StarlingX Project Overview

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Let Me Introduce StarlingX

- New, top-level OpenStack Foundation pilot project
- Software stack providing high performance, low latency, and high availability for Edge Cloud applications
- The first release came out in October/2018, with the second release planned for May/2019,
- Growing community
  - Inviting users, operators and developers to try out the software and participate in the community

Project Overview

What Is Driving Edge Computing?

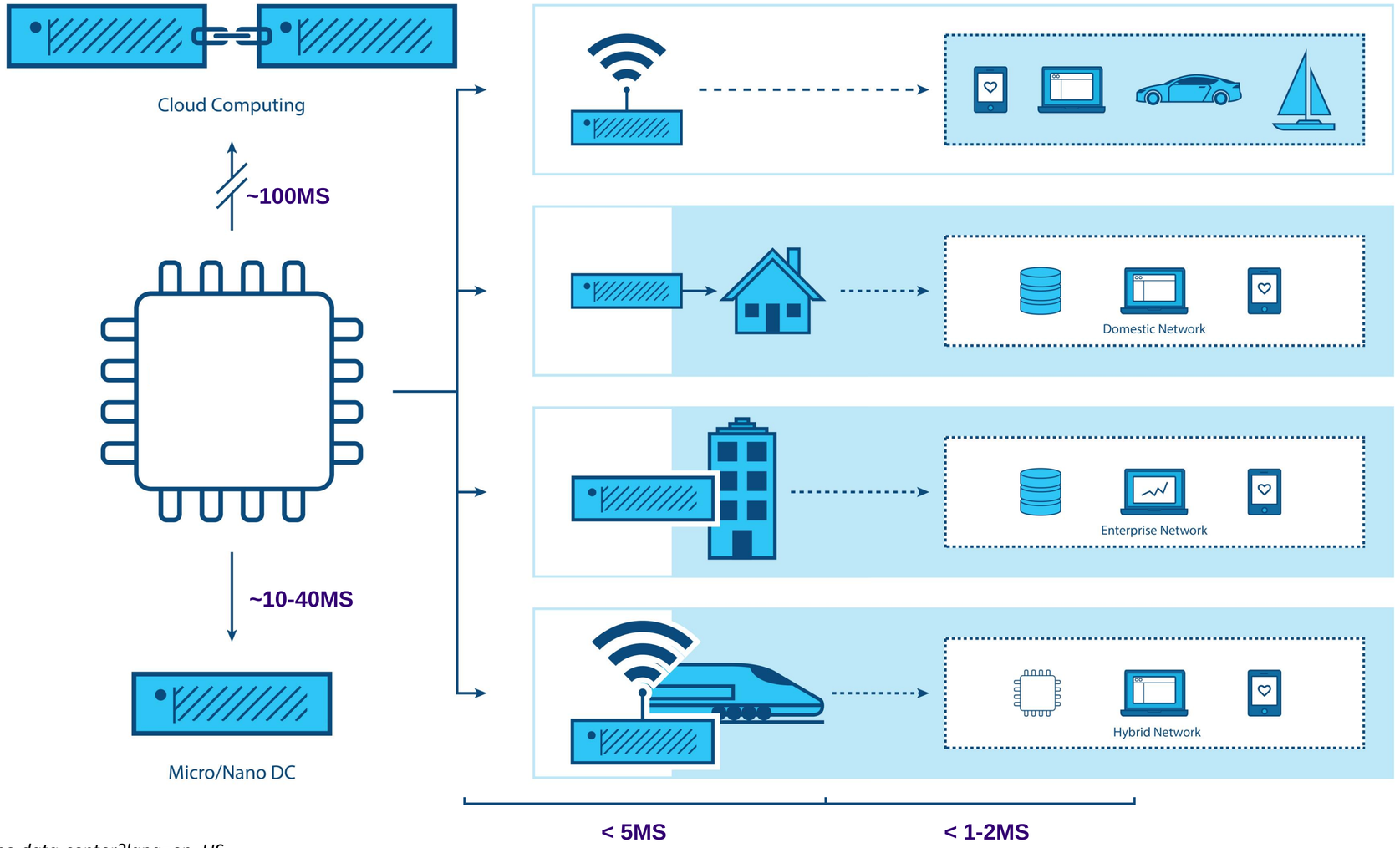
A. Latency

B. Bandwidth

C. Security

D. Connectivity

“WHERE” MATTERS

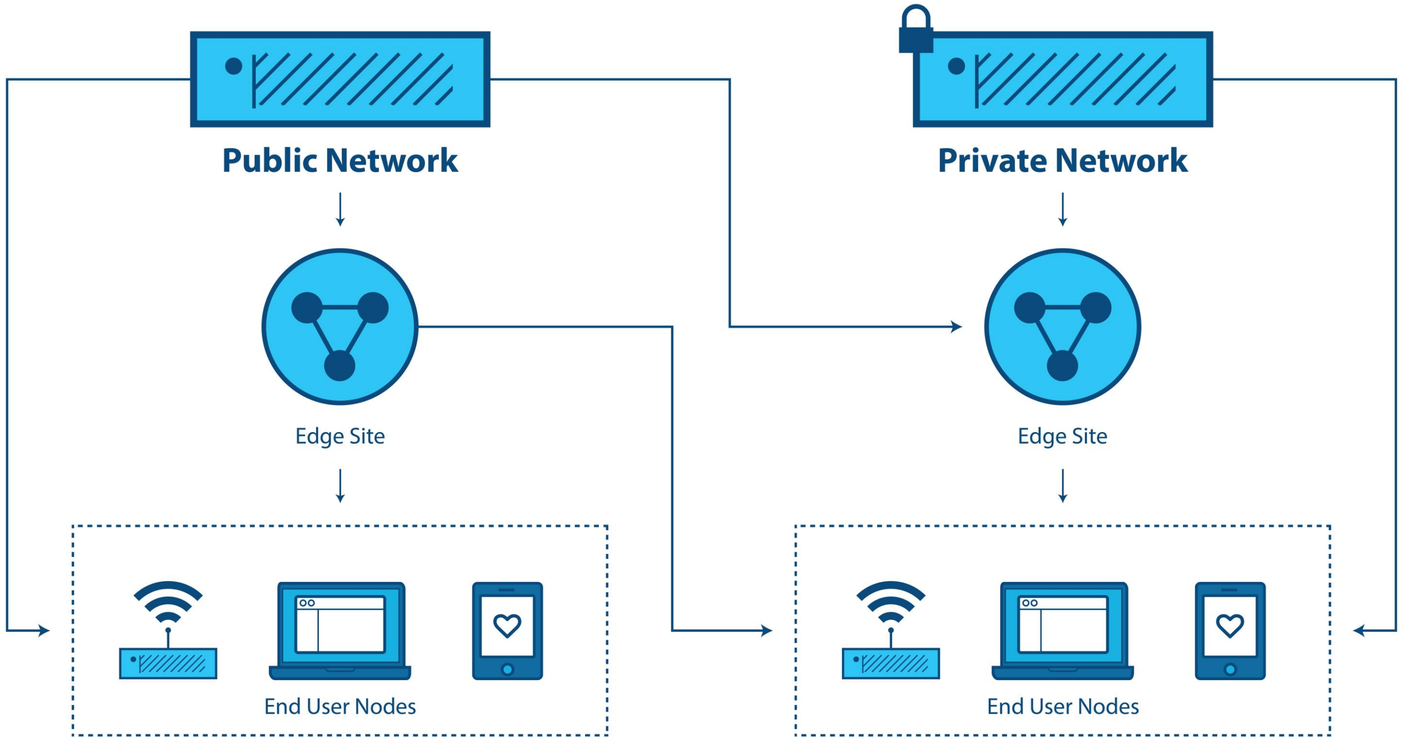


Source: Cloud Edge Computing: Beyond the Data Center
https://www.openstack.org/edge-computing/cloud-edge-computing-beyond-the-data-center?lang=en_US

What Problems Is StarlingX Solving?

Massive data growth

Network needs to be smarter

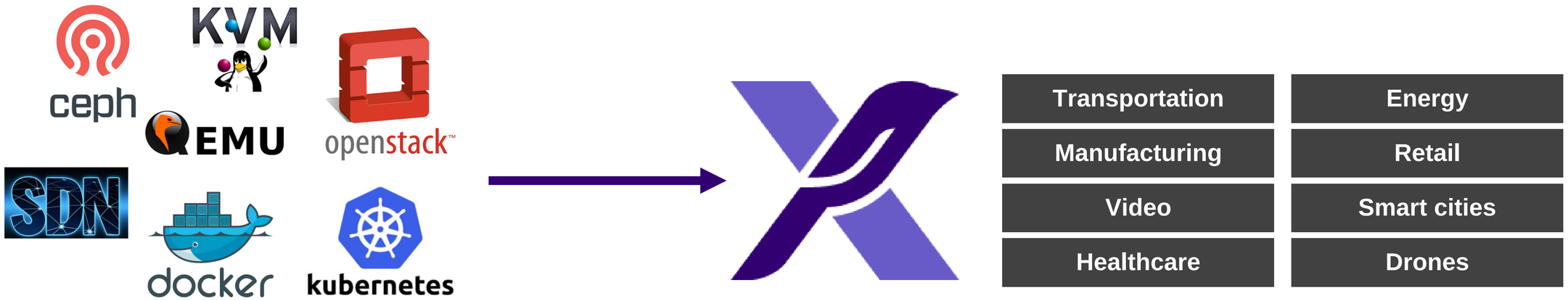


1. Distributed infrastructure demands a different architecture
2. The maturity and robustness of Cloud is required everywhere
3. Managing a massively distributed compute environment is hard

Goals of the StarlingX Project

Re-Configure Proven Cloud Technologies for Edge Compute

- Orchestrate system-wide for bare metal, VMs and Container workloads
  - Deploy and manage Edge clouds, share configurations
- Simplify deployment to geographically dispersed, remote Edge regions



StarlingX Technology

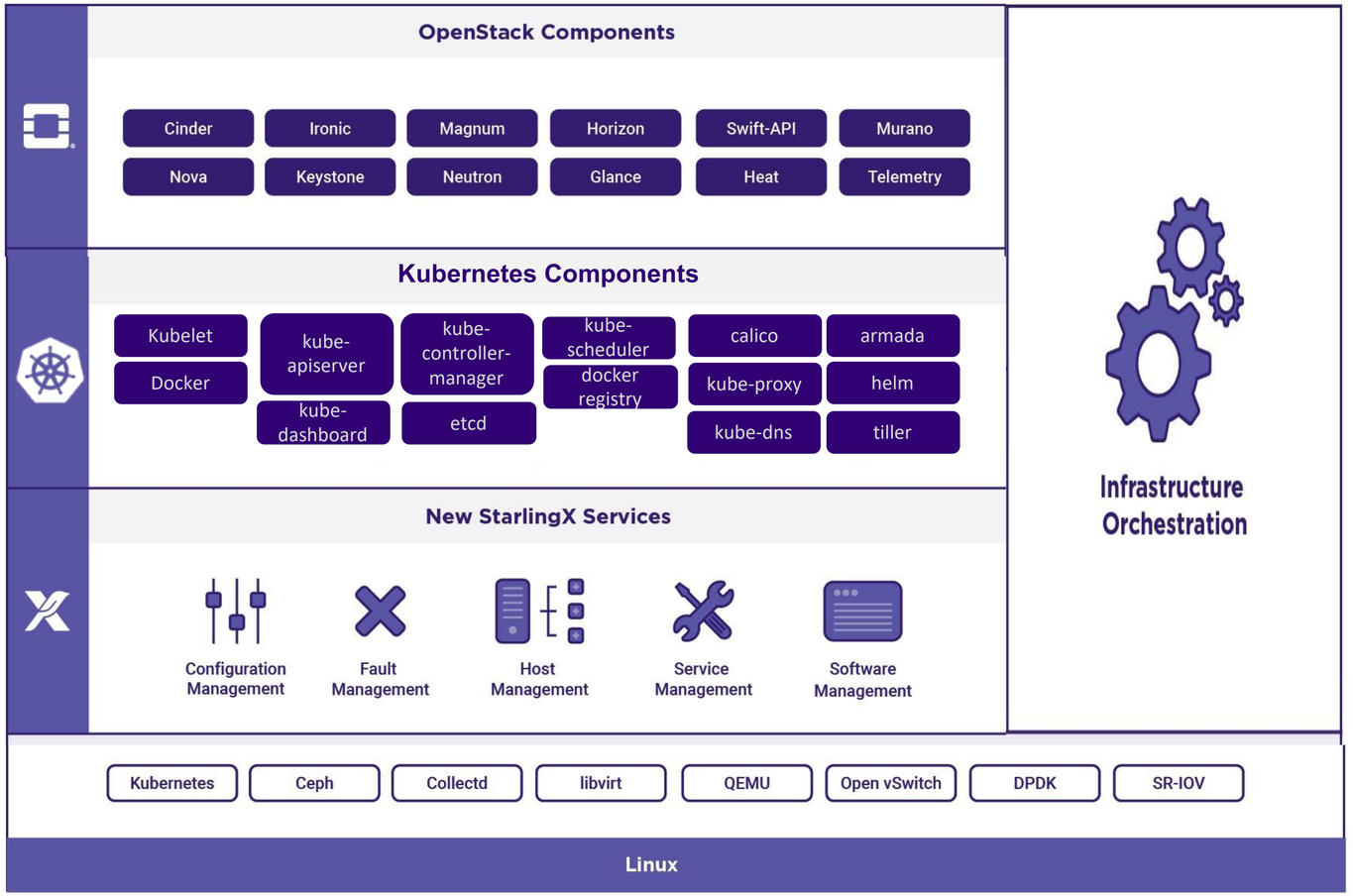
StarlingX - Edge Virtualization Platform

StarlingX provides a **deployment-ready**, **scalable**, **highly reliable** Edge infrastructure software platform

Services from the StarlingX virtualization platform focus on

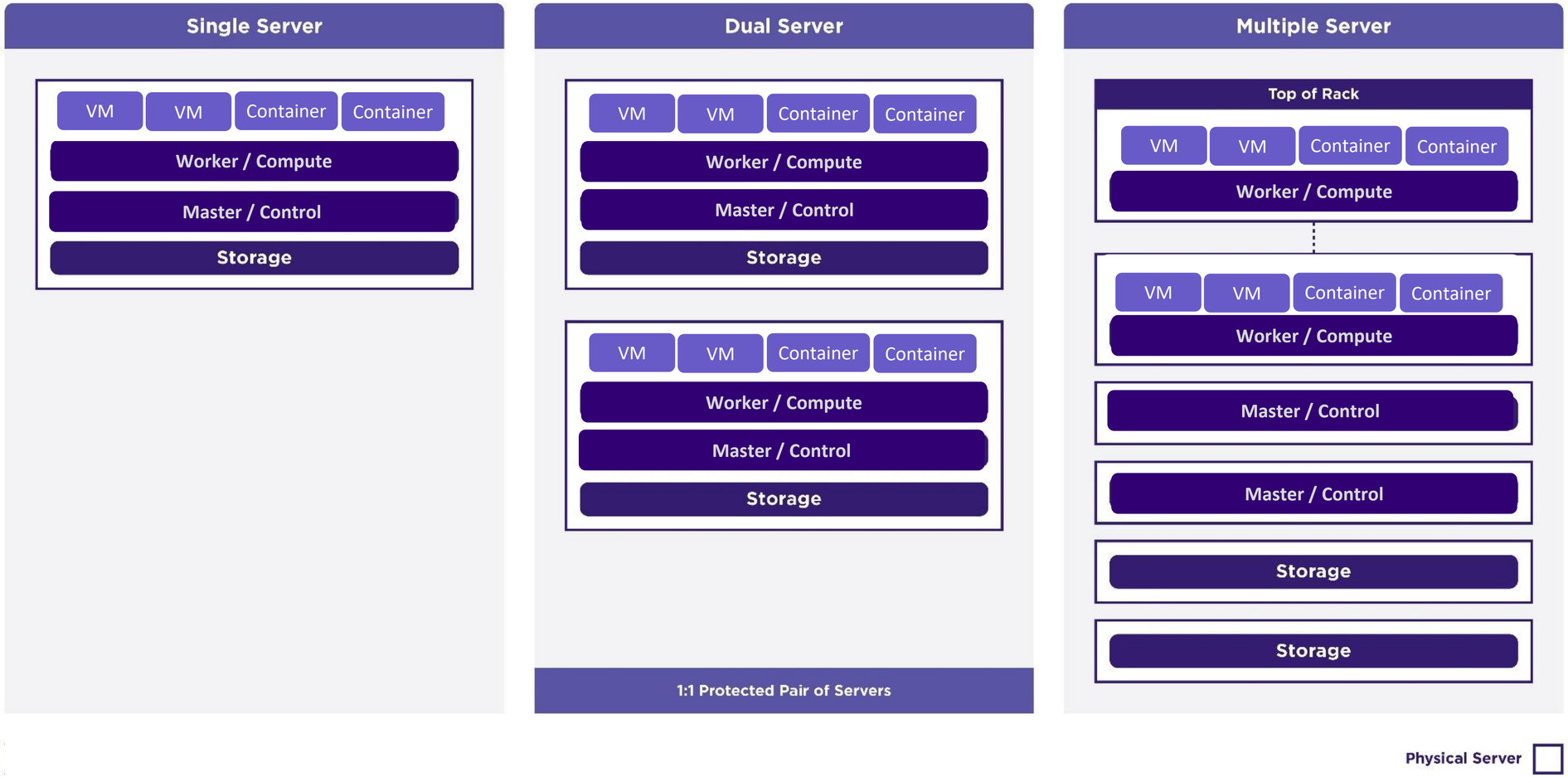
- **Easy deployment**
- **Low touch manageability**
- **Rapid response to events**
- **Fast recovery**

Think control at the Edge, control between IoT and Cloud, control over your virtual machines.



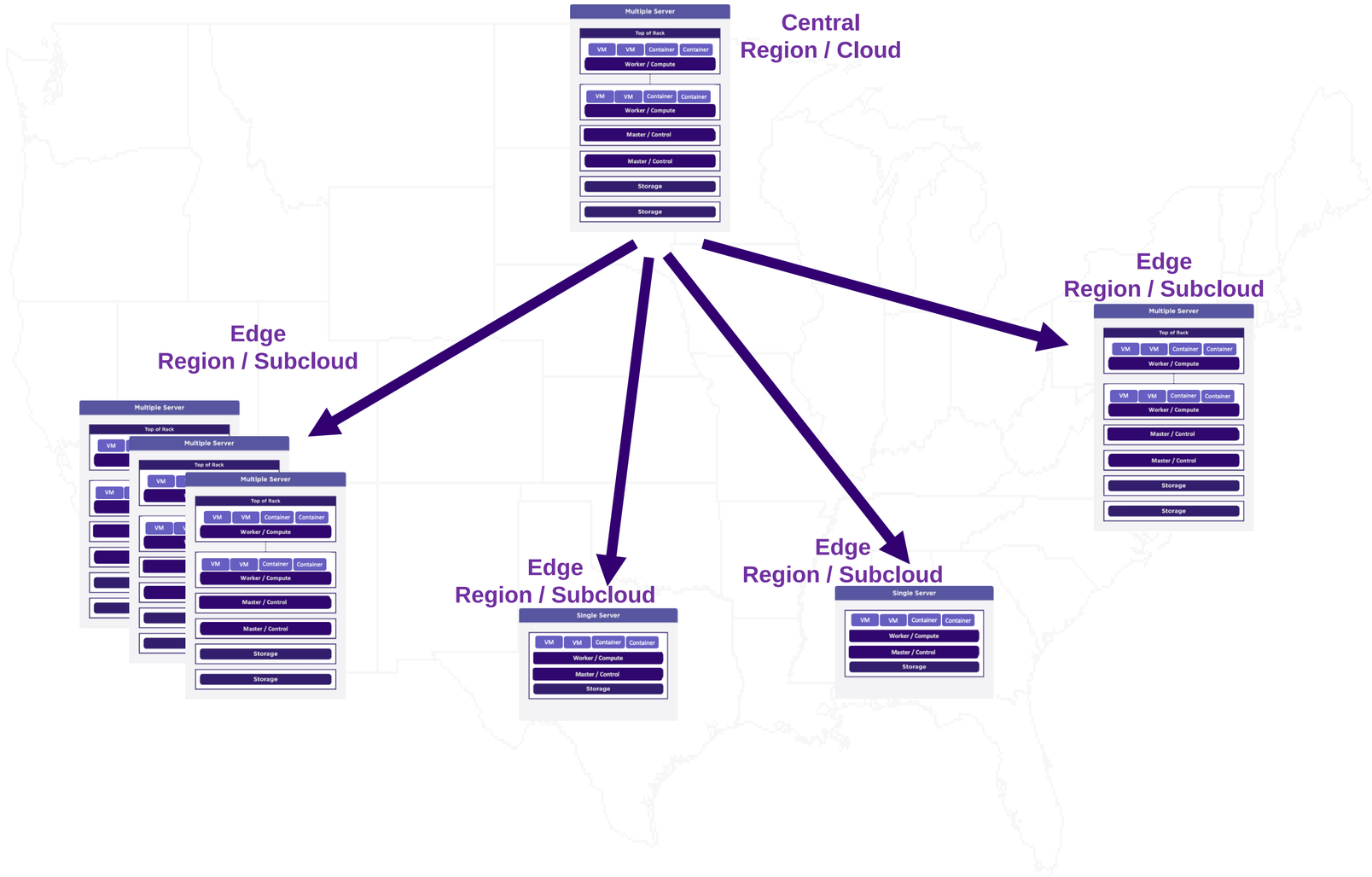
Scalability from Small to Large

- Single Server
  - Runs all functions
- Dual Server
  - Redundant design
- Multiple Server
  - Fully resilient and geographically distributable



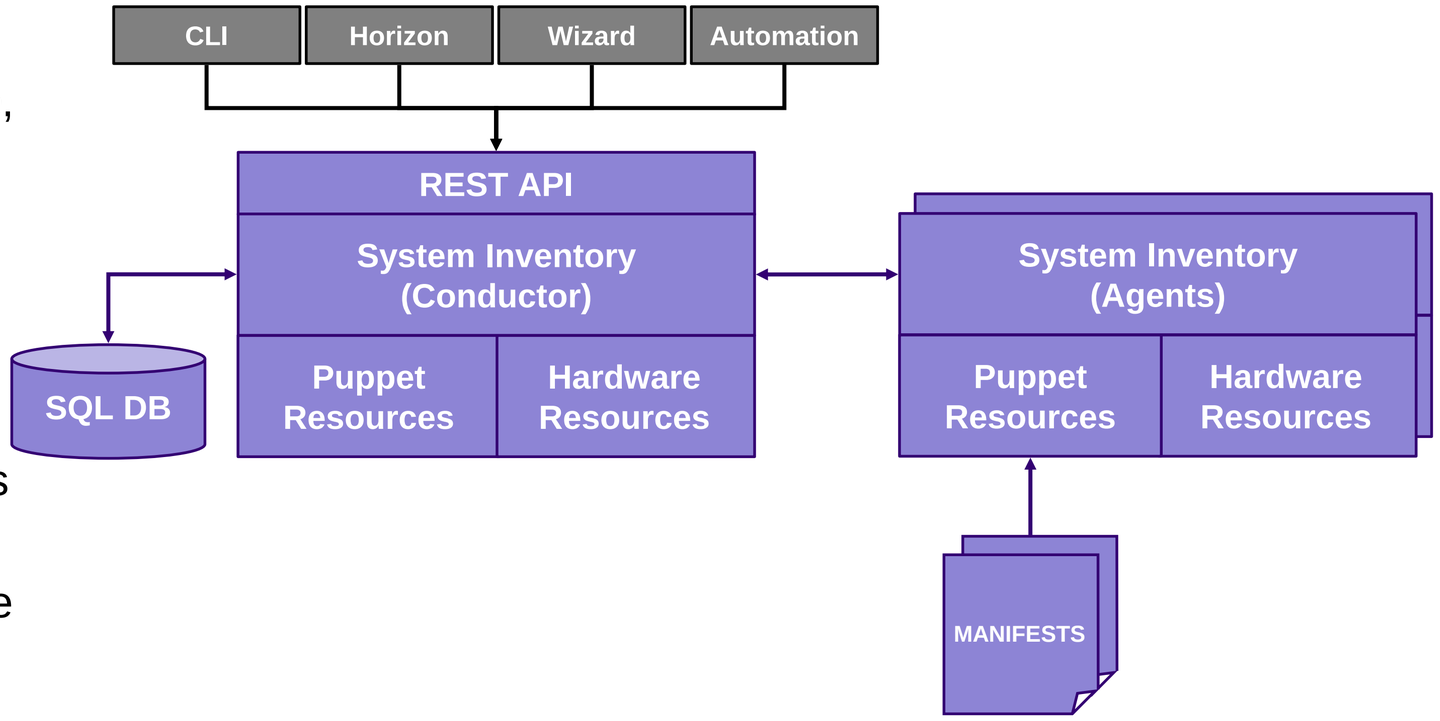
Scaling from the Core to the Edge

- Geographically distributed multi-region deployment,
- Central Region providing Orchestration and Synchronization Services,
- Geographically distributed Edge Regions of various sizes



Configuration Management

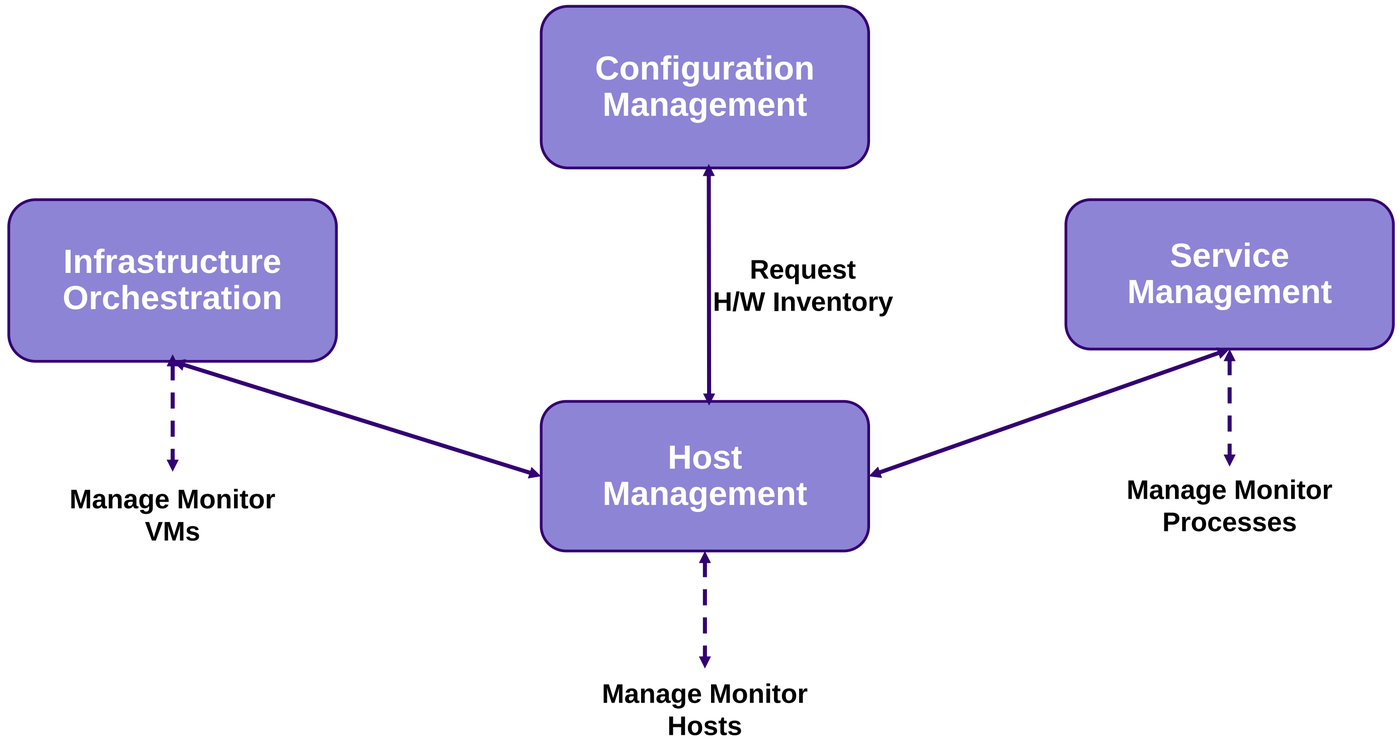
- Manages installation
  - Auto-discover new nodes
  - Manage installation parameters (i.e. console, root disks)
  - Bulk provisioning of nodes through XML file
- Nodal Configuration
  - Node role, role profiles
  - Core, memory (including huge page) assignments
  - Network Interfaces and storage assignments
- Inventory Discovery
  - CPU/cores, SMT, processors, memory, huge pages
  - Storage, ports
  - GPUs, storage, Crypto/compression H/W



System Configuration and Setup

Host Management

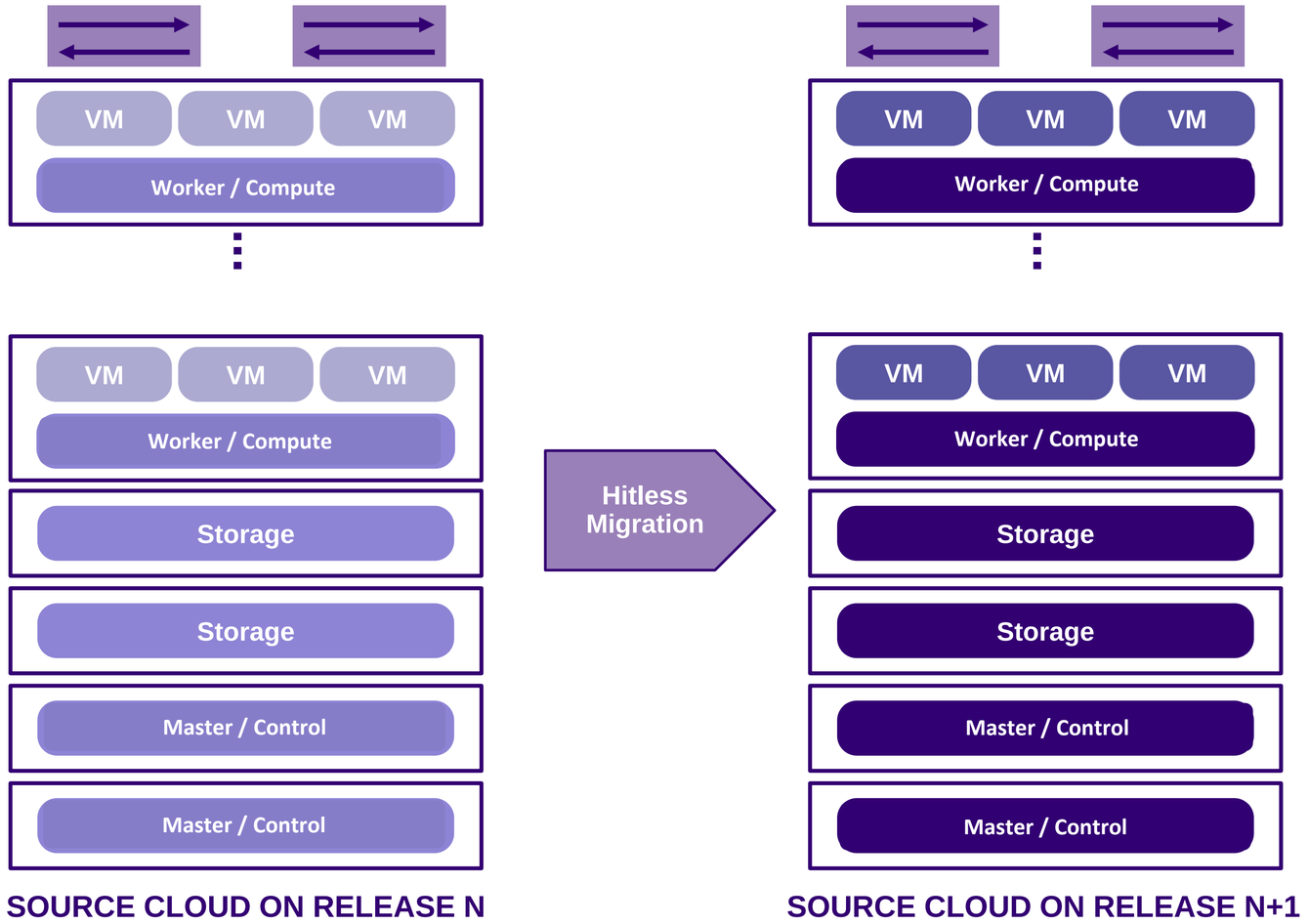
- Full life-cycle management of the host
- Detects and automatically handles host failures and initiates recovery
- Monitoring and alarms for
  - Cluster connectivity, critical process failures
  - Resource utilization thresholds, interface states
  - H/W fault / sensors, host watchdog
  - Activity progress reporting
- Interfaces with board management (BMC)
  - For out of band reset
  - Power-on/off
  - H/W sensor monitoring
- Manage the host via REST API



Vendor Neutral Host Management

Software Management

- Automated deploy of software updates for security and/or new functionality
- Integrated end-to-end rolling upgrade solution
  - Automated, low number of steps
  - No additional hardware required for upgrade
  - Rolling upgrade across nodes
- In-service and reboot required patches supported
  - Reboot required for kernel replacement etc.
  - VM live migration is used for patches that require reboot
- Manages upgrades of all software
  - Host OS changes
  - New / upgraded StarlingX service software
  - New / upgraded Kubernetes software
  - New / upgraded OpenStack software



Software Upgrades and Patching

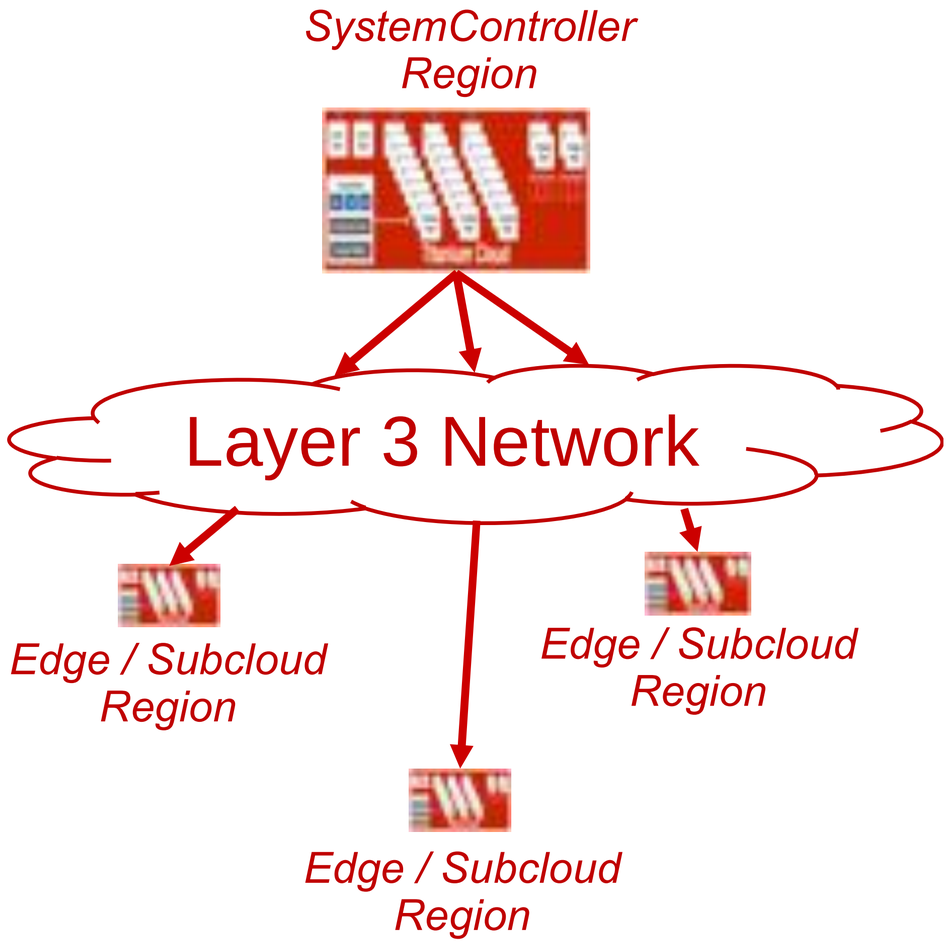
Distributed Cloud

- Based on OpenStack Regions,

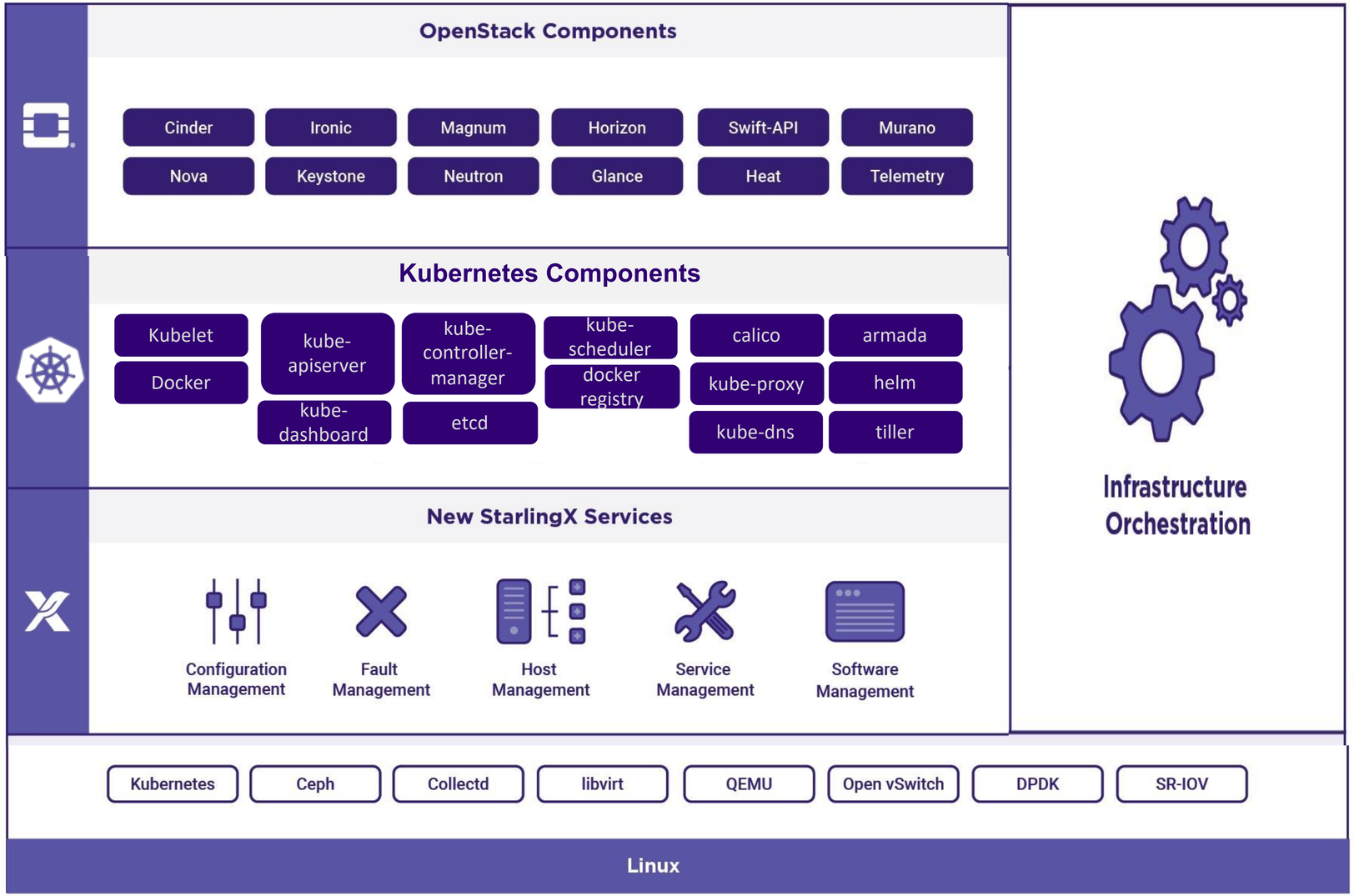
- Central SystemController Region:
  - Hosting Shared Services and
  - System-wide Infrastructure Orchestration functions:
    - Deployment and Management of Subclouds,
    - Configuration portal for shared configuration across all Subclouds,
      - Users, Projects, Images, etc. .
    - Fault aggregation,
    - Patching orchestration.

- Remote Edge / Subcloud Regions:
  - Geographically dispersed,
  - Connected via L3 network,
  - Running reduced Control Plane.

- Inter-Region Communications strictly REST APIs / L3.



Architecture



*Other names and brands may be claimed as the property of others

The Road to the Edge

- Build it yourself from open source components
  - Building blocks need refinement
  - Time consuming
  - Gaps to fill
- Use StarlingX
  - New services provide **improved manageability** for the platform and **high availability for your applications** to meet **Edge Cloud requirements**
  - Tested and available as a **complete stack**
  - **Mission-ready** for your applications

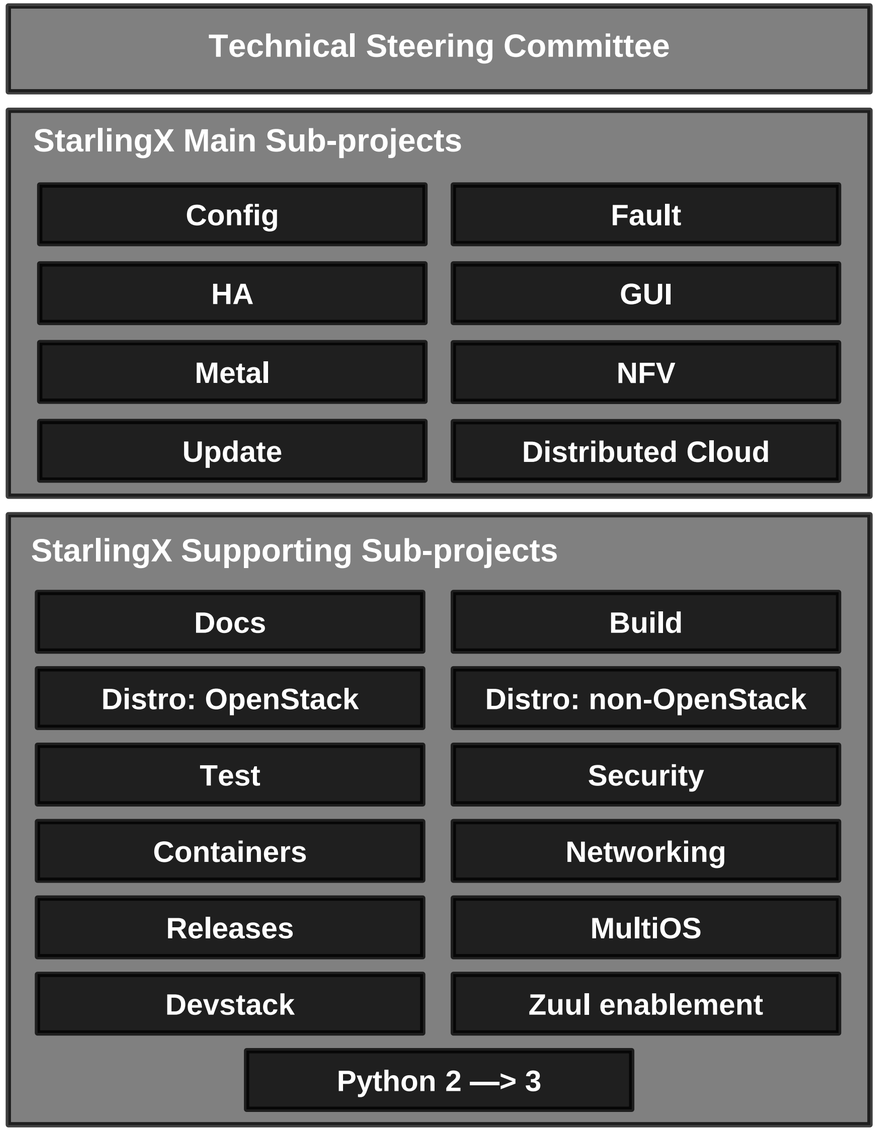
Community and Contributing

Principles

- The StarlingX project follows the “four opens,”
  - Open Collaboration
  - Open Design
  - Open Development
  - Open Source
- Technical decisions are made by technical contributors and a representative Technical Steering Committee.
- The community is committed to diversity, openness, encouraging new contributors and leaders to rise up.

Sub-project Structure

- Main sub-projects
  - New functionality and services
- Supporting sub-projects
  - Supporting services, test and infrastructure
- Sub-project team structure
  - 1 Team Lead
  - 1 Project Lead
  - Core Reviewers
  - Contributors



Governance Roles

- Contributor
  - Someone who made a contribution in the past 12 months
    - Code, test or documentation
    - Serving in a leadership role
  - Can run and vote for elected positions
- Core Reviewer
  - Active contributors to a sub-project, appointed by fellow core reviewers
  - Responsible for reviewing changes and specifications
  - Can merge code and documentation changes

Governance Roles

- Technical Lead
  - Per sub-project
  - Core Reviewer with additional duties
  - Helps guiding the technical direction of a sub-project
- Project Lead
  - Sub-project level coordination work
    - Tracks and communicates progress and priorities
  - Sub-project ambassador

Governance Bodies

- Technical Steering Committee (TSC)
  - Responsible for overall project architectural decisions
  - Managing the sub-project life-cycle
  - Making final decisions if sub-project Core Reviewers, Technical Leads or Project Leads disagree
  - It will be comprised of 9 people, where the initial group will be appointed; the project will move to an election based system within the first year
  - The initial TSC members are Brent Rowsell (Wind River), Ian Jolliffe (Wind River), Dean Troyer (Intel), Saul Wold (Intel), Curtis Collicutt (Interdynamics), Ada Cunha (Ericsson), Shuquan Huang (99Cloud) and Miguel Lavalle (Verizon/OATH)

Contributions

- Code and formal documentation are available through git / gerrit
  - git.starlingx.io
- Informal documentation is also on our wiki:
  - https://wiki.openstack.org/wiki/StarlingX
- Bugs are tracked in Launchpad
  - https://bugs.launchpad.net/starlingx
- New ideas are introduced in the specs repository
  - https://git.openstack.org/cgit/openstack/stx-specs/
- Design and implementation work is tracked in StoryBoard
  - https://storyboard.openstack.org/#!/project_group/86

Community

- You do not need to be an Individual Member of the OpenStack Foundation in order to contribute, but if you want to vote in the annual OpenStack Foundation Board of Directors election, you may join: openstack.org/join
- If you are contributing on behalf of an employer, they will need to sign a corporate contributor license agreement, which now covers all projects hosted by the OpenStack Foundation (same model such as Apache and CNCF)

Communication

- #starlingx@Freenode
- Mailing Lists:
  - lists.starlingx.io
- Email:
  - http://lists.starlingx.io/cgi-bin/mailman/listinfo/starlingx-discuss
- Weekly meetings:
  - Zoom calls
  - https://wiki.openstack.org/wiki/Starlingx/Meetings

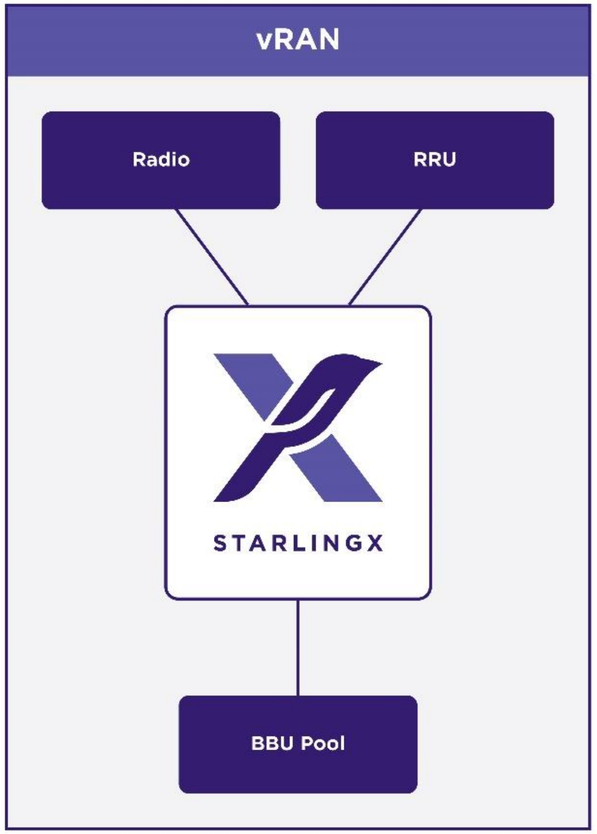
STARLINGX

Thank You!

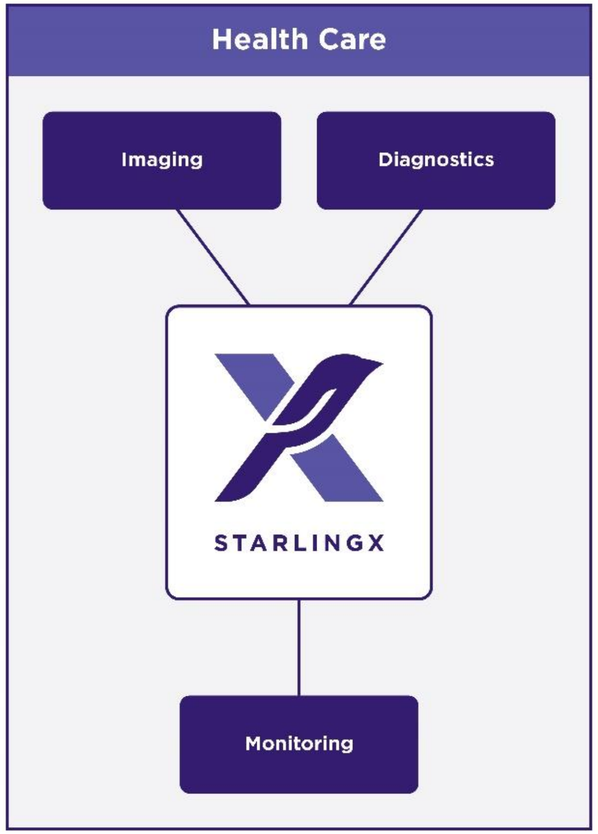
Q&A

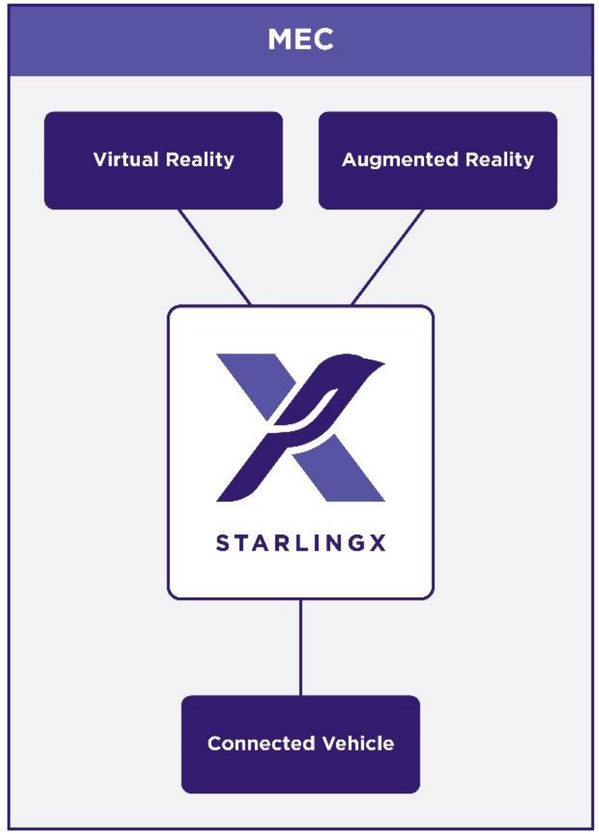
Appendix

Edge Computing Use Cases



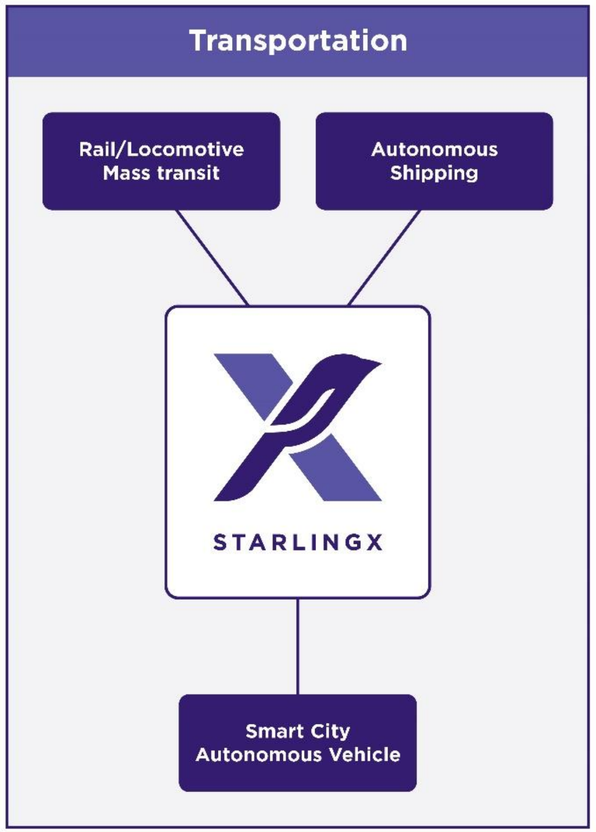
vRAN == virtual Radio Access Network

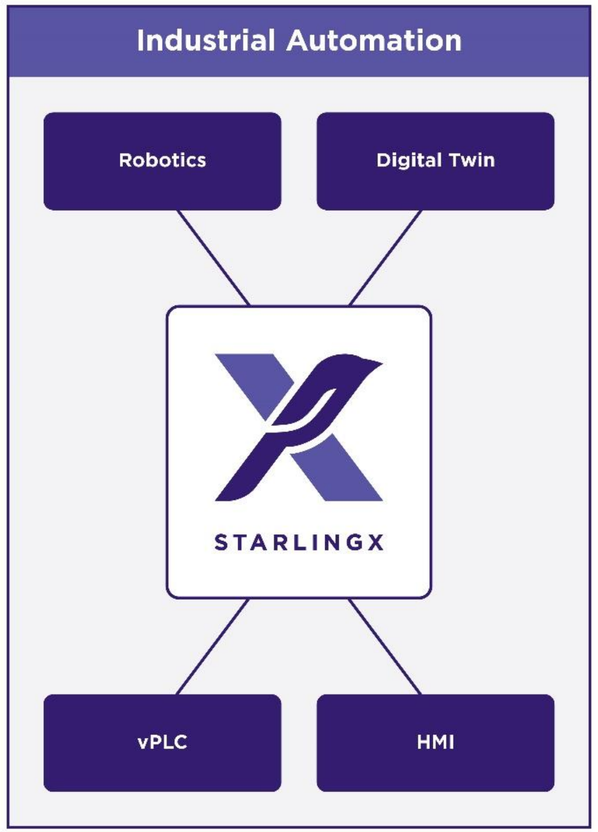


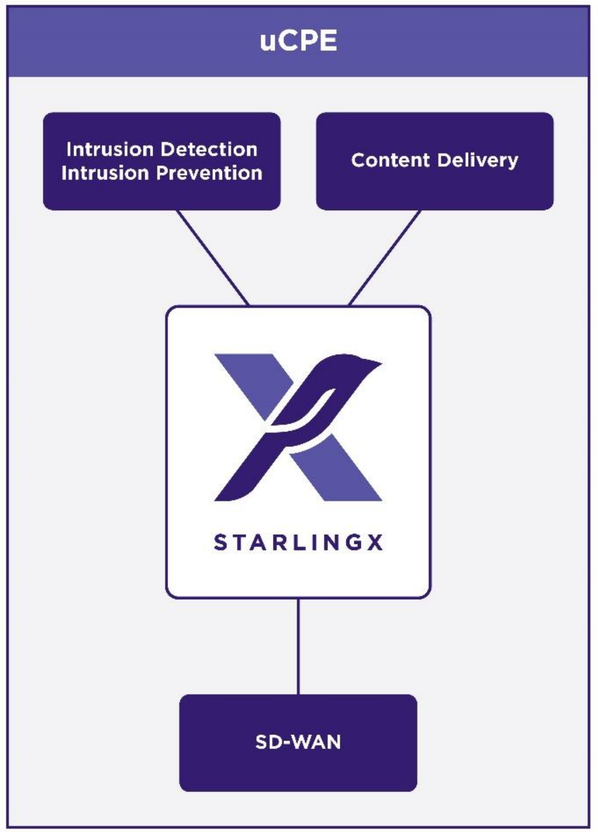


MEC == Multi-access Edge Computing

Edge Computing Use Cases







uCPE == universal Customer Premises Equipment

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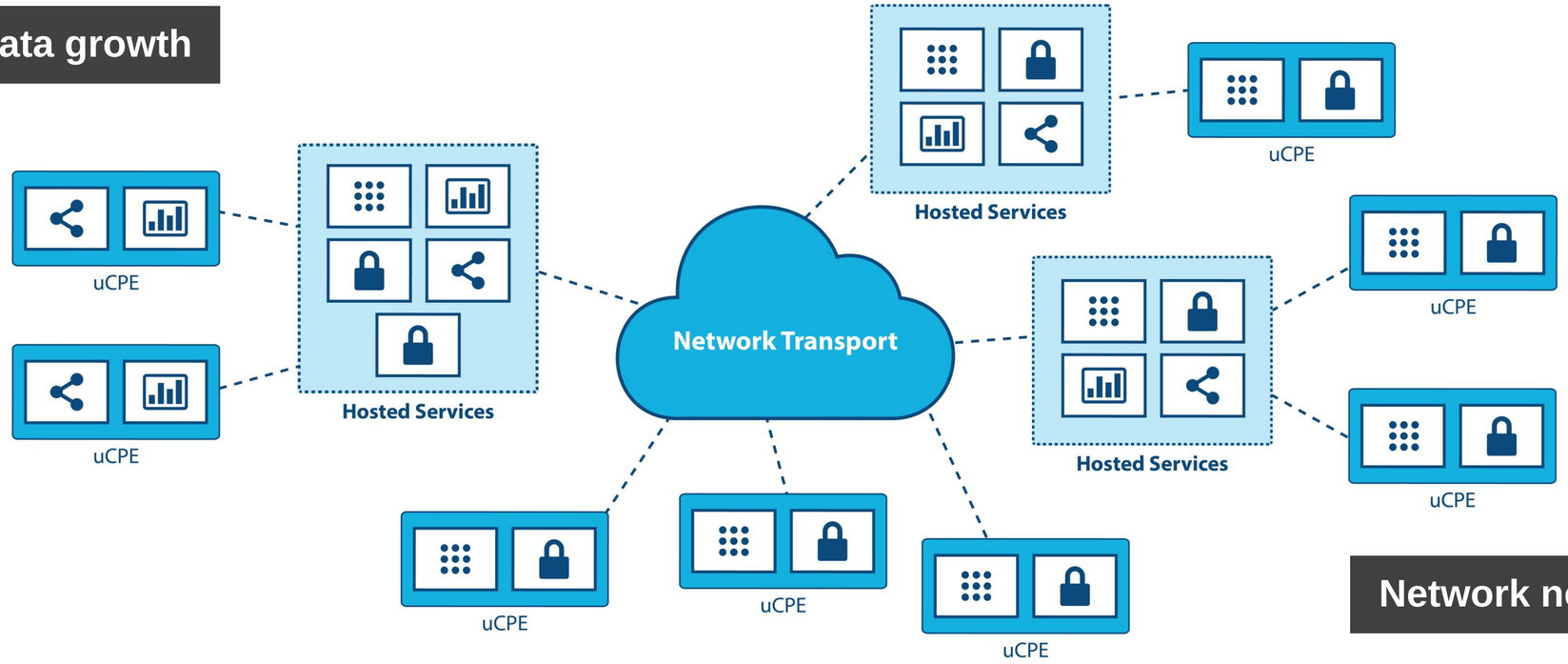

Network needs to be smarter

1. Distributed infrastructure demands a different architecture
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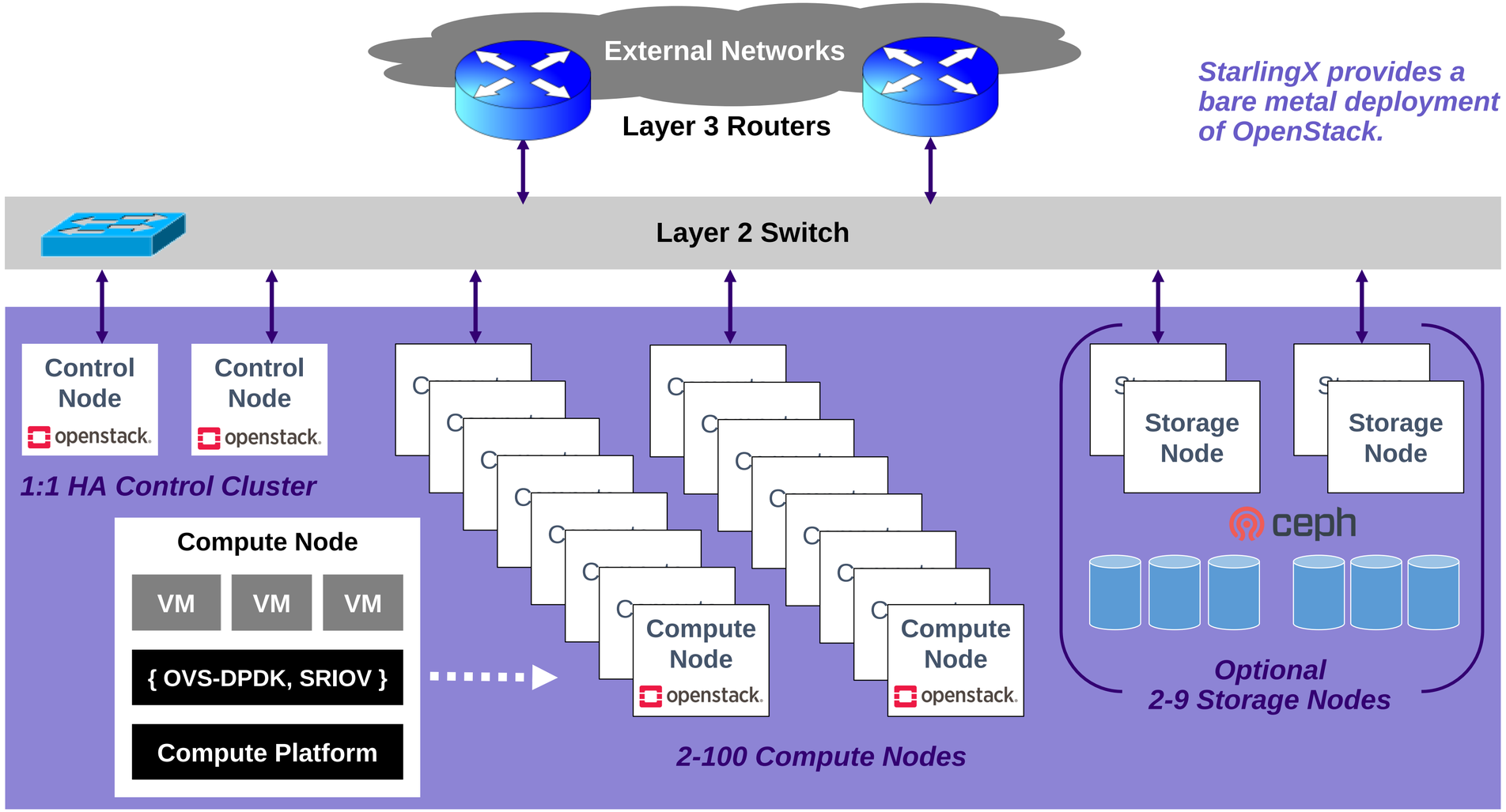
Standard Configuration



StarlingX provides a bare metal deployment of OpenStack.