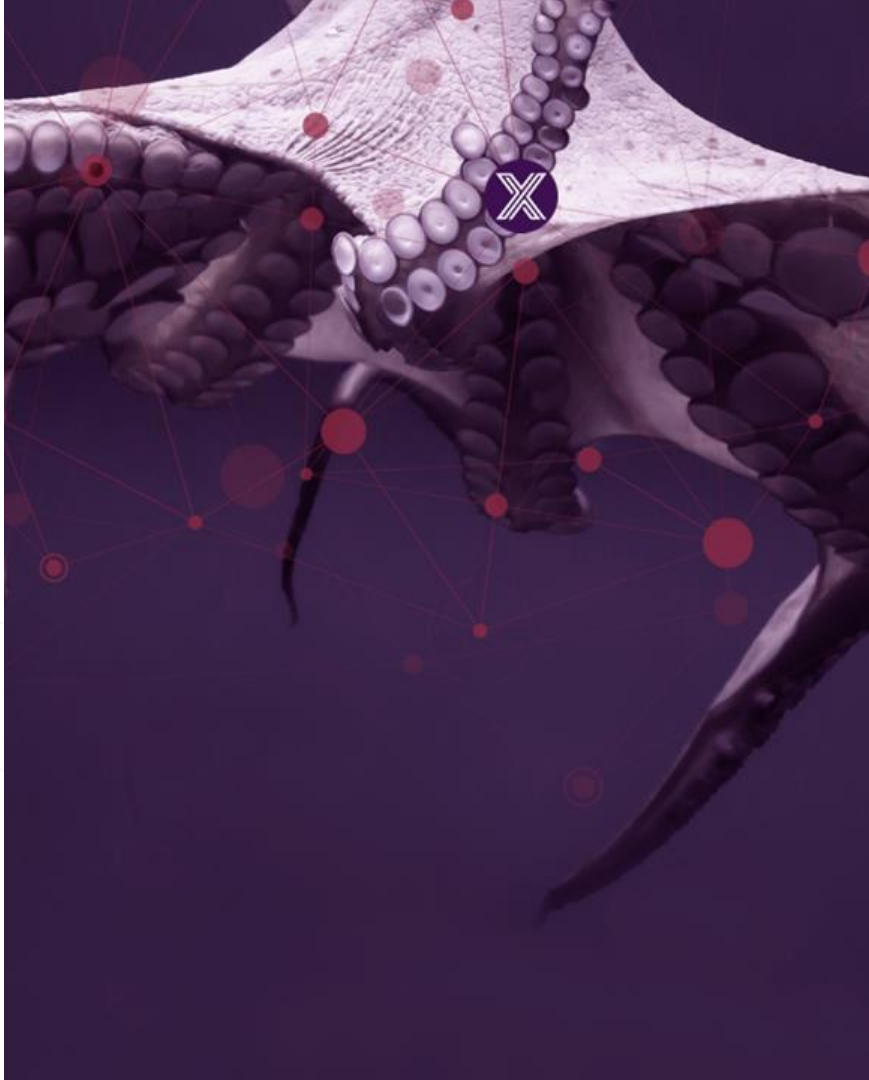
EDGE X FOUNDRY™

China Project Meeting

https://wiki.edgexfoundry.org/display/FA/China+Project

Apr 3, 2020



LF Antitrust Policy Notice

EdgeX Foundry meetings involve participation by industry competitors, and it is the intention of the Linux Foundation to conduct all of its activities in accordance with applicable antitrust and competition laws. It is therefore extremely important that attendees adhere to meeting agendas, and be aware of, and not participate in, any activities that are prohibited under applicable US state, federal or foreign antitrust and competition laws.

Examples of types of actions that are prohibited at EdgeX Foundry meetings and in connection with Linux Foundation activities are described in the Linux Foundation Antitrust Policy available at http://www.linuxfoundation.org/antitrust-policy. If you have questions about these matters, please contact your company counsel, or if you are a member of the Linux Foundation, feel free to contact Andrew Updegrove of the firm of Gesmer Updegrove LLP, which provides legal counsel to the Linux Foundation.

Meeting Logistics

Time: 3pm – 4pm (China Standard Time) CST first Friday monthly

Dial-In Info: Join Zoom Meeting: https://zoom.us/j/392518710

Dial by your location:

+86 10 87833177 China

+86 10 53876330 China

400 669 9381 China Toll-free

400 182 3168 China Toll-free

400 616 8835 China Toll-free

+1 669 900 6833 US (San Jose)

+1 646 558 8656 US (New York)

877 369 0926 US Toll-free

855 880 1246 US Toll-free

Meeting ID: 392 518 710

Find your local number: https://zoom.us/u/abscayLpz

*China Project calls are recorded and added to Wiki post-call

China Project – Core Team Members/Representatives Present Today

Company	Name	Email
VMware	Gavin Lu	gguanglu@vmware.com
Intel	Melvin Sun	melvin.sun@intel.com
Thundersoft	Shuo Zhang	gavin.zhang@thundersoft.com
Thundersoft	Pengcheng Zou	zoupc@thundersoft.com
WayClouds	Qiang Fu	fuqiang@wayclouds.com
CertusNet	Liyuan Zhang	zhangly@certusnet.com.cn
EMQ	Rocky Jin	rocky@emqx.io

Note: Quorum for China Project meetings requires at least fifty percent of all voting members of the TSC to be present. The TSC may continue to meet if quorum is not met, but will be prevented from making any decisions at the meeting. Decisions by vote at a meeting require a majority vote of those in attendance, provided quorum is met. Current quorum = 5 members

Today's Agenda

- Core team updates
- Industry sub-teams updates
- Upcoming Events

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Core team update

Maintainers

Maintainer Update (Gavin)

- China Project wiki
  - https://wiki.edgexfoundry.org/display/FA/China+Project
- Training webinar
  - #2: expert service and scheduling, by VMware, on Mar 6
  - #3: add devices and service monitoring, by Thundersoft, on Mar 13
  - #4: use EdgeX device service & Node RED, by IOTech, on Mar 20
  - #5: use OpenVINO with EdgeX for Edge Inference, by Intel, on Mar 27
  - #6: EdgeX Hackathon station setup (HW,SW, Tools, etc.), by Intel on Apr 2
- Quarterly meetup
  - Defer to Apr
- Official Wechat
  - Went live on Mar 3
  - ID: EdgeXFoundryCN, Chinese: “EdgeXFoundry社区”
  - Operator: VMware Comm team or outsourcing
- External facing collaboration
  - Proposal of a joint lab based on EdgeX, submission to AII, due by Apr 30

Maintainer Update (Melvin)

- Welcome to join EdgeX Ideation Challenge hosted by EdgeX Foundry
  https://www.topcoder.com/challenges/30117605/?type=develop

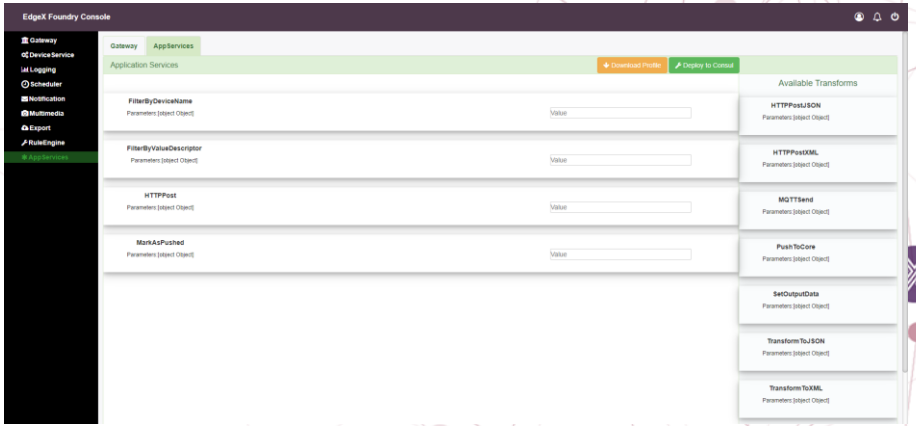
  Deadlines:
  Registration - 24:00, Apr 15th
  Submission - 24:00, Apr 16th
  Review - 24:00, Apr 18th
  Winners - 24:00, Apr 19th
- Marketing plan in the next 6 months
  - EdgeX Hackathon in China
  - EdgeX marketing report/white-paper on use-cases and solutions in China

Direct Contribution to EdgeX: Rule Engine (EMQ: Rocky)

- Kuiper - An edge lightweight IoT data analytics software
  - Kuiper for EdgeX beta version was released at 23th, Mar
  - Next internal version to be released at 7th, Apr (Kuiper 0.3.0)
  - First EdgeX integration version to be released at the week of 13th, Apr (Kuiper 0.3.1)
  - Documents
    - EdgeX rule engine tutorial - https://github.com/emqx/kuiper/blob/master/docs/en_US/edgex/edgex_rule_engine_tutorial.md
    - How to get metadata of EdgeX in Kuiper – https://github.com/emqx/kuiper/blob/master/docs/en_US/edgex/edgex_meta.md
    - Edgex Message bus sink: https://github.com/emqx/kuiper/blob/master/docs/en_US/rules/sinks/edgex.md
  - Resources
    - https://github.com/emqx/kuiper
    - Kuiper 2020 roadmap: https://github.com/emqx/kuiper/projects/1

EdgeX UI (Gavin)

- Status
  - finished integration with App Services Configurable



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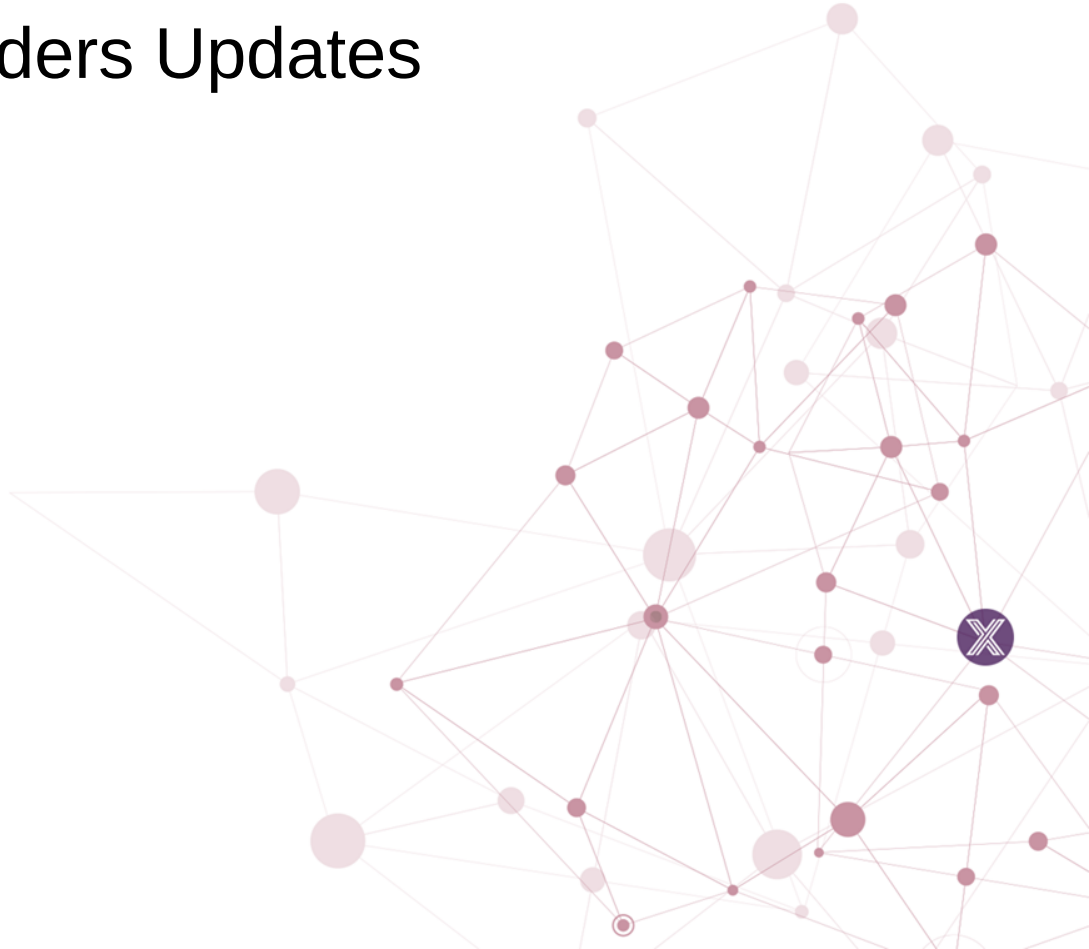
Industry Sub-team Updates

Team Leaders

Industry Sub-team Leaders Updates

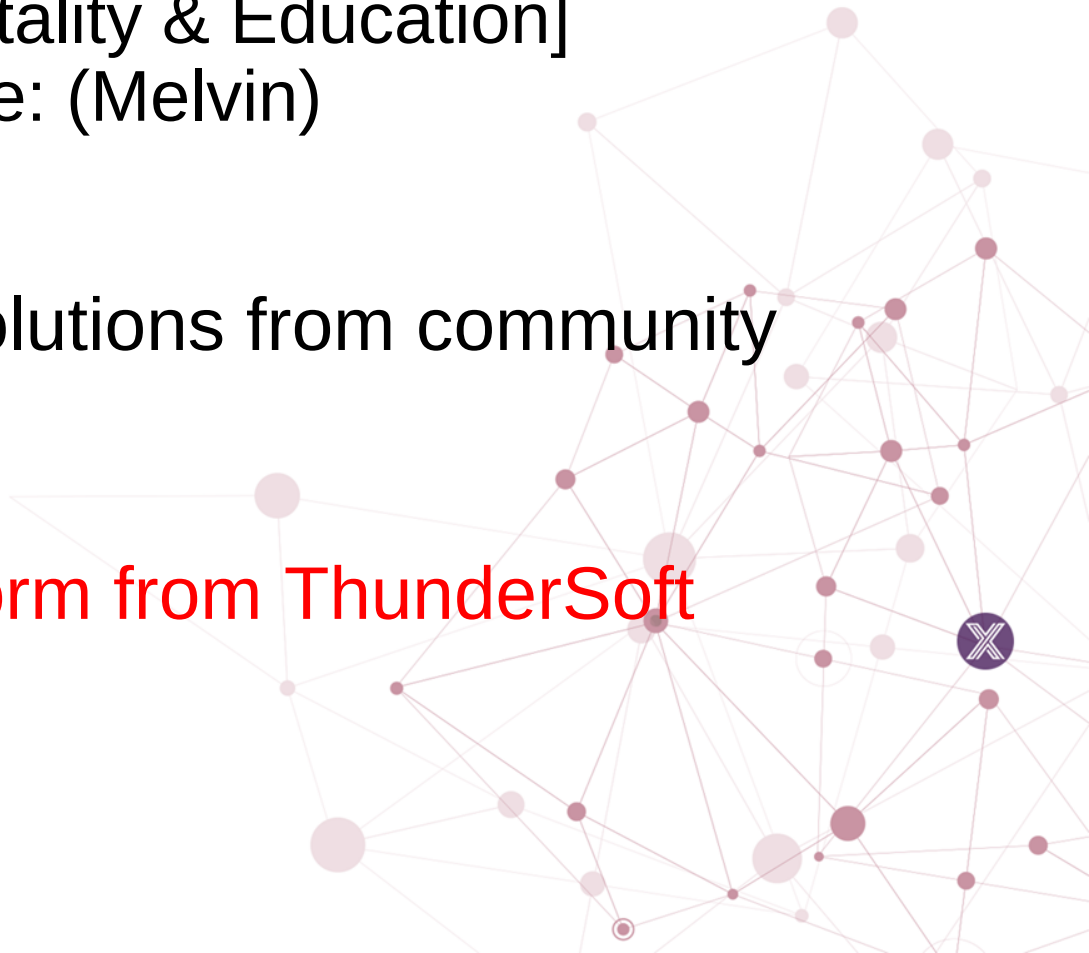
- Retails
  - Intel: Melvin Sun
- Manufacturing
  - Thundersoft: Shuo Zhang
- Energy
  - WayClouds: Qiang Fu
- Cities/Campus
  - Intel: Melvin Sun
- Transportation



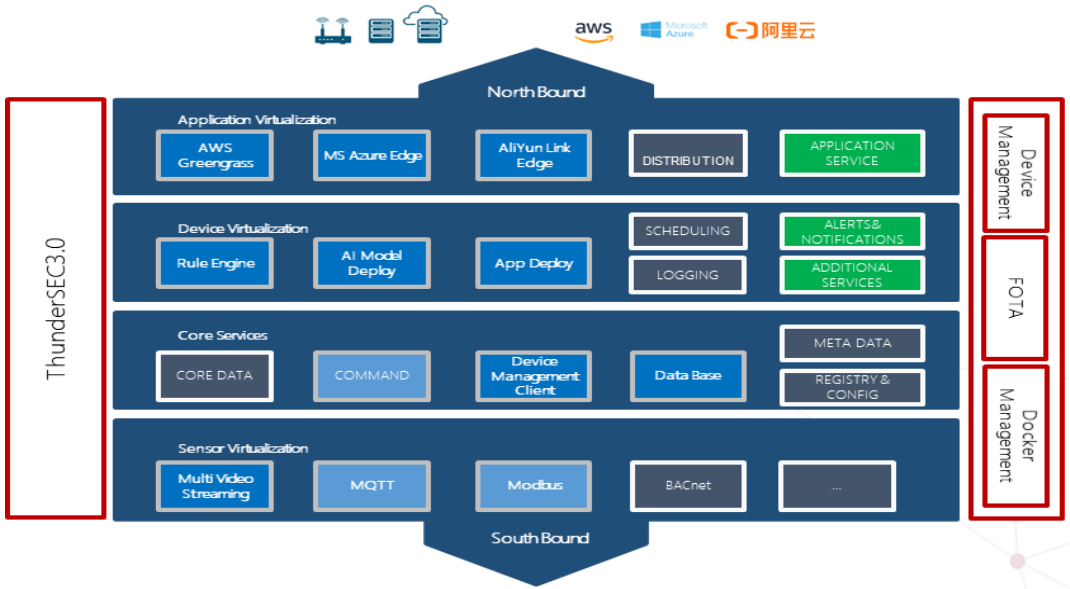
[Retail, Banking, Hospitality & Education] sub-team leader update: (Melvin)

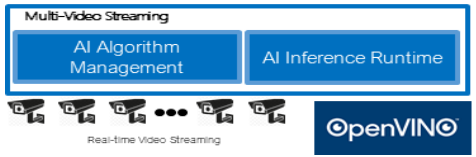
EdgeX commercial solutions from community members

-- TurboX Edge Platform from ThunderSoft



ThunderSoft--TurboX Edge Platform





TurboX EDGE 是面向边缘计算，独立于硬件厂商和服务厂商的软件平台。可与物联网场景中已有的网关设备、传感器设备和云服务协同工作。
TurboX EDGE包括传感器虚拟化，核心服务，设备虚拟化，应用服务虚拟化四个主要部分。实现物联网数据从南向（设备端）到北向（云端）的传输、存储、汇总和分析，以及对物联网设备从北向（云端）到南向（设备端）的智能控制，并提供标准的、开发的设备连接接口以及边缘计算集群管理与系统管理参考实现。

跨平台
支持X86 \ ARM64 计算架构；支持Android、Linux、Windows 多种操作系统

微服务
基于容器化微服务技术开发更有管理型的、易扩展的、可移植的。

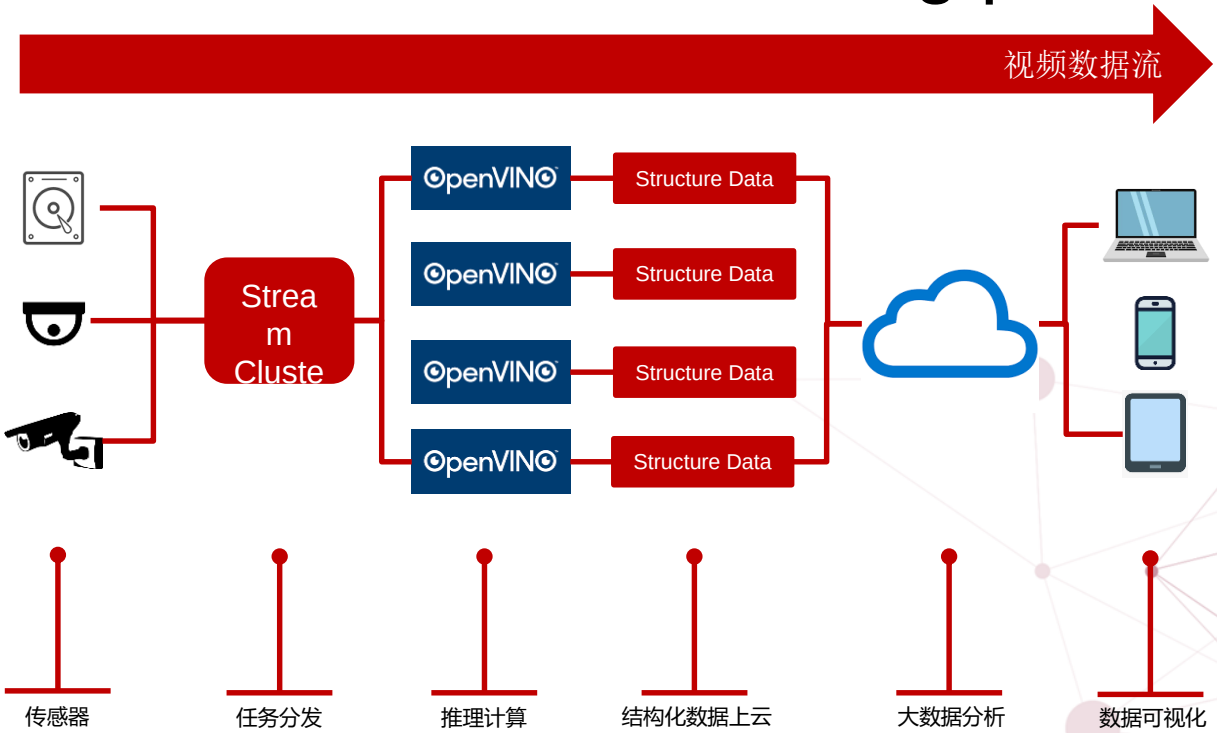
实时处理
提供高性能的嵌入式人工智能计算硬件平台与软件环境
支持多摄像头的实时视频流采集

安全增强
系统隔离、全硬盘加密、代码保护

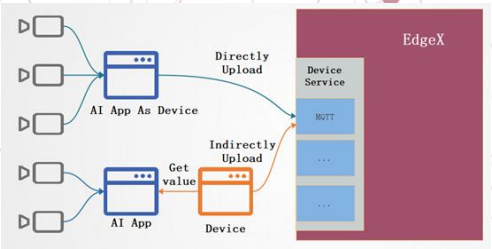
集成主流云服务
AWS\MS Azure IoT\ Ali Yun

整体解决方案
提供端到端的系统管理方案，例如FOTA，设备管理。

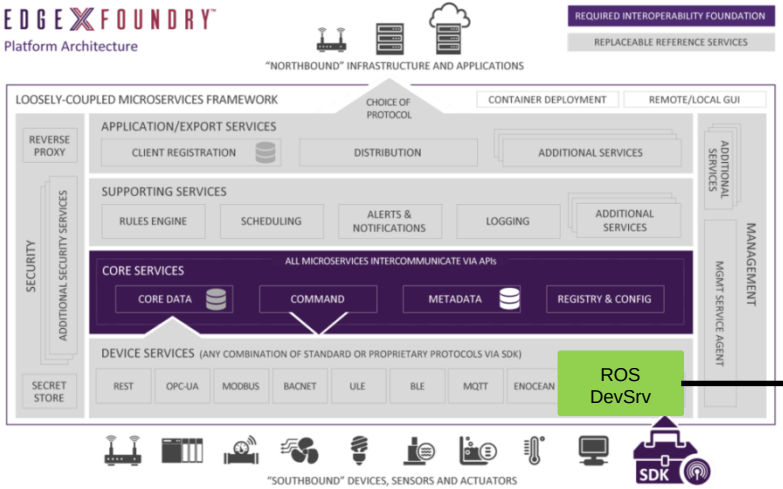
Data analytics capabilities on the Edge: multi-sources of video streaming processing



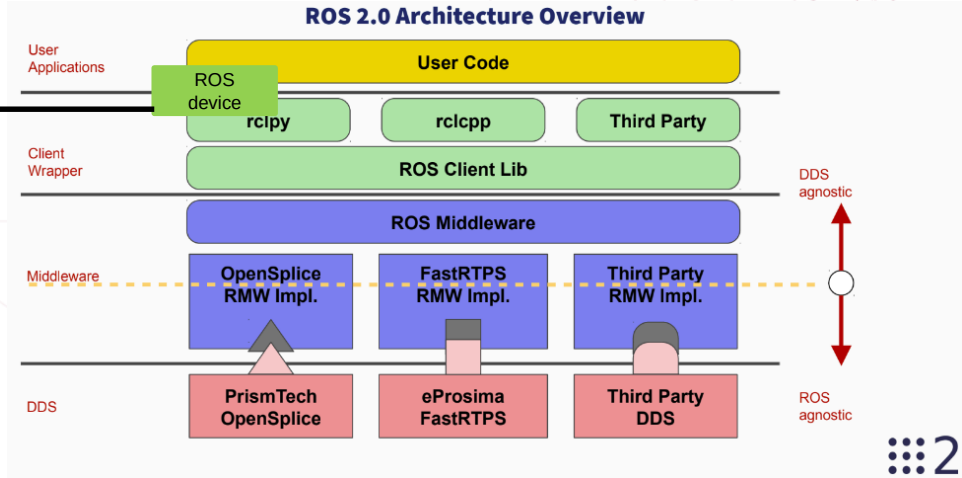
RT EDGE 是TurboX EDGE为满足基于视频、图像数据进行实时决策所构建的独立服务，提供人工智能推理计算所必须的硬件资源和运行环境。RT EDGE 是传感器虚拟化的一种特定实现，在其内部将视频流数据作为输入，将人工智能算法推理计算后的特征数据作为输出。通过这样的架构设计，使得系统可处理人工智能算法推理结果与其他传感器的数据之间的业务逻辑关联。



[Manufacturing] sub-team leader update: (Shuo Zhang)



Robots are gradually entering the retail, service, delivery, inspection and other application scenarios, but currently there is no mature solution for information interaction with traditional IoT devices.



- Add a Device service to EdgeX to receive and send ROS messages.
- Add a ROS node to the ROS system to convert ROS messages with the EdgeX API.

[Manufacturing] sub-team leader update: (Shuo Zhang)

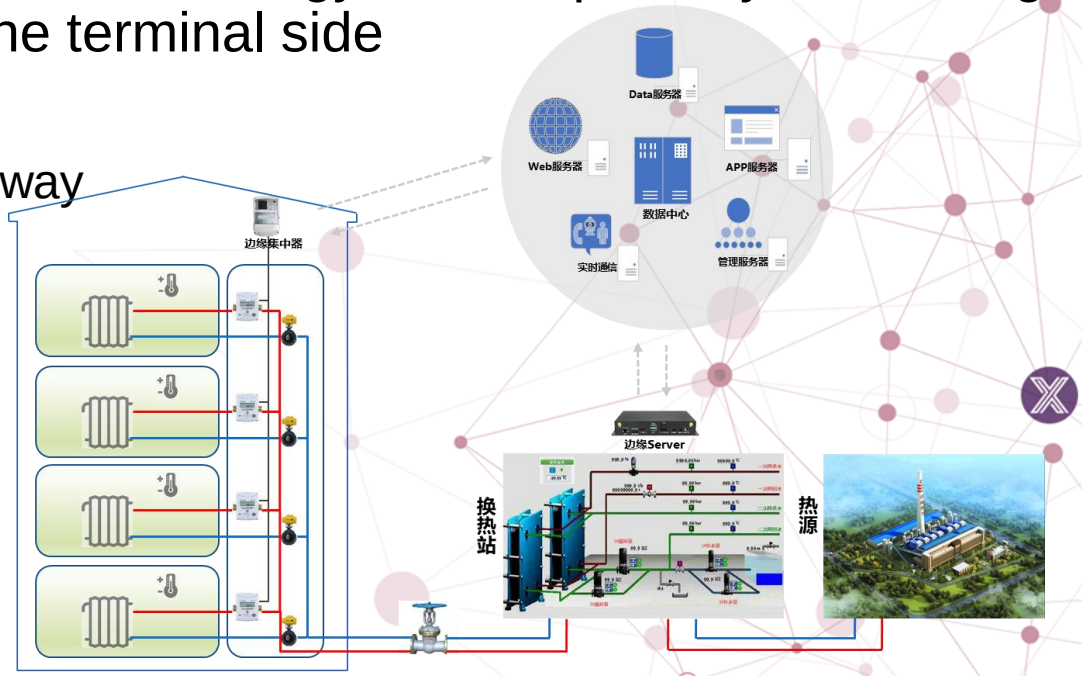
- EdgeX and ROS2
  - April 2020，KickOff
  - June 2020，Running on Robotics
  - September 2020，Release and running on real Robot product.

[Energy] sub-team leader update: (Qiang Fu)

- Plan of enterprise lighting and power saving collaboration with Opple
  - Commercial estate Smart Lighting Project resumes run in early April
  - First projects in Shanghai will begin to be delivered in June，More than the 100 Client use
  - A large number of IoT devices will be connected and tested in the project，Contains the communication protocols：ZigBee、Wi-Fi、BLE
  - Feedback to the community on long-term use and improvement suggestions

[Energy]: Heat supply by Xiao Shen, Quarkdata

- Value proposition: Reduce the energy consumption by 15% using Edge computing from the terminal side
- HW
  - ARM based edge gateway
  - 4 Cores. 2G LPDDR4.
  - Mbus/485/USB2/RJ45
- SW
  - Ubuntu 16
  - EdgeX Foundry



[Energy]: Heat supply by Xiao Shen, Quarkdata

- CFD based optimization for single room

$$\begin{cases} \frac{\partial(\rho u)}{\partial t}+\frac{\partial(\rho uu)}{\partial x}+\frac{\partial(\rho vu)}{\partial y}+\frac{\partial(\rho wu)}{\partial z}=\frac{\partial}{\partial x}(\mu\frac{\partial u}{\partial x})+\frac{\partial}{\partial y}(\mu\frac{\partial u}{\partial y})+\frac{\partial}{\partial z}(\mu\frac{\partial u}{\partial z})-\frac{\partial p}{\partial x}+S_u \\ \frac{\partial(\rho v)}{\partial t}+\frac{\partial(\rho uv)}{\partial x}+\frac{\partial(\rho vv)}{\partial y}+\frac{\partial(\rho wv)}{\partial z}=\frac{\partial}{\partial x}(\mu\frac{\partial v}{\partial x})+\frac{\partial}{\partial y}(\mu\frac{\partial v}{\partial y})+\frac{\partial}{\partial z}(\mu\frac{\partial v}{\partial z})-\frac{\partial p}{\partial y}+S_v \\ \frac{\partial(\rho w)}{\partial t}+\frac{\partial(\rho uw)}{\partial x}+\frac{\partial(\rho vw)}{\partial y}+\frac{\partial(\rho ww)}{\partial z}=\frac{\partial}{\partial x}(\mu\frac{\partial w}{\partial x})+\frac{\partial}{\partial y}(\mu\frac{\partial w}{\partial y})+\frac{\partial}{\partial z}(\mu\frac{\partial w}{\partial z})-\frac{\partial p}{\partial z}+S_w \end{cases}$$

μ：粘度，空气粘度随温度变化，大致在 0.017~0.019 之间，单位 $Pa\cdot s$。

p：压力

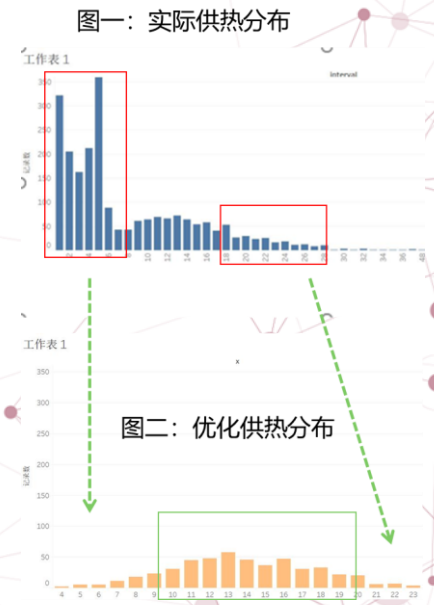
S_u, S_v, S_w：三个方向的广义源项

Zone Sensible Heating

	Calculated Design Load [W]	User Design Load [W]	User Design Load per Area [W/m2]	Calculated Design Air Flow [m3/s]	User Design Air Flow [m3/s]	Design Day Name	Date/Time Of Peak {TIMESTAMP}	Thermostat Setpoint Temperature at Peak Load [C]	Indoor Temperature at Peak Load [C]	Indoor Humidity Ratio at Peak Load [kgWater/kgAir]	Outdoor Temperature at Peak Load [C]	Outdoor Humidity Ratio at Peak Load [kgWater/kgAir]	Minimum Outdoor Air Flow Rate [m3/s]	Heat Gain Rate from DOAS [W]
86D0B3	950.48	950.48	105.61	0.131	0.131	CHICAGO OHARE INTL AP ANN HTG 99.6% CONDNS DB	1/21 24:00:00	20.00	20.00	0.01200	-20.00	0.00065	0.000	0.00

The Design Load is the zone sensible load only. It does not include any system effects or ventilation loads.

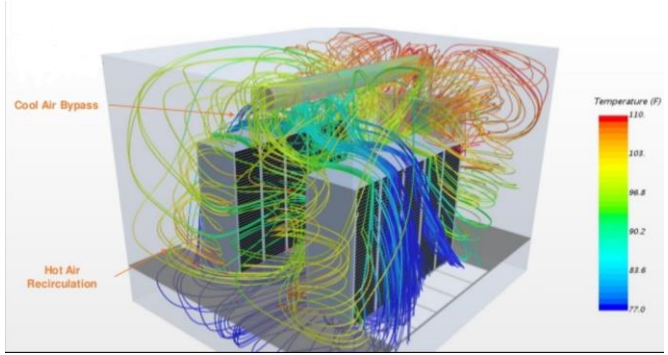
- Statistic Model for global optimization



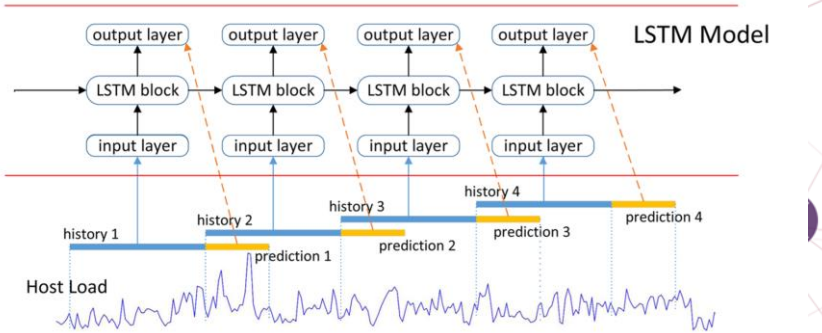
[Energy]: Cooling system optimization for data center and 5G station by Xiao Shen, Quarkdata

- Value proposition: Reduce the energy consumption for cooling system by 15-25%

- CFD based model for heat distribution study

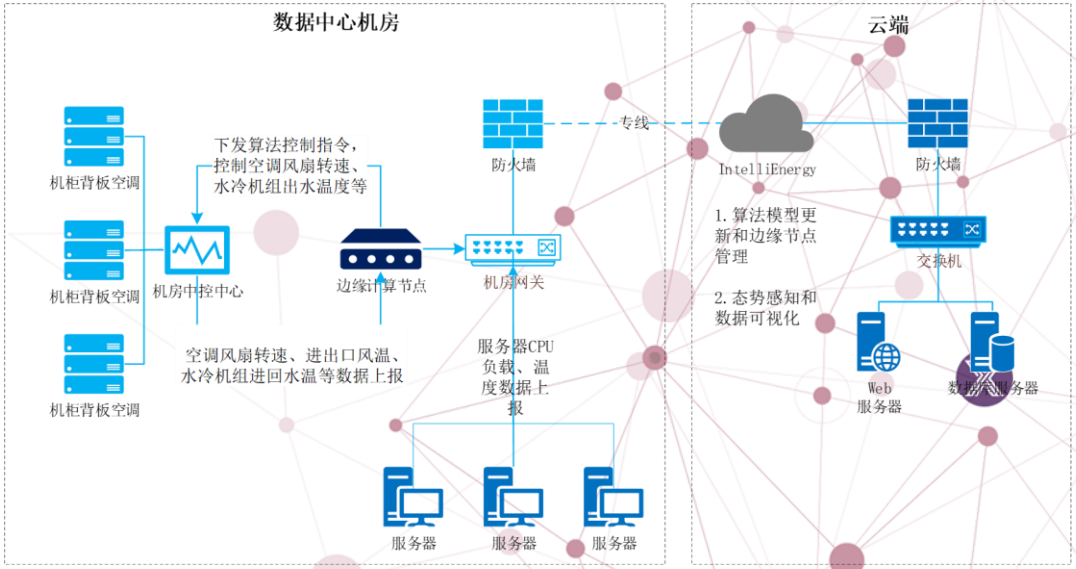


- LSTM based model for load prediction



[Energy]: Cooling system optimization for data center and 5G station by Xiao Shen, Quarkdata

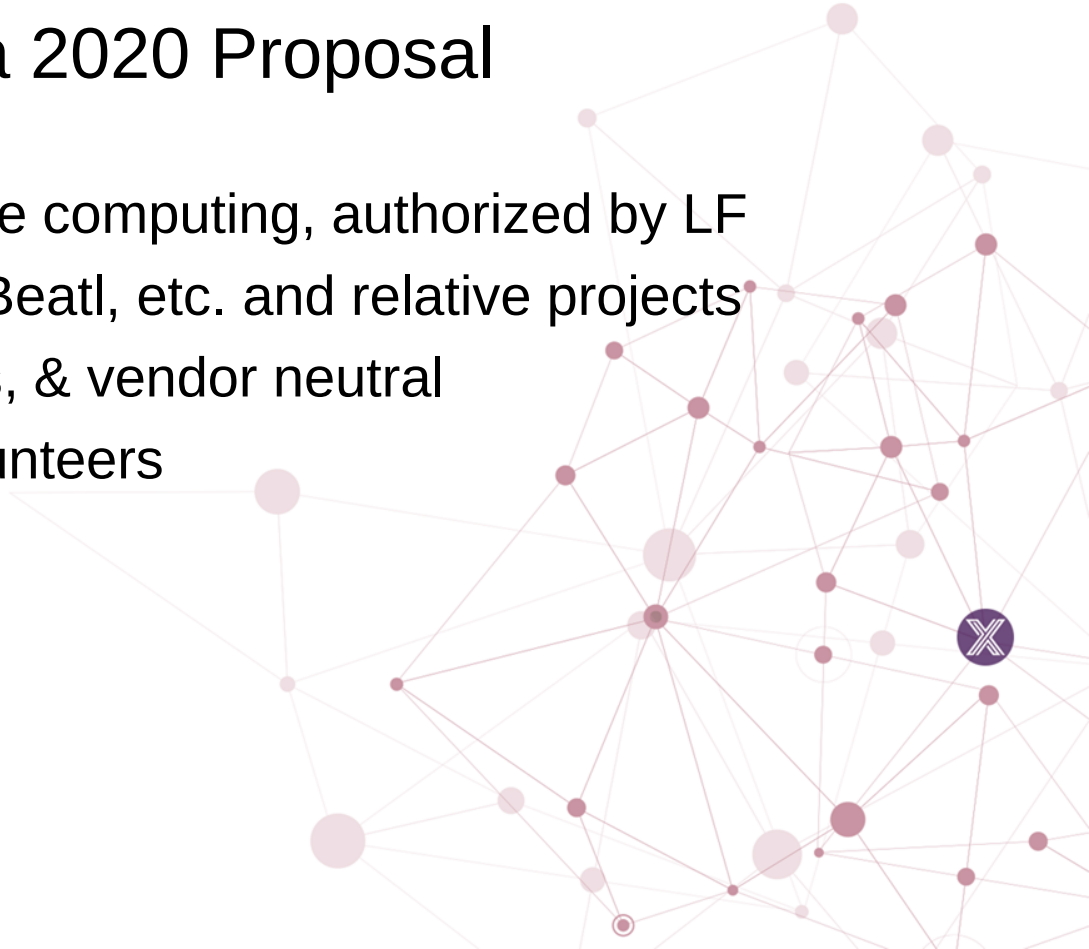
- Deployment
  - Use edge gateway to control the cooling system
  - Model is trained in cloud side, and use model reduction technique to make it inference in edge side.
- HW
  - ARM based edge gateway
  - 4 Cores. 2G LPDDR4.
  - Mbus/485/USB2/RJ45
- SW
  - Ubuntu 16
  - EdgeX Foundry



Upcoming Events

LF Edge Summit China 2020 Proposal

- A combined event on edge computing, authorized by LF
- Include EdgeX, Akraino, Beatl, etc. and relative projects
- Half:half on tech:business, & vendor neutral
- Call for sponsors and volunteers



Upcoming events update

- Industrial Internet Summit 2020 hosted by AII
  - http://aii-alliance.org/summit2020/
  - Submitted a topic on EdgeX China Project
  - Planned in Feb 12-14, **delayed**
- Open Source Summit 2020, Shanghai, Jul 28-30
  - https://www.lfasiallc.cn/kubecon-cloudnativecon-open-source-summit-china/program/cfp-oss/
  - CFP ending by Feb 28, **cancelled**
- Open Networking & Edge Summit North America 2020, Los Angels, Apr 20-21
  - https://events.linuxfoundation.org/open-networking-edge-summit-north-america/program/cfp/
  - CFP closed on Feb 3, **delayed to fall 2020**
- Open Networking & Edge Summit Europe 2020, Antwerp, Sep 29-30
  - https://events.linuxfoundation.org/open-networking-edge-summit-europe/program/cfp/
  - CFP ending by Jun 7

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Thank You!