Fully Automated Infrastructure for a Content Delivery

Li9 was involved in developing and implementing a high-performance content delivery network for a major US provider of IP TV Services. TV content is captured from satellites and delivered through cable and internet networks throughout the US. Before the project the company was spending over $2.5Million annually on renting a CD Network from global suppliers.

Li9's involvement was development of a completely automated and dynamic infrastructure to support the IP TV Services. Li9 used Red Hat, NGINX Networking, and HashiCorp's tools, along with other key Open Source technologies to create the fully automated datacenter.

Pain points:

- High latency on delivering of content to the user devices such as laptops, tables, TVs, mobile phones, etc.
- Significant packet lost on the last mile – video streams had not been smooth.
- Encoders stuck periodically adding breaks in the streaming process.
- No options to tune the performance depending on sizes of video chunks.
- High Costs for CD Network.
- High development and support costs.

Solution:

- Li9 designed a private CDN based on following requirements:
  - Exclude breaks in video streaming.
  - Exclude points of failures.

Li9 Technology Solutions helps companies optimize their existing IT infrastructures, leverage hybrid cloud environments, and build DevOps infrastructures that modernize and automate application development. Li9 enables businesses to transform their IT service delivery to help them accelerate innovation and application delivery.

Li9 has helped some of the greatest companies in the world by leveraging the Li9 Solutions Portfolio of best-in-class technologies and services to deliver business services fast, at scale, and more effectively to provide them a competitive advantage. With an extensive array of elite technical certifications and credentials, Li9 is recognized by partners for commitment to excellence and its focus on delivering business focused IT Solutions.

  - Dynamic including and excluding servers for scaling and maintaining.
  - Autodetecting failures and redirecting workload between health nodes
  - Automated distributing workload between nodes depending on a distance to end users and nodes throughput.
  - It should be able to run in own data centers.
  - Decrease expenses on CDN.
- Developed automation for fully automated deploying of edge and parent nodes.
- Server operating systems Linux/RHEL and Unix/FreeBSD are tuned for the best network performance.
- Deployed an OpenStack cloud for flexible manipulating of encoders.
- Installed multiple GlusterFS clusters to provide redundant storage.
- Most of infrastructure operations are wrapped out into self-automation and a single run command, such as:
  - Scaling cache servers (power on, install OS, software, adding to data plane) – using PXE scripts, iDRAC/iLO (ipmi tools) and ansible playbooks.
  - Automated detection of failures of encoders (which run in OpenStack cloud), starting new instances, and destroying the failed ones.
  - Control plane gathers metrics from data plane and manages the traffic flows – monitoring with Grafana and Prometheus.

Benefits:

- Smooth and stable and smooth IP TV streams.
- Network latency has been decreased up to 150%.
- Overall performance increased up to 200% while the number of cache servers was able to be decreased with the optimized network.
- All points of failures were eliminated with key components being at least n+1.
- The project had been implemented for three months, and all clients were migrated to this solution.
- CD Network costs were reduced by over $1.3 Million in the 1st year.

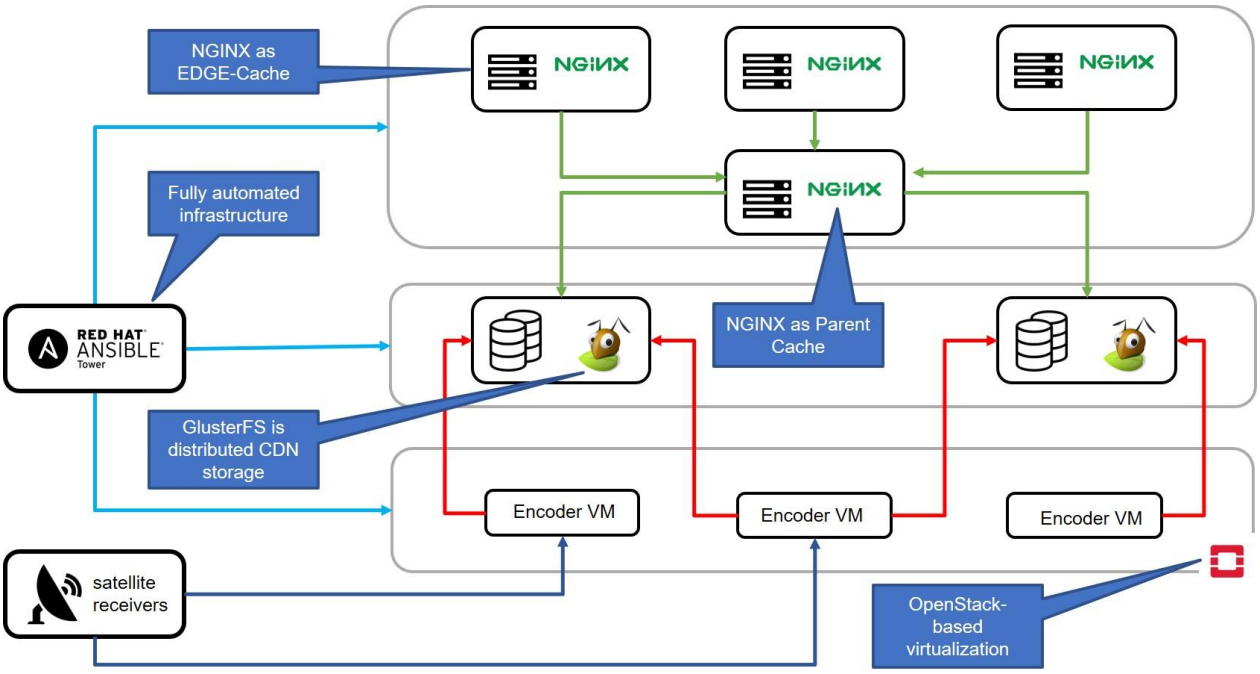

Figure 1. CDN Delivery Infrastructure