EDGE X FOUNDRY™

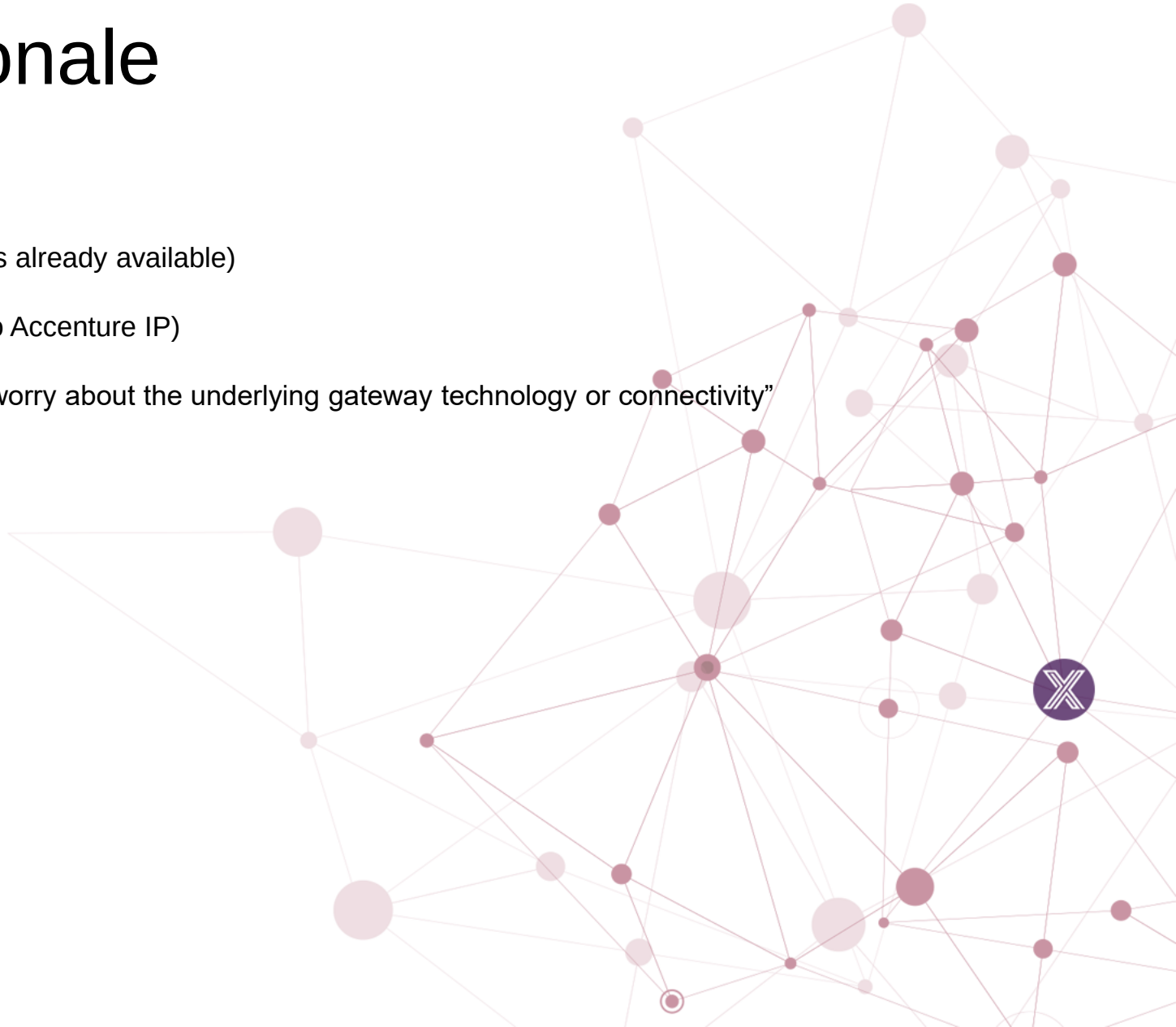
Adopter Series Requirements

Adopter Series Presentations

- Accenture, AIP+ - Jun 30
- Thundersoft, TurboX – Jul 14
- Jiangxing Intelligence, Edge Box – Jul 28
- Tibco, Project Air – Aug 25
- See https://wiki.edgexfoundry.org/display/FA/Vertical+Solutions+Working+Group#VerticalSolutionsWorkingGroup-UpcomingEvents

Why EdgeX – the Rationale

- Accenture
  - Hardware/OS agnostic
  - Cloud agnostic (with multiple cloud connectivity options already available)
  - Rich variety of protocol connectors
  - Flexible micro service architecture (easy to integrate to Accenture IP)
  - Download and execute dockerized images
  - “generate value for our customers without needing to worry about the underlying gateway technology or connectivity”
- Thundersoft
  - Micro service based
  - Cloud support
- J.I.
  - Interoperability/plug-play components
  - Hardware/OS agnostic
  - Flexibility/micro service architecture
- Tibco
  - Open and unifying
  - Interoperable
  - Collaboration with other LF Edge projects
  - Community support
  - Application SDK



Requirements

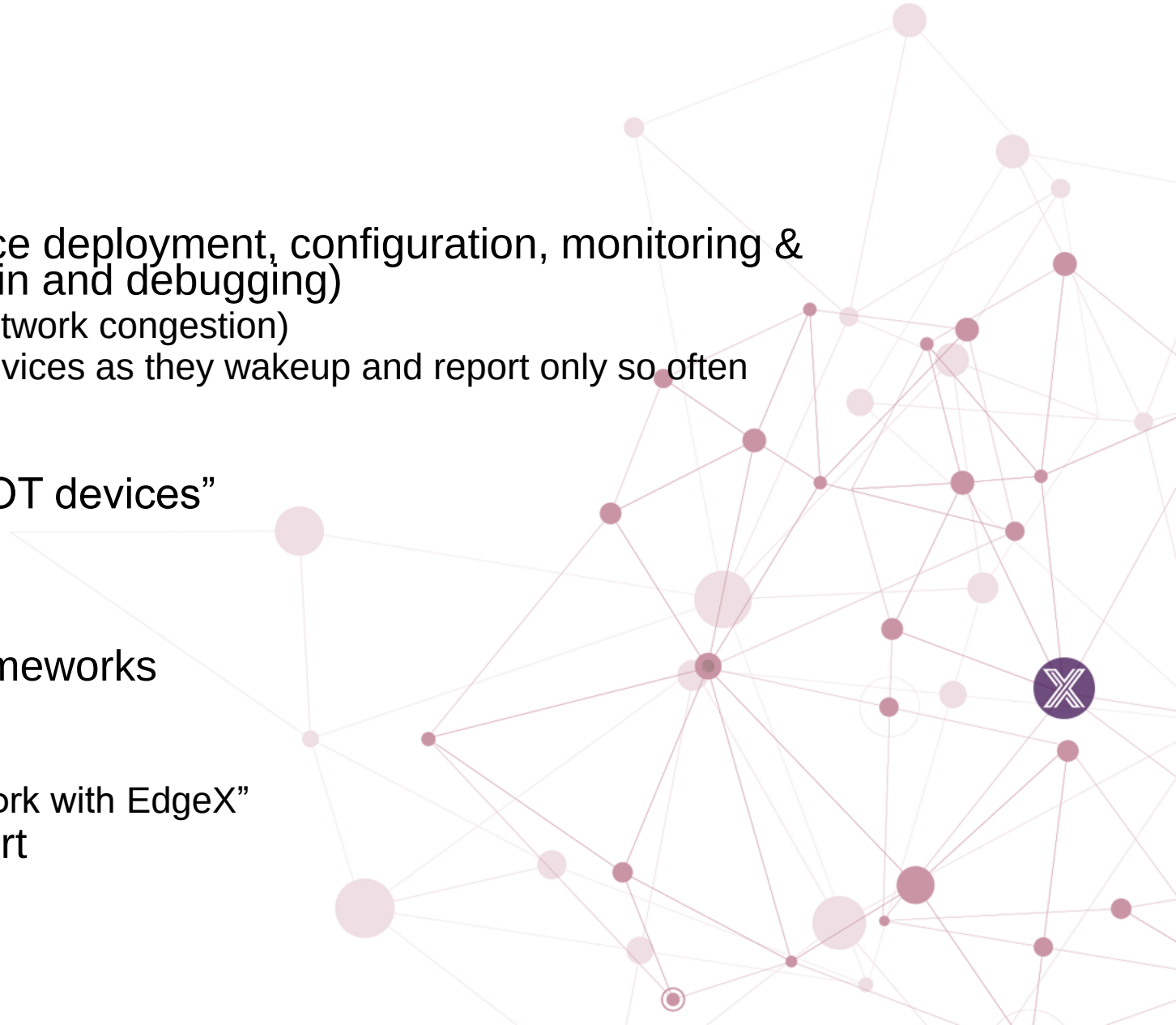
- This deck includes potentially requirements collected from the EdgeX Adopter Series from the summer of 2020
  - Requirements already built into EdgeX are not covered
- Requirements are categorized as
  - **Explicit** requests for new features, changes, etc.
  - **Implicit**
    - Based on description of their use cases/solutions
    - Extensions they have built
    - Changes they made to EdgeX

Accenture

- Implicit
  - Low code/no code pipeline configuration
  - Deal with a wide range of device protocols
  - Filter data at the edge
  - Use data at the edge
  - Offer Digital Twin
  - Long lived solutions (“obsolescence's factor”)
  - Autonomous operation requires high reliability
  - High operational availability means weeks of planning on patches/upgrades to avoid outages
  - Device registration from top down
  - Device data simulator

Accenture

- Explicit Asks
  - Tooling to support remote IOT device deployment, configuration, monitoring & administration (included remote login and debugging)
    - Diagnosing network issues/faults (network congestion)
    - Losing data from battery powered devices as they wakeup and report only so often
    - Device failure
    - Incorrect configuration
  - Support for “Intelligent connected IOT devices”
    - Cameras
    - Semi-autonomous devices
    - Distributed analytics pipelines
  - Recommend and integrate with frameworks
    - Video analytics and robotics
  - Certification schemes
    - These devices are “guaranteed to work with EdgeX”
  - Better real time/deterministic support



Accenture – other notes

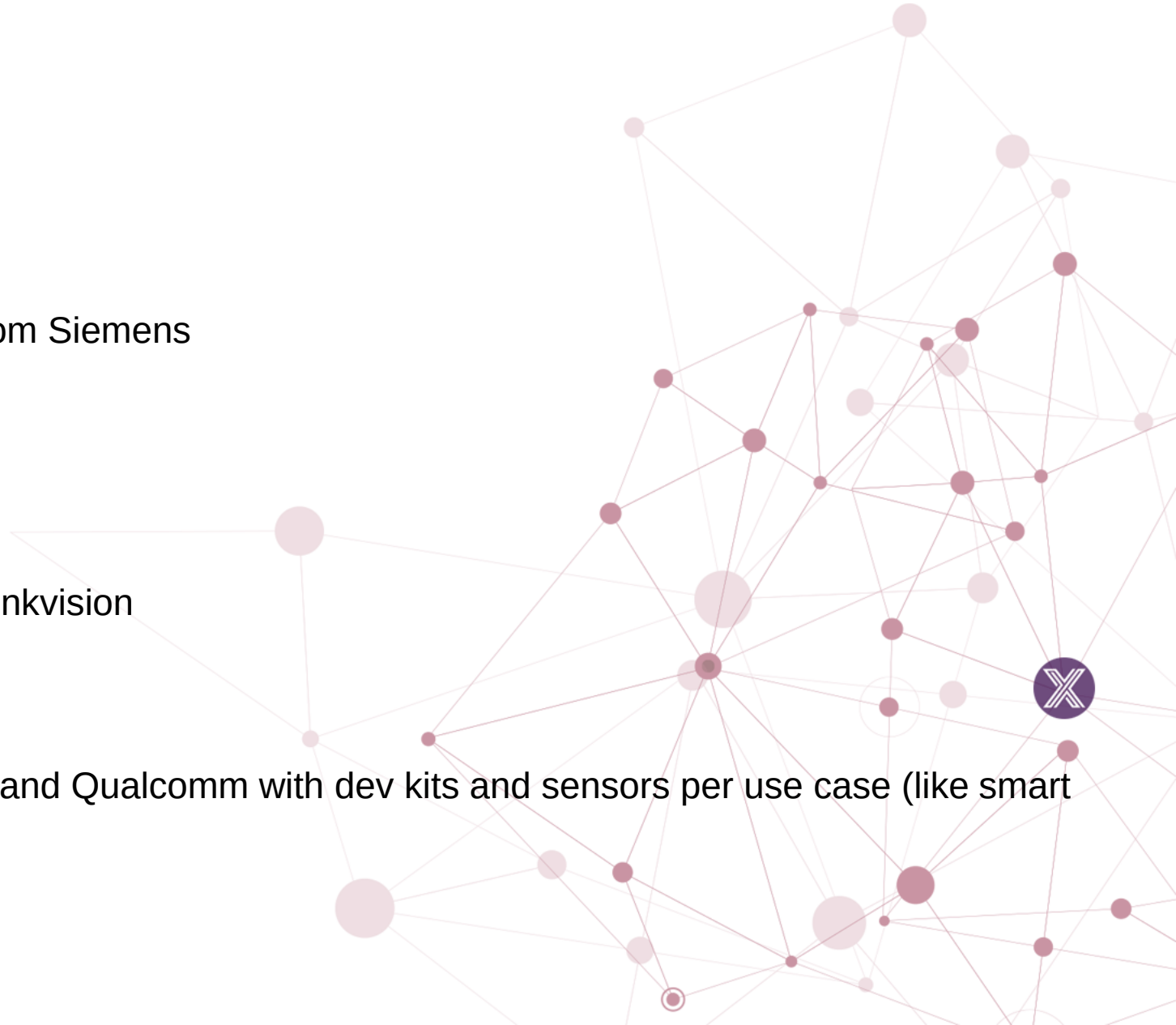
- Used to use Kura
- Focused on industrial use cases
- Trialing video analytics for smart city
  - Pot hole detection on garbage truck
- Concern for how expensive the gateway (hardware/software) is
  - A limiting factor (process and memory power)
  - Moore's law will take this problem away
- Use hardware acceleration at the edge
  - GPU and CPU execution in parallel for analytics
- "Engineers put too much debug and lose performance"
  - They have a tunable metrics collection capability
  - Use Grafana for metrics display and tip to potential problems
  - Operator commands additional information when there appears to be a problem
- "Accenture solution creation teams value this solution more than clients."
  - Clients view it as a black box – they want an implementation that is cost effective and reliable

ThunderSoft

- Implicit
  - Enhanced multimedia support
  - Enabled Robot Operating System (ROS)
  - ONVIF support
  - Additional sensor/protocol support (many Chinese hardware)
  - Data caching on the edge
  - Device virtualization
  - Android support
  - EdgeStream – like gstreamer

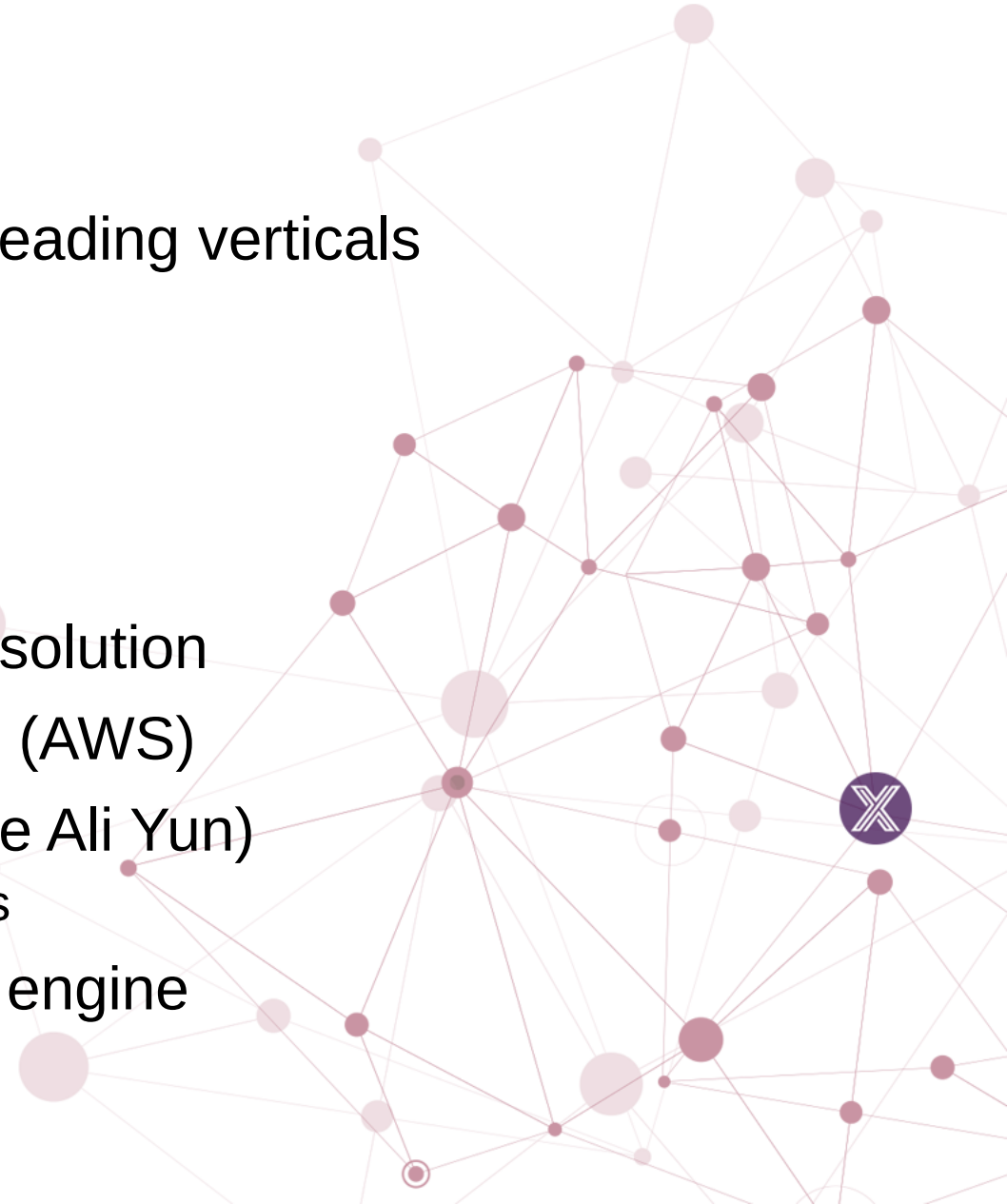
ThunderSoft

- Explicit
  - More sensor / protocol support
    - More hardware specific devices
    - Commerical protocols – like those from Siemens
  - ROS support
  - ONVIF support
  - Video processing
    - Multimedia framework support
  - Extended Cloud support
    - Greengrass, MS Azure IOT, Ali Yun linkvision
  - Data caching on the edge
  - Qualcomm support
  - EdgeX “Plus”
    - Ready made solutions on RP3, Intel and Qualcomm with dev kits and sensors per use case (like smart factor, etc.)



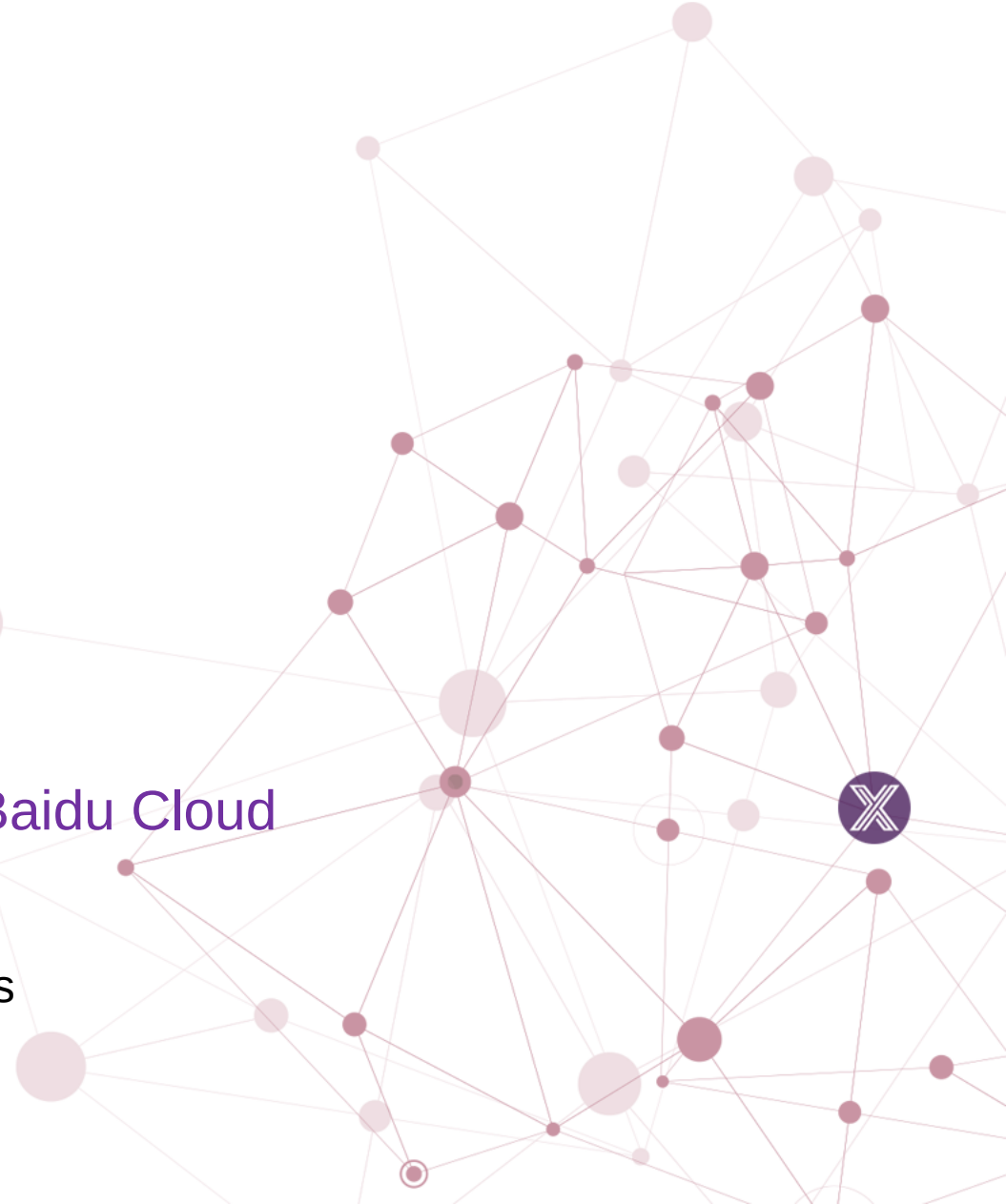
ThunderSoft – other notes

- Smart city, industrial, automotive, robotics are leading verticals
  - Smart home, smart office, healthcare trailing
- Standardization accelerating
  - Alliance of Industrial Internet with EdgeCross
- End to end solutions are must-have
- Customers don’t ask for EdgeX, they ask for a solution
- Using Greengrass to do data buffering to cloud (AWS)
- Some cloud vendors are doing more in IOT (like Ali Yun)
  - Cloud vendors are not doing a good job with devices
- Using Tensor Flow and Tensor Flow light for AI engine



Jiangxing Intelligence

- Implicit
  - Time series database (Influx)
  - MCU/FPGA support
  - AI inference integration
  - Caching QoS (messaging)
  - Container optimization
    - Reducing the size of containers
    - Reduce transmission time and storage of containers
  - Application management
  - UI
  - Connectivity to Alibaba Cloud, Tencent Cloud, Baidu Cloud
  - Robotic devices integration
  - Kubernetes integration
    - Docker Swarm for ARM and smaller resource systems

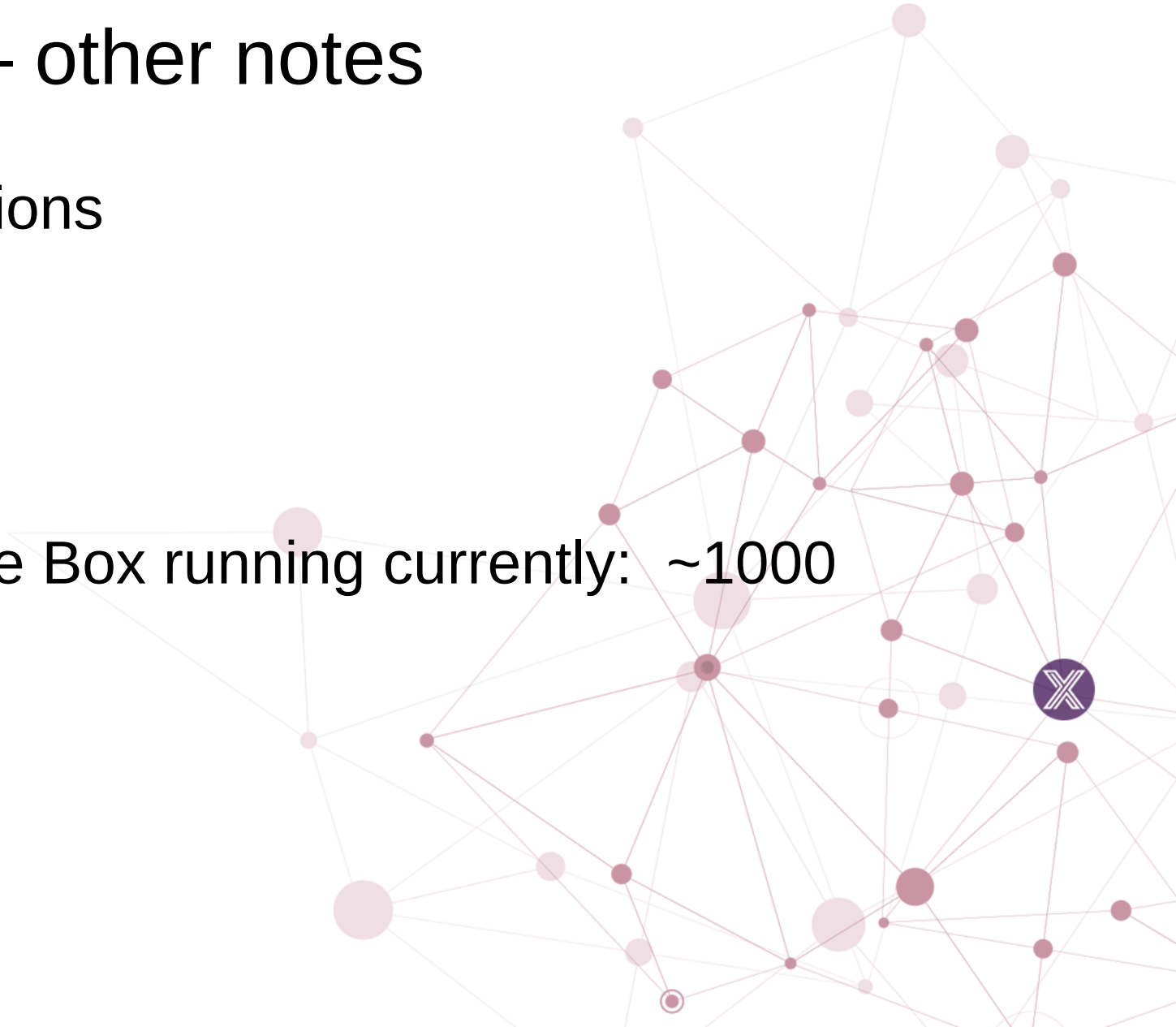


Jiangxing Intelligence

- Explicit
  - More help for C/C++
  - More conveniences around deployment
  - AI notification interface (AI results to actuate)
    - Data in/out of AI engines (not necessarily model upgrades/updates, etc)
  - New resource management
    - How many times is a function (like AI function) is called
  - Video streaming & analytics
    - Detect objects
  - Energy saving strategy
    - Take advantage of low resource (power) devices
    - Use MCU based strategy
    - Turn on/off things “smartly”
  - Lower performance overhead (high priority need – because of industrial use cases and existing hardware there and ARM chips)
    - Writing and reading actions have high overhead (especially for ARM)
  - Device registration optimization (device unique ID required per instance of Edge Box)
  - Move to HA services / solutions
  - More convenient UI
  - Compatibility with more frameworks like NV DeepStream

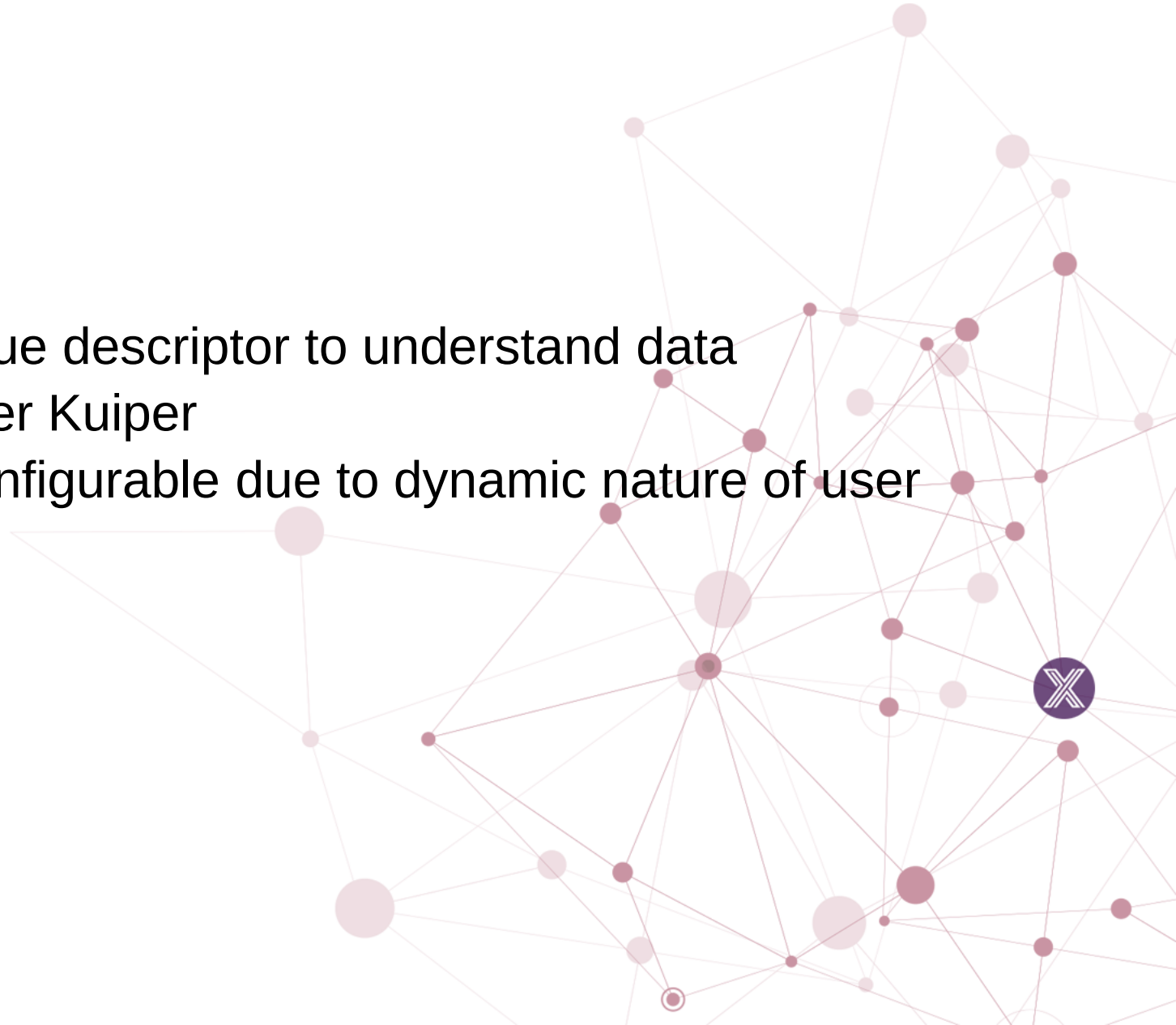
Jiangxing Intelligence – other notes

- Created pre-packaged solutions
  - Water affairs
  - Power grid monitoring
  - Smart Substation
  - Etc.
- Number of instances of Edge Box running currently: ~1000



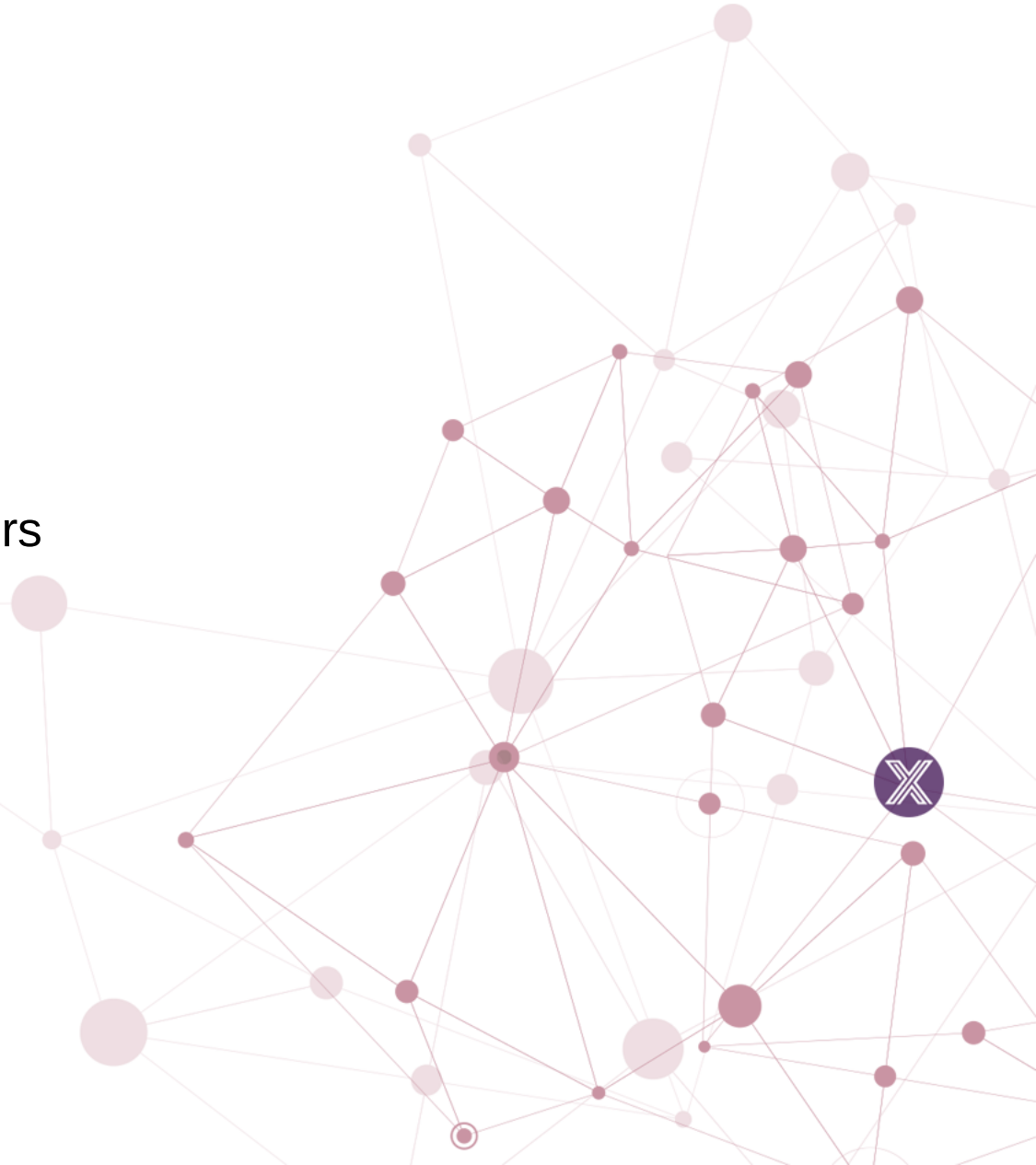
Tibco

- Implicit
  - Stream processing
  - Use of device profile over value descriptor to understand data
  - Integration of Flogo Rules over Kuiper
  - Custom app services over configurable due to dynamic nature of user needs
    - Add/remove filters, rules, etc.



Tibco

- Explicit
  - Deployment (dynamically)
    - Project Eve integration
  - Sensor / protocol support
    - Integration with Fledge for low level connectors
    - Manufacturing protocols/devices in particular



Tibco – other notes

- “Connect, Unify, Predict” – project orientation
- Performance optimization – race car data
- Horizontally focused
  - Tibco verticals come to Tibco Labs for horizontal solutions that can be applied vertically
- Integrates with Tibco Flogo Runtime @ the gateway
- Project Air is open source – driving backend Tibco solutions
  - Facilitate edge to enterprise integration
- No customer deployments in production yet