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AT&T Edge Computing Strategy and OpenStack’s Role in It

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AT&T Labs
Edge computing is a method of optimizing cloud computing systems by performing data processing at the edge of the network, near the source of the data.

- **Quality of Experience (QOE)** - The reduction in latency and more efficient utilization of network capacity
- **Right Content at the Edge could reduce backhaul traffic** – Data from the edge is processed at the edge
- **Decompose and dis-aggregate access function** – Flexible with modularity and loose coupling of both Hardware and Software
- **Better Network Resiliency** – Ability to deploy cluster between Edge Data Center allowing for shared restoration of capacity
Edge Computing - Placement

Placement varies depending upon the use case, latency, space availability, etc.,

- **Device**: ~2 ms
- **Last mile network**: <5 ms
- **Access**: 1-3 ms
- **Edge computing**: ~5-20 ms

Total latency need to be <20 ms for immersed AR/VR experiences

**Customer devices**
- Mobile
- AR/VR end user
- Drones
- Autonomous Vehicles

**Customer Premises**
- Home
- Smart Cities
- Small Enterprises
- Stadiums
- Enterprises
- Public buildings

**Access Network**
- Telco Real estate & Network Edge
  - (Central Offices, etc.)

**Centralized and/or EC**

Open Network Automation Platform (ONAP) can provide seamless automation across Edge Cloud and Centralized Cloud

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Edge requires flexible architecture that can evolve as technology evolve

**OpenStack based Edge Architecture**

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### CI / CD Drives Life-cycle Mgmt.

<table>
<thead>
<tr>
<th>Apps</th>
<th>Workload</th>
<th>Service</th>
<th>Ops</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise Apps</td>
<td>VMs</td>
<td>Simple SDN</td>
<td>Logging</td>
</tr>
<tr>
<td>VNFs</td>
<td>Containers</td>
<td>Monitoring</td>
<td>Monitoring</td>
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<tr>
<td>Microservices</td>
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<td>Alerting</td>
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### ONAP

<table>
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<tr>
<th>Apps</th>
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<tbody>
<tr>
<td>Ceph(SDS)</td>
<td>Promenade</td>
<td>Kubernetes Release Management</td>
<td>Hosting</td>
</tr>
<tr>
<td>CNI (SDN)</td>
<td>Shipyard</td>
<td>Container Runtime Orchestration</td>
<td>Baremetal Operating System</td>
</tr>
</tbody>
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### Build & Deploy (Full Automation)

**Common orchestration across data center and edge**

**Open Network Automation Platform**

- **Runtime Platform (Minimum set for Edge)**
  - **Nova** | **Neutron**
  - **Compute** | **Networking**
  - **Horizon** | **Keystone**
  - **Dashboard** | **Identify Service**
  - **Glance** | **Cinder**
  - **Image Service** | **Block Storage**

**Build & Deploy (Full Automation)**

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<td>Helm</td>
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<td>Kubernetes</td>
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<td>Docker</td>
<td></td>
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<tr>
<td>Host OS</td>
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### Economical | Zero touch provisioning | Thin control

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**Full Automation Stack** — AT&T developed and contributing to Open Stack and have plans to contribute to CNCF

Demo was based on these Open Source

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<tr>
<td>Shipyard - A workflow engine to execute a graph of deployment activities</td>
<td><a href="https://github.com/att-comdev/shipyard">https://github.com/att-comdev/shipyard</a></td>
</tr>
<tr>
<td>Drydock - A pluggable orchestrator to translate a YAML host topology into a provisioned set of host</td>
<td><a href="https://github.com/att-comdev/drydock">https://github.com/att-comdev/drydock</a></td>
</tr>
<tr>
<td>Armada - An orchestrator for installing, upgrading, and managing a collection of Helm chart</td>
<td><a href="https://github.com/att-comdev/armada">https://github.com/att-comdev/armada</a></td>
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<td>Deckhand - A foundational python REST YAML processing engine providing data and secrets management to other platform services</td>
<td><a href="https://github.com/att-comdev/deckhand">https://github.com/att-comdev/deckhand</a></td>
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**OpenStack Helm Repositories**

- [https://github.com/openstack/openstack-helm](https://github.com/openstack/openstack-helm)
- [https://github.com/openstack/openstack-helm-addons](https://github.com/openstack/openstack-helm-addons)
- [https://github.com/openstack/openstack-helm-infra](https://github.com/openstack/openstack-helm-infra)

Support these Open Source projects for community benefit!
OpenStack for Edge Computing!

Community to recognize EC as No.1 goal – Address broader Edge Use cases

Zero-Touch provisioning is key – No human touch install and upgrade of OpenStack

Support massive scale– Thousands of locations.

Support modular deployment – Only deploy needed components

Support new technologies faster (Edge enablers)– GPU, FPGA, NPU, etc.,

Support integration with other Edge Technologies – Containers, ONAP, etc.,