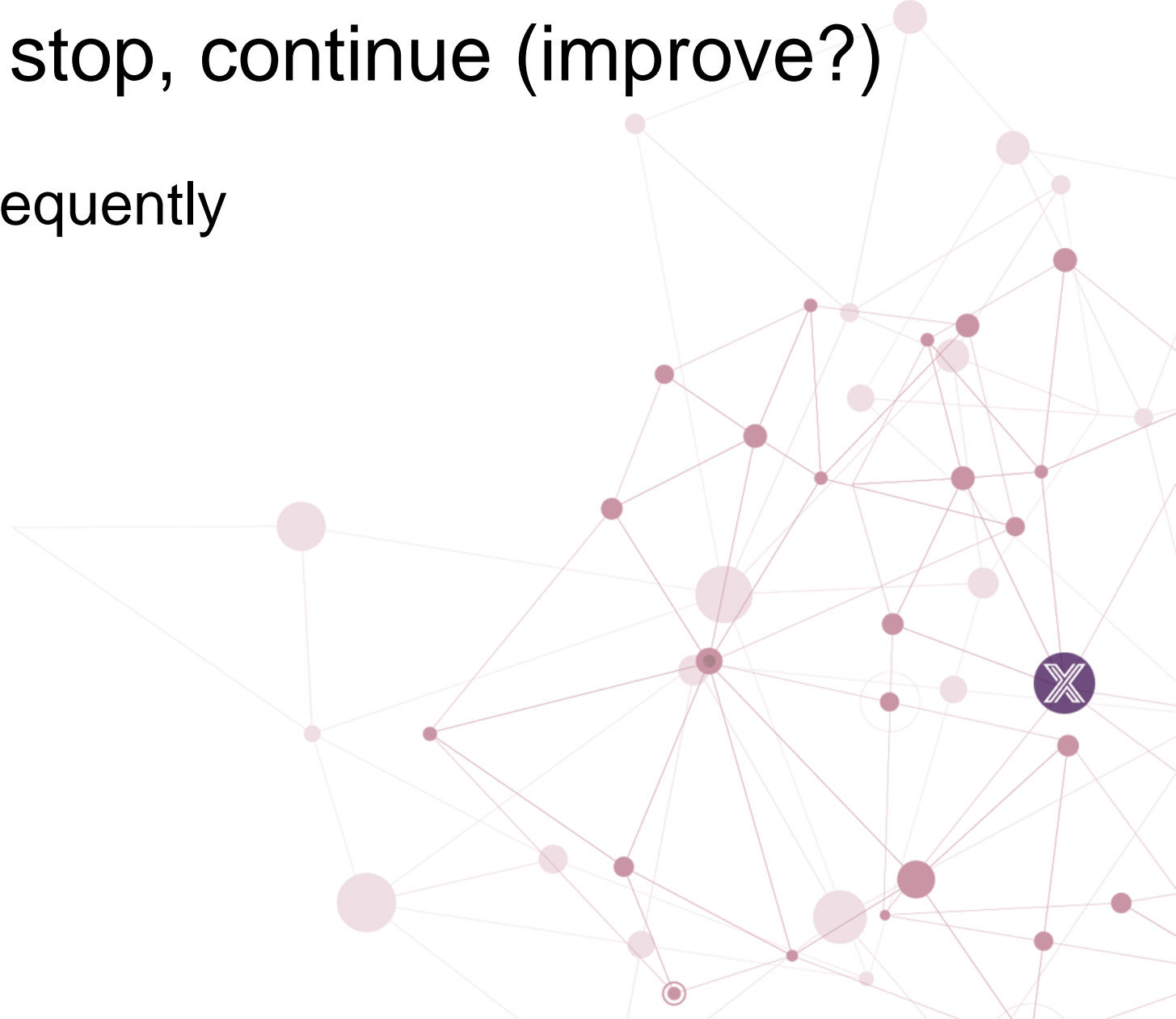

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EdgeX Meeting Times Relook

- 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
  - Application Services WG @ 9am and 3:30PM PDT alternate weeks
- Wednesdays
  - TSC @ 8am PDT
  - Security @ 9am PDT
- Thursdays
  - Core @ 8am PDT
  - DevOps @ 9am PDT
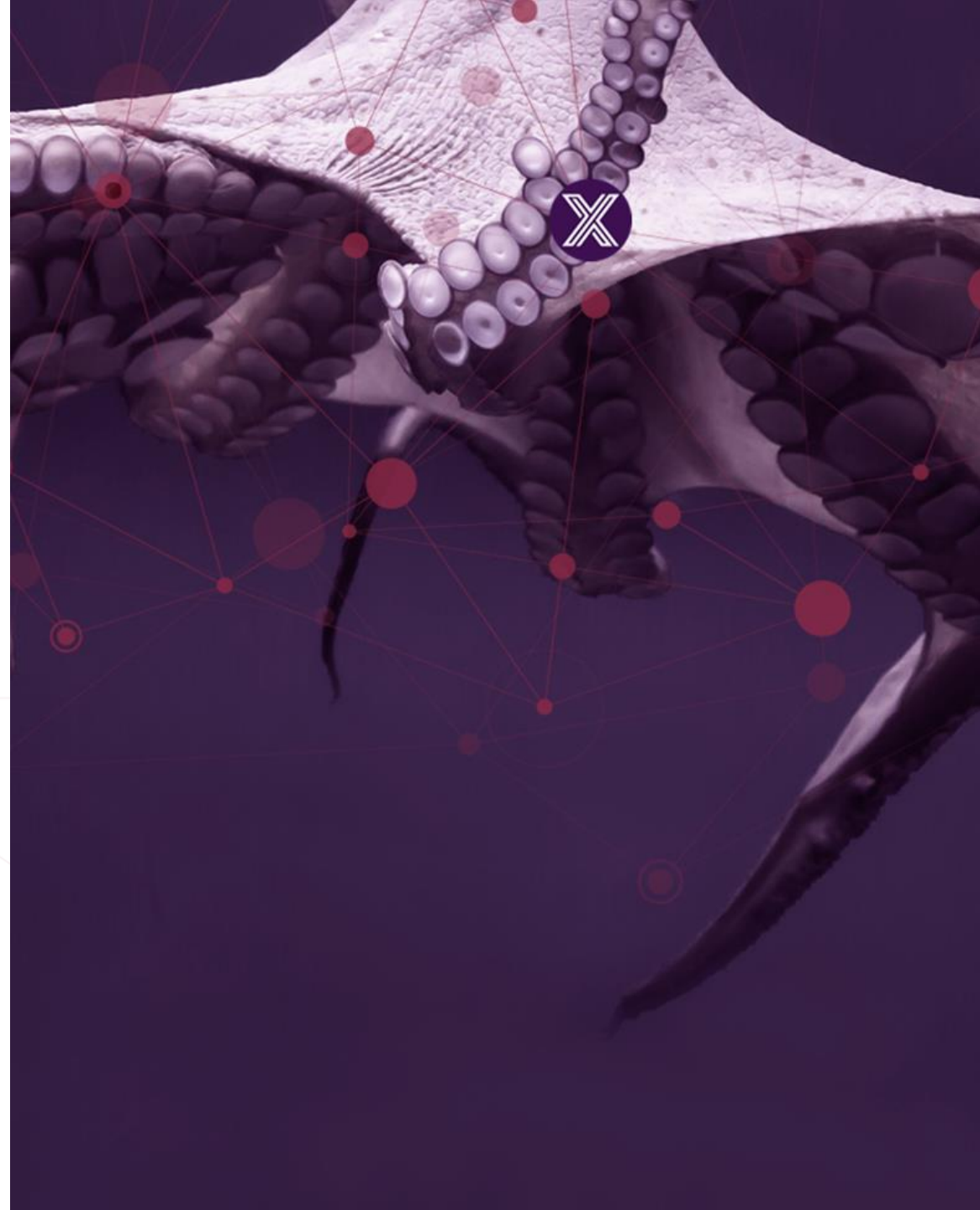- Friday
  - No meetings

Any changes ?
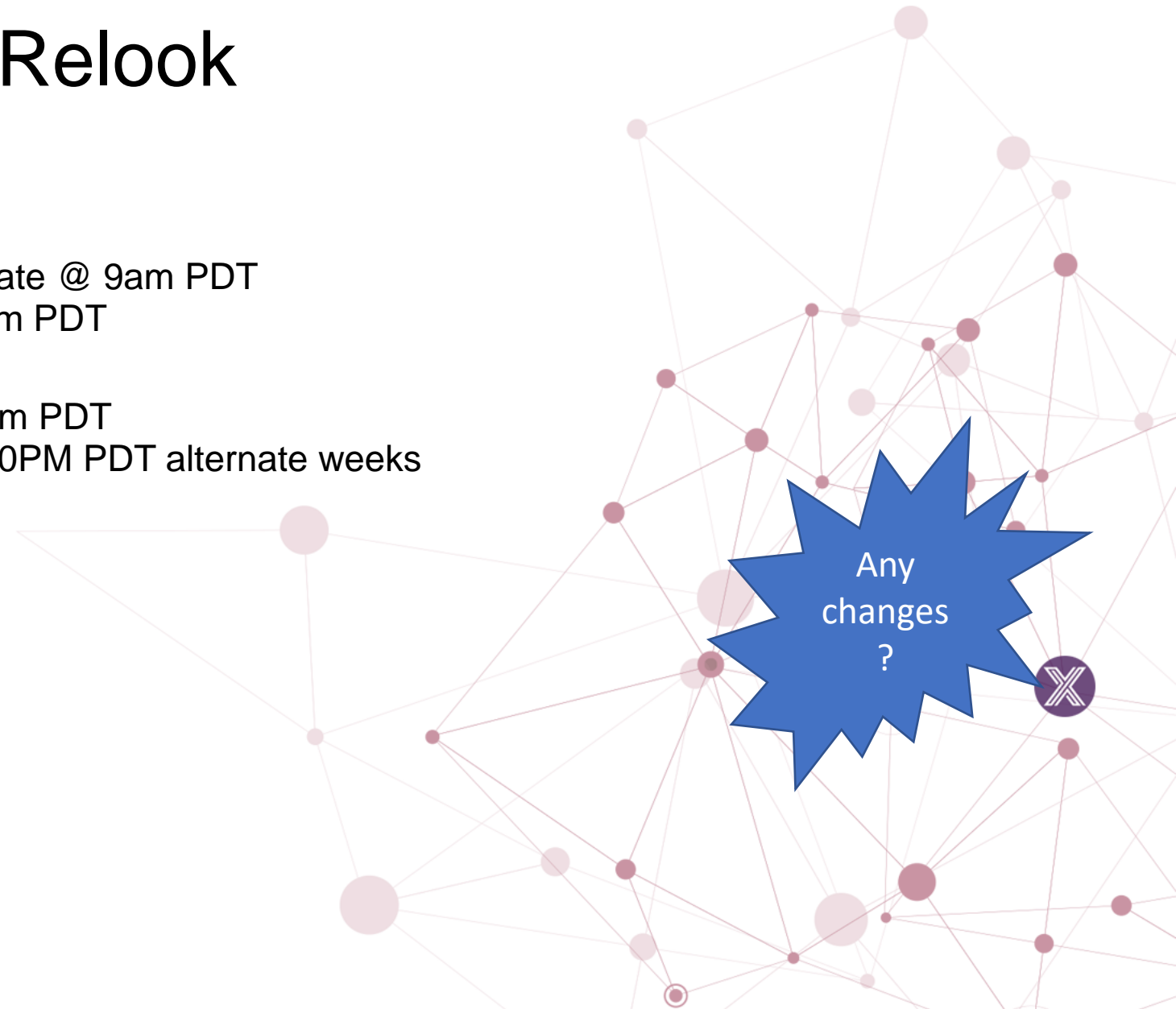
EdgeX Meetings Start, stop, continue (improve?)

- WG meetings – more/less frequently

- Monthly architect meetings
  - More/less frequent?

- Adopter Series
  - Bi-monthly?

Architectural Discussions/Decisions

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In Scope

Dynamic Profiles

- ADR - https://github.com/edgexfoundry/edgex-docs/pull/605
- What do we allow to be added, removed, updated on profiles (and their associations) once system is running
  - Adding easier than allowing updates/removals
- Needs to be enforced across the system
  - CLI, GUI, APIs, etc.
- Probably need at least a design during this release

Metrics Collection

- ADR - https://github.com/edgexfoundry/edgex-docs/pull/268
- Each service to send metrics to topic
  - Ex: number of events sent, average time per request, etc…
- How to implement
  - Go metrics, other package
  - Impact to C services
- Considerations
  - Impact to size
- Also need control plane events??
  - Ex: a device was provisioned, a service was stopped, config has changed…

UoM
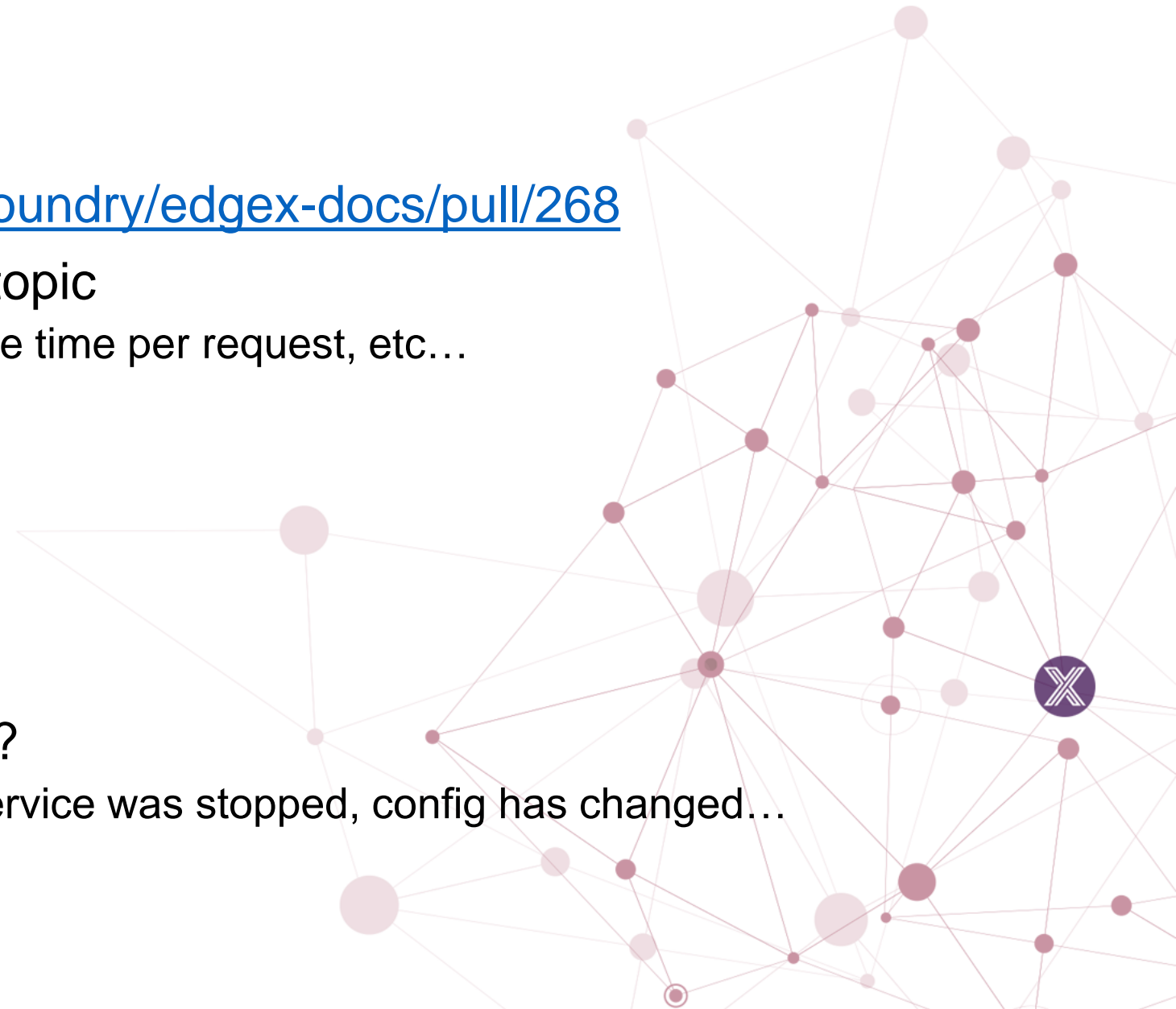
- ADR - https://github.com/edgexfoundry/edgex-docs/pull/386
- Can't find a spec that is universally used
- Allow for adopter to specify but add to UoM to event/readings
- Validation - later

Tracking project decisions

- ADR has been used (successfully?) for large stuff

- What about all the smaller and project decisions by WGs?

- Project is losing track
  - PR process is too heavy to submit for all decisions
  - Needs to be accessible by everyone
  - Needs to be quick to update

- For reference: Kubernetes
  - https://github.com/kubernetes/community/blob/master/sig-architecture/README.md

Under consideration

In scope by default

North-South message bus

- We've successfully implemented the ability to send sensor data from south to north via message bus
- No way to send requests from north to south in message bus
- Message bus provides means for:
  - Guaranteed delivery and better QoS where needed
  - Messaging preferred in many use cases
- Would require (and could be done in phases)
  - Command service to receive and relay messages
  - DS to receive/process messages
- Other questions
  - Would AS need message bus acknowledgement
  - Rules engine to call message bus or REST option?
  - What about other services using message bus (support)

Moving Command API into Metadata service

- Command API is tiny
  - Doesn't have its own DB anymore
- Reasons for it to still exist (future needs)
  - Allow for more/tighter access control
    - Control who has access to critical actuation
  - Allow for multiple actuation needs
    - Fire commands across device services
    - Fire many commands at one time
    - Allow for command transactions

Kubernetes

- What's next?

- We have an example

- In the past we had a helm chart example

- Intel members say "can't run EdgeX in K8s"
  - How can we get more (services) of EdgeX running in K8s
    - What's blocking from running all of EdgeX in K8s?
    - Why and why is not in a form that most in K8s field accept?
    - Expectation of scalability – how do we address?

Things Provisioning

- Adopters are asking for more automatic discovery/provisioning
  - "Zero touch" provisioning
- How can we improve and simplify the discovery of devices?
- How can we improve and simplify the automatic provisioning of devices?
- Device configuration file is helping
- How about some tooling too?

Windows Support

- We claim platform independence
- Running natively on Windows is now nearly impossible (outside of Docker or something like WSL2)
  - ZeroMQ does not compile on Windows 10 (Mike J script broken)
- Can we keep backward compatibility but allow for no-ZMQ windows option?
- Can we provide Windows MSI for base EdgeX install (like Ubuntu Snap with everything included?)
- And do we need testing in CI/CD for Windows?

REST/SOAP inside a device service

- How should REST/SOAP communications be handled in a Device Service?
- Comes from Support object data type in both Set and Get command issue
  - https://github.com/edgexfoundry/edgex-go/issues/3754
- RFID/LLRP DS need similar
  - https://github.com/edgexfoundry/device-rfid-llrp-go#data-format
- Needs and ADR going forward

Global Configuration

- Is it time to consider some sort of global configuration?
  - We have a lot of duplication
  - Requires a lot of config to be touched when an adopter wants to change one item
    - Examples: topic name, logging
    - Turn on/off metrics collection in the future
- Difficulty – where would the configuration go?
- Considerations: with or without Consul, with or without security (and Vault)
  - Additional consideration: containerized vs non-containerized (Snaps)

On the fence

Out of scope by default

EdgeX Size Concern

- EdgeX size is getting bigger
  - Of course there is more functionality too
  - Better security – but at a price
  - Message bus support – but requires infrastructure (potentially a broker)
- EdgeX services are quite tiny, but 3rd party services are huge
  - They were created for the enterprise by enterprise experts
  - They were not meant for the edge
  - We only use a fraction (10%) of the functionality provided by these systems
- It is time to research alternatives or even consider our own implementations in some cases
  - Could we encourage 3rd party partners to develop edge specific alternate?
  - We need to be careful in creating custom security service that are not trusted
    - First rule in security – don't create your own security solutions
- Spend this release researching options

Component	Size
Consul	113MB
Kong (and its DB)	308MB
Vault	196MB
Average EdgeX service	~20MB

Deprecating SMA

- It is already deprecated
- What replaces it? Does anything replace it?
  - Start/Stop/Restart capability
  - Metrics of services (memory, CPU)
  - Get config
- Docker or K8s provides this
  - What about non-containerized or Snaps
- What is the timing of removing
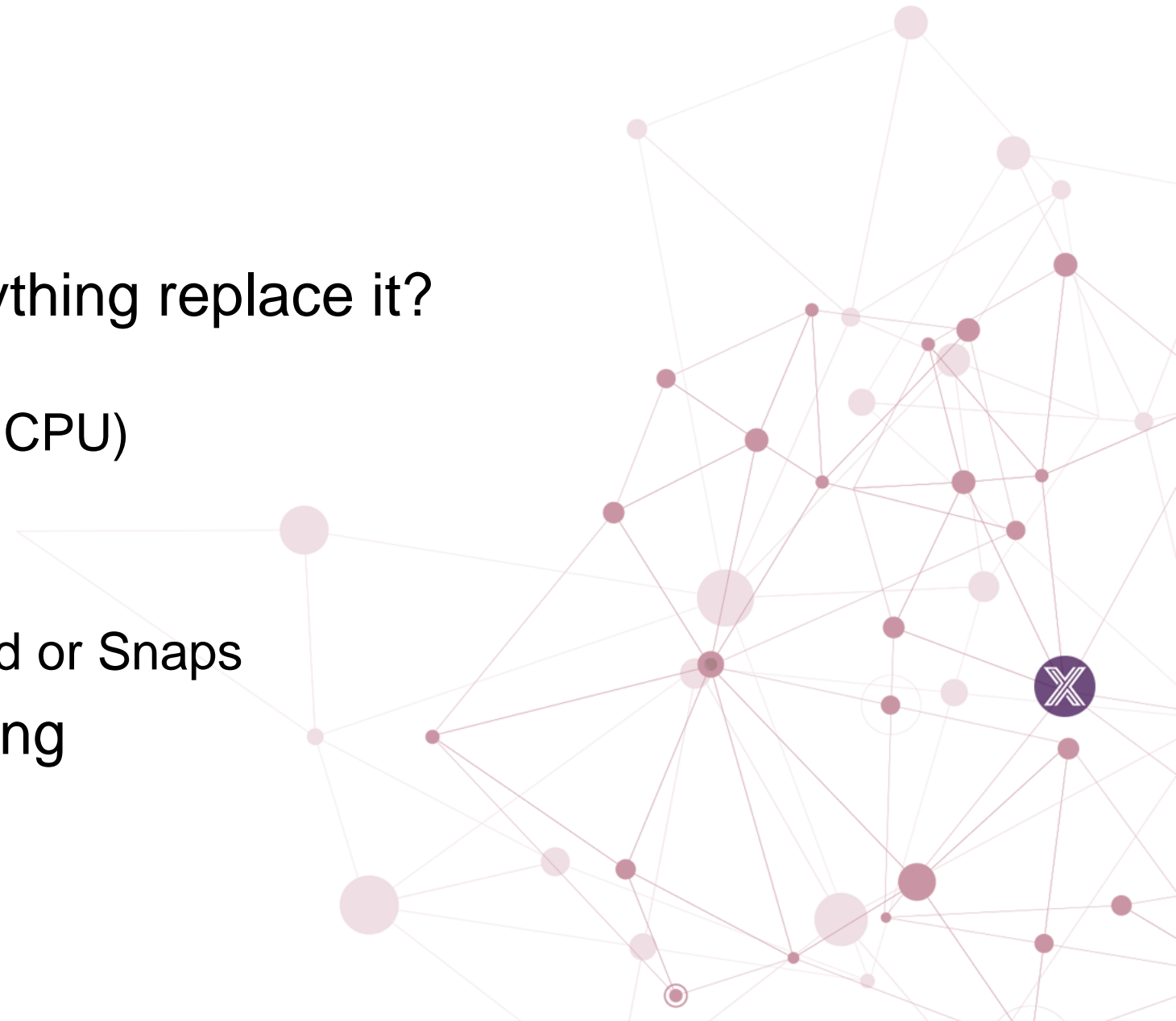
Expand Support Notifications

- Adopter use case needs
  - Send notifications via SMS, web socket or message protocol (MQTT)
  - Make it easier to use/send notifications
    - Better examples
- Allow rules engine to trigger notifications
- Allow configuration (vs coding) of alarms
  - Notifications based on certain conditions
    - Examples
      - Sensor value falls outside of a threshold
      - Service metric falls outside of a threshold (time to respond is > than a number of milliseconds)
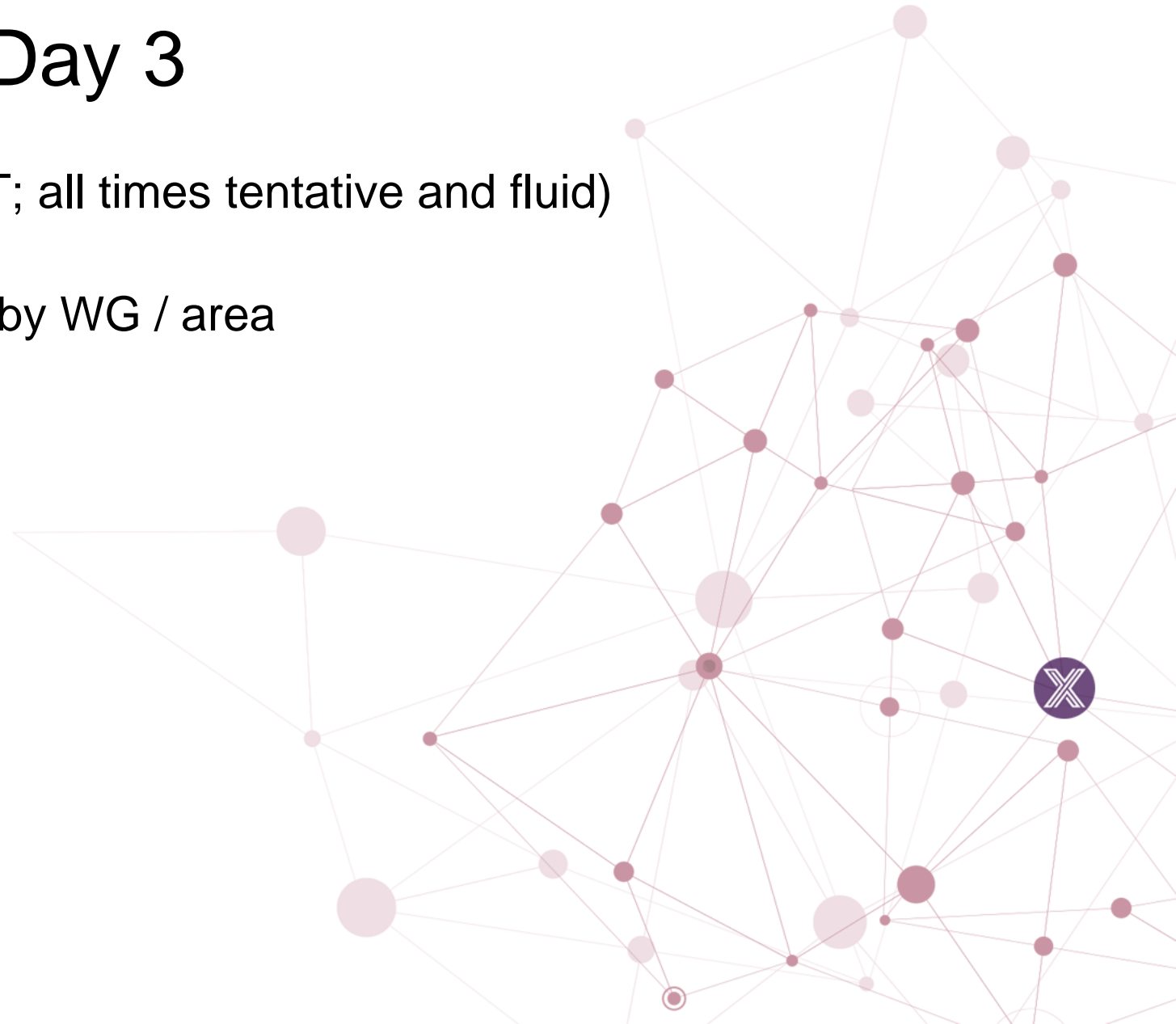   - Service memory use exceeds a threshold of MB
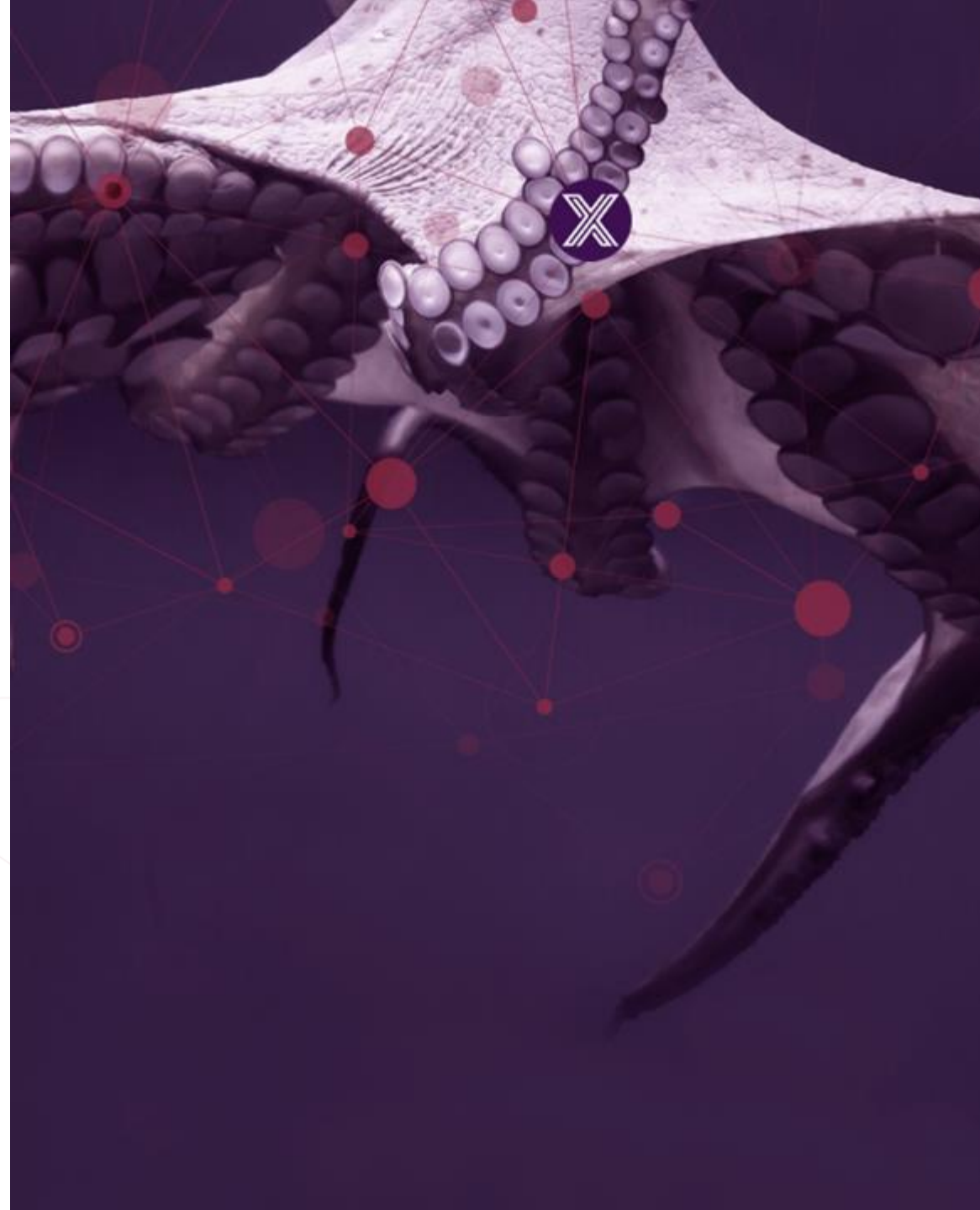
Conference Agenda – Day 3

- Nov 3, Wednesday (all times in PDT; all times tentative and fluid)
- 7:00am PDT
- 7:15am Kamakura scope planning by WG / area
    - General
        - Common
        - Cross cutting concerns
    - Core
        - GUI
        - CLI
        - System management
        - Test QA
    - Device Service
    - Application
        - eKuiper / rules engine
    - Security
    - DevOps
- 11am day 3 adjourn

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Kamakura Scope
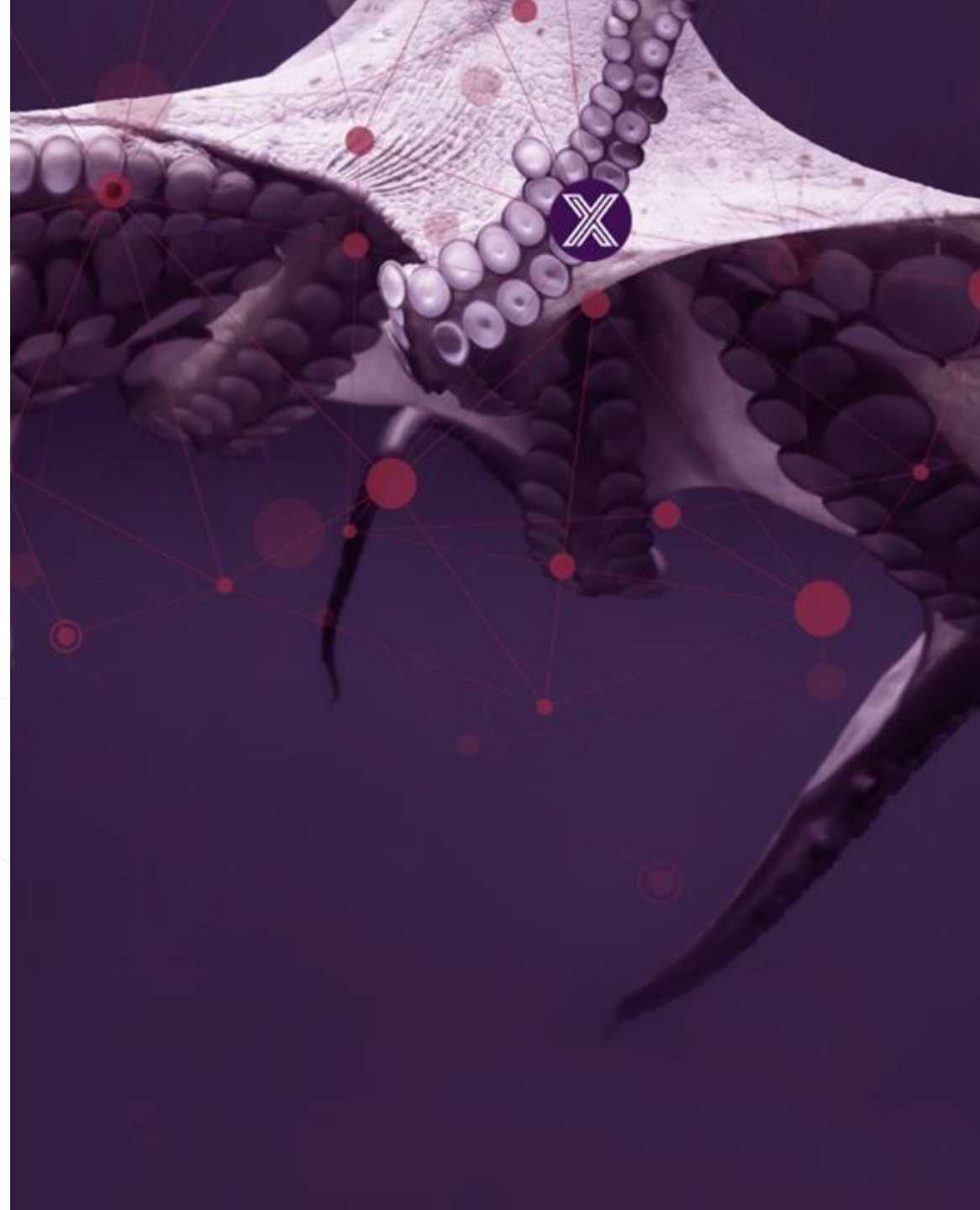
Considerations

- 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

Caveats

- Items in the pages following are options at this point
- May be research or design tasks for this release
  - May be partial implementation
- No level of effort has been determined
- No priority has been assigned

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General

- Upgrade Go (1.17)
- Always send CBOR option for performance
  - Test first and apply if it makes sense
  - What would "significant" savings look like?
  - >100 milliseconds?
- Remove ZMQ to allow for Windows native
  - Backward compatibility issue
- Replace poorly supported 3rd party libs
  - bitbucket.org/bertimus9/systemstat
  - github.com/armon/circbuf
  - github.com/go-logfmt/logfmt
  - github.com/mitchellh/consulstructure
  - github.com/pascaldekloe/goe
  - github.com/ryanuber/columnize
  - github.com/sean-/seed
  - 3 V1 CLI's as well
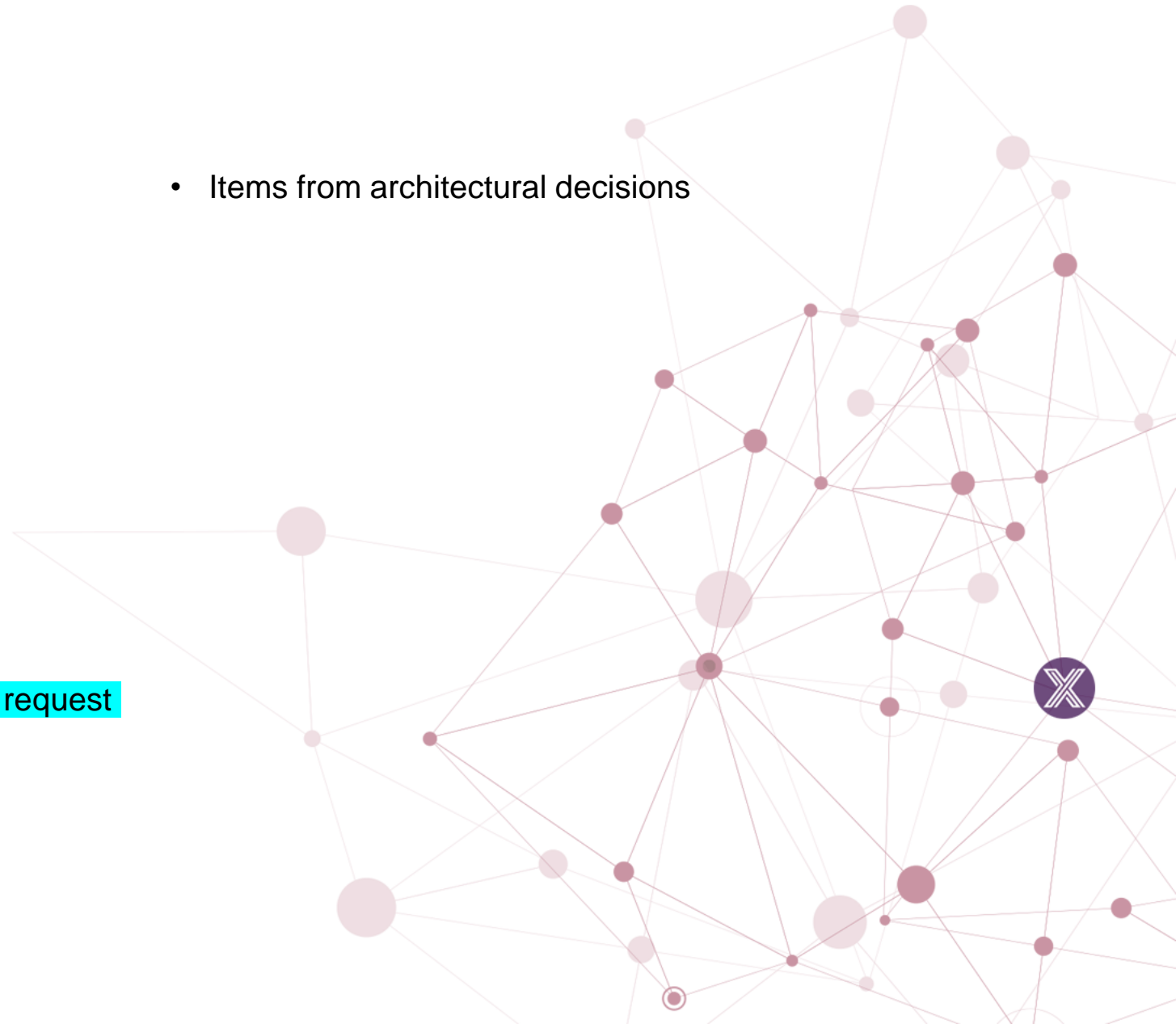
- Items from architectural decisions
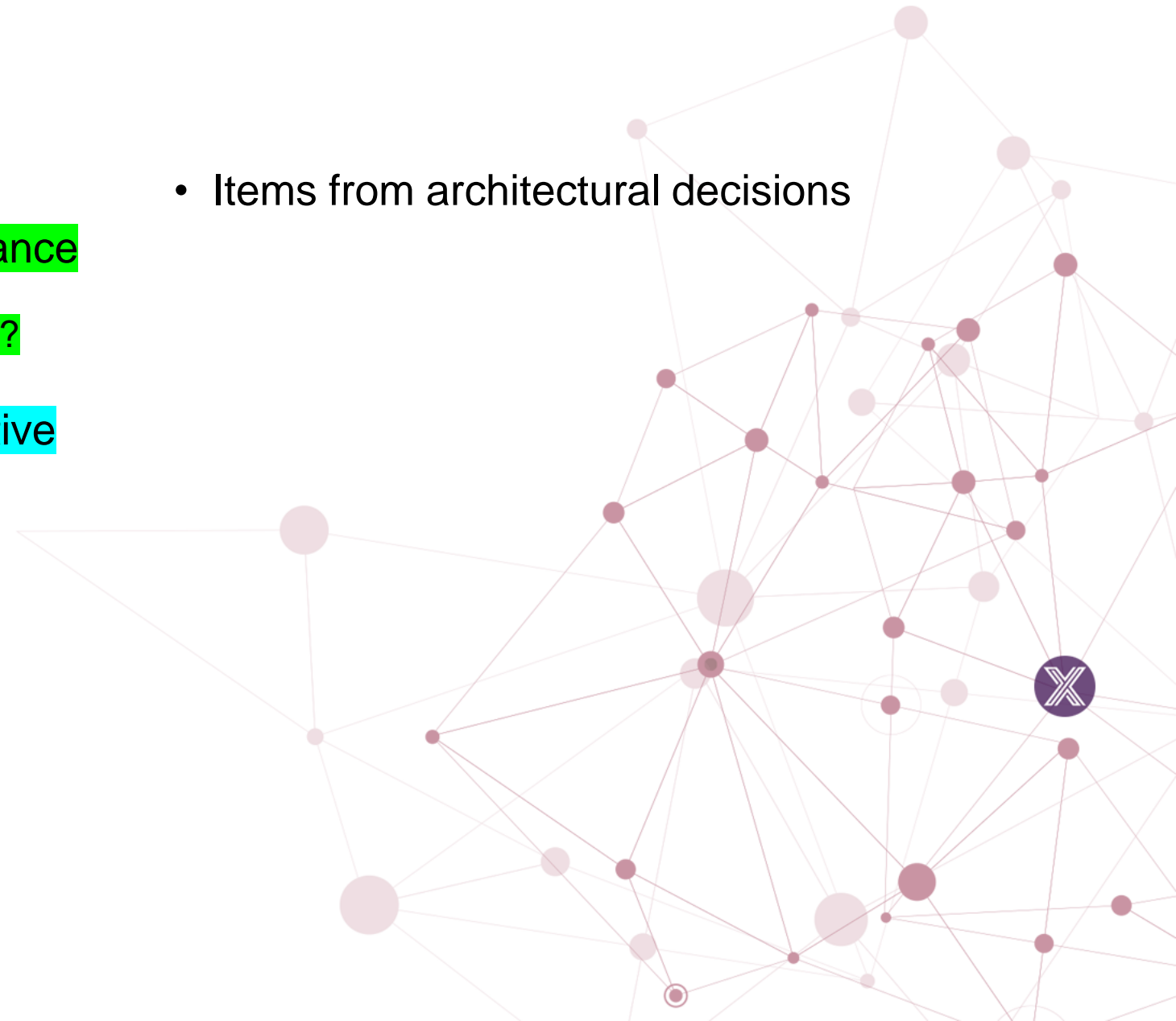
Core

- Core
  - Update lastConnected should not trigger device service callback
  - Refactor the pkg.Encode func name
  - Move to typing in JSON
    - Tech debt to use interfaces vs string:string in properties
    - Complexity - using the string match on provision watcher
  - Support custom attribute in Device object
    - Labels very simplistic and not what they are intended for
    - Eaton requirement help
    - Narrow discussion to support for parent-child
  - Prometheus integration
  - Expand the notification service
    - SMS, message bus, web sockets
    - Raise alarms (when data or metric out of threshold)

- GUI
  - Fix unallowed activity (ex: mod device profile)
  - Testing

- CLI
  - V2
  - Support app and device services
  - Support for registry, proxy setup
- Test QA
  - More Improvements to testing (from our Jakarta planning)
    - Test without optional services, message bus v REST, etc.
    - Improved integration test (Kuiper)
    - Improved stress tests
    - Improved performance testing (other device types, CBOR, etc.)
  - Trigger performance tests from edgex-taf
  - Real hardware testing
    - In the LF lab?
    - At least a small pilot
    - CI/CD integration needs?

- Items from architectural decisions

Device Services

- C SDK work outstanding
  - Complete securing consul with access tokens
  - Complete securing the message bus
  - Secret provider for all
- BACNet DS
- Review/approve contributions (UART, GPIO, CoAP)
- CORS support in C SDK / C Device Services
- Record and replay DS
  - Wiki doc design already in place
- Use cmake options to optimize dependencies
- Use Yaml v3 library (vs V2)
  - Needed for code hygiene purposes
- Handle both JSON request bodies as well as CBOR request bodies
- Implement ProtocolProperties validation mechanism
- DS Filtering
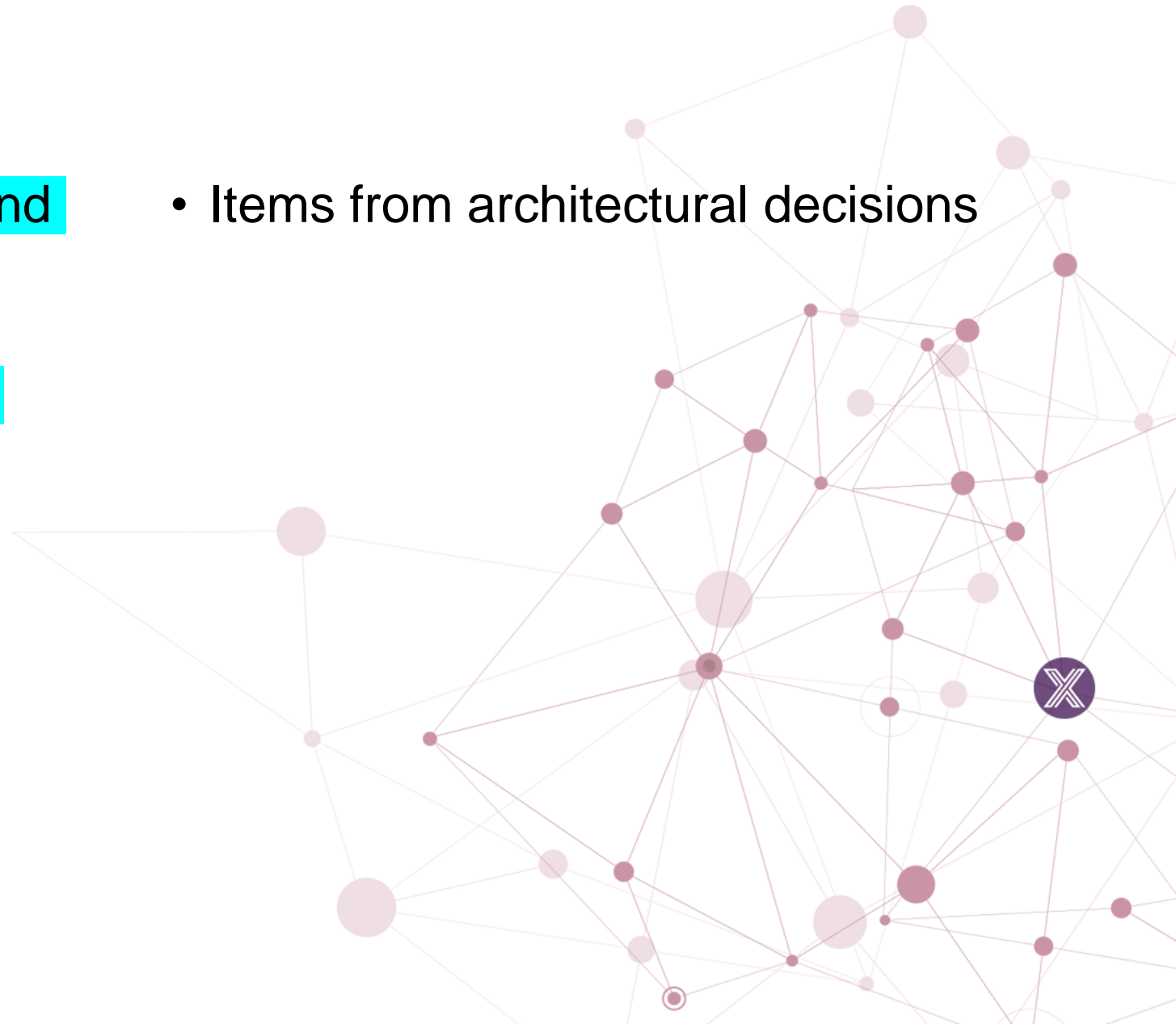 - ADR already in place

- Items from architectural decisions

Application Services

- Tight coupling between EdgeX and eKuiper
  - How do we remove this?
- Use nano message IPC for ASC pluggable pipeline function
- CloudEvent as TargetType

- Items from architectural decisions

Security

- [Secure Consul Ph2] Device SDK C: Enable Registry/Config access tokens
  - https://github.com/edgexfoundry/device-sdk-c/issues/335

- Secure message bus connection for C SDK
  - https://github.com/edgexfoundry/device-sdk-c/issues/314

- Implement ADR 0019 - Delayed start secret store tokens (SPIFFE ADR)
  - https://github.com/edgexfoundry/edgex-go/issues/3773

- Add "make lint" target and add to "make test" target (only for GO)
  - https://github.com/edgexfoundry/go-mod-secrets/issues/129

- Update SSH Tunneling for remote Device Service how to for V2
  - https://github.com/edgexfoundry/edgex-docs/issues/515

- Update Swarm for remote Device Service how to for V2
  - https://github.com/edgexfoundry/edgex-docs/issues/516

- Internal Digest implementation doesn't work with ONVIF Foscam/amcrest IPCAM
  - https://github.com/edgexfoundry/device-camera-go/issues/104

- Expose Consul UI on the host when EdgeX is operating in secure mode (snap)
  - https://github.com/edgexfoundry/edgex-go/issues/3744

- [Secure Consul Ph. 3] Fine tune Vault configuration as to Consul's secret engine token's TTL
  - https://github.com/edgexfoundry/edgex-go/issues/3258

- [Secure Consul Ph. 3] Create ACL Policies and Roles for all services and per EdgeX service
  - https://github.com/edgexfoundry/edgex-go/issues/3257

- [Secure Consul Ph. 3] Create a global Consul token (stored in a file) for use in remote configuration
  - https://github.com/edgexfoundry/edgex-go/issues/3158

- ADR for microservice communication security (ADR first – not necessarily implement)
  - https://github.com/edgexfoundry/edgex-go/issues/1950

- We should perhaps be thinking about enabling the "bring-your-own Vault" approach, similar to what I proposed for SPIFFE/SPIRE support. This would allow users to potentially run the Vault instance in a cloud where it is more secure.

- Integrate GoKart security scanning
  - https://github.com/edgexfoundry/edgex-go/issues/3715

- Investigate alternatives to Kong that have better platform support and use less memory
  - https://github.com/edgexfoundry/edgex-go/issues/3747

DevOps

- Pipeline Optimizations:
  - Tech Debt: Fix multiple nodes being spun up during edgeXBuildGoApp and edgeXBuildCApp
  - Spike: docker image multi-arch builds with buildx (spin up less nodes, speed up builds)
  - *Implementation: depending on spike docker image multi-arch builds with buildx
  - Spike: rewrite git-semver in python
  - *Implementation: depending on spike, rewrite git-semver in python
  - Potential Golang linting/scanning pipeline changes. Will coordinate with Security WG

- Documentation
  - Continued documentation updates

- Potentially automate badge awarding
- Implementation of Docker CIS Security bench pipeline
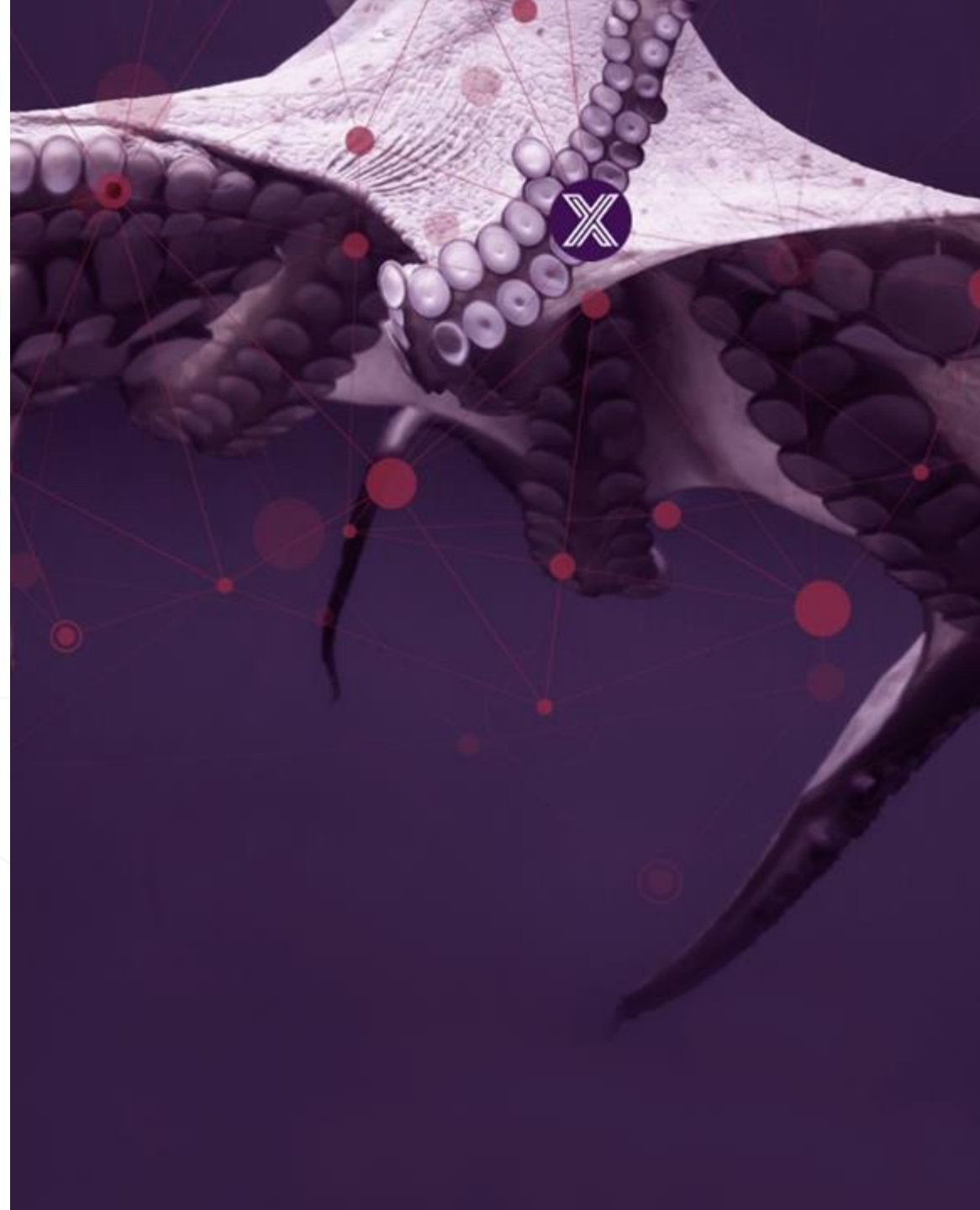- Investigate Snky API

Miscellaneous

- Snaps
  - ???

- <mark>Examples updates/improvements</mark>
  - <mark>Cloud export – more explicit for Azure, AWS, Google</mark>
  - <mark>Update cloud templates</mark>
  - <mark>Timeseries DB export (Influx)</mark>
  - <mark>RP4</mark>
  - <mark>More Kubernetes support/examples</mark>
- <mark>Docs</mark>
  - <mark>Device service restructuring and adding undocumented features</mark>
  - <mark>Documenting the API (like discovery)</mark>

Conference Agenda – Day 4

- Nov 4, Thursday (all times in PDT; all times tentative and fluid)
- 10am PDT Meeting Start
- Scope and architectural questions not addressed in prior 3 days will be finished as priority work on day 4 as needed.
- 10:15am Requests of adopters
- 11am Jakarta lessons learned
- 11:30am Spring release - in person face to face??
  - Venue/time line
- 11:45am Long term roadmap - beyond Kamakura
  - Backlog revisit
  - Next LTS forecast
- 12:30pm Planning meeting lessons learned and changes for Levski
- 1pm day 4 adjourn

On Slack – what are we getting requests for?

- Allow defining device commands more broadly not limiting them to getter/setter methods only (#3752) [Siemens]
- When a device is added, it's first inserted into database and then the device service is informed about the device. If for some reason the device service rejects this device (maybe due to some invalid configuration), the device will still be present in the database. Does it make sense that the metadata service first informs the device service and allow for an OK response before the device is added to database? [Intechww.com]
- Encrypt the sensor data in the database (decrypt when retrieving from the database. Aka – encrypt data at rest [Unknown]
- Request to order notifications [Intechww.com]
- Alternate for Kong or BYOB secure store (alternate to Vault) [Unknown]
- Multiple pipeline for more than one client [Alpha-ICT.in]
- UDP export [multiple, Freewave.com]
- Message bus to the south [multiple]
- Documentation/examples for auto discovery [Oracle]
- App functions SDK in C [multiple]
- DS'es for OPC-UA, Bluetooth, Zigbee

Lessons Learned in Jakarta

- Positives
- What could be improved
- Shout outs for great work

- For context and reference – here were our items from Ireland
  - Things that we did well/were wins
    - V2/TAF
      - Lot of work, scheduled well, coordinated well
      - Lot of redesign as we went along
    - Behaving more "agile" in project nature
    - Breaking changes – we got a lot done; removed future issues
      - Even things that weren't originally on our radar like port adjustments
    - EdgeX doing well in China
    - Slack communications
    - EdgeX Website
      - EN/Chinese
  - Things that we could improve
    - Some design decisions seemed too rushed
    - Redesign did cause churn
    - Did we tackle too much?
    - Outreach organization – needs some focus
    - Need for hackathon like outreach – COVID impact, but how do we get more developers
    - Not overlay freeze week with planning meeting
    - Need 3 weeks for freeze with LTS

Spring (Levski) Release Planning

- Time for a face-to-face?
    - Organizational support
    - Venue suggestions/volunteers to host
    - Timing
        - Mid-April?
        - With potential early May release dates

Long-term Roadmap

- Backlog
  - https://wiki.edgexfoundry.org/display/FA/Backlog
- What would we see as likely big features in Levski?
- When would we project our next LTS?
  - 2 years?
- Long-term considerations
  - Digital ledger technology
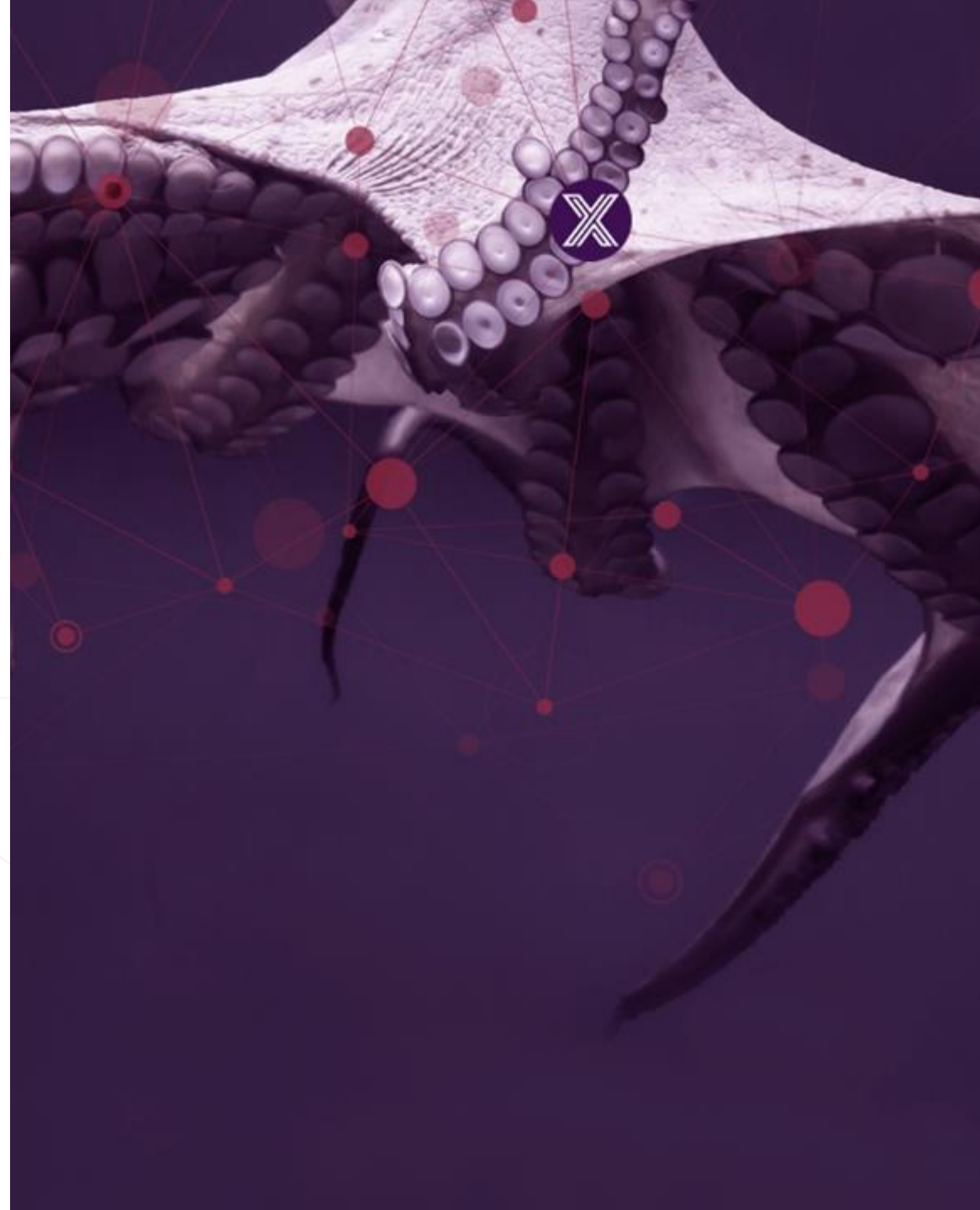   - Providence and governance

Planning Meeting 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?

Conference Agenda – Day 5

- Nov 5, Friday (all times in PDT; all times tentative and fluid)
- 8am PDT Meeting Start
- Unconference schedule to be determined