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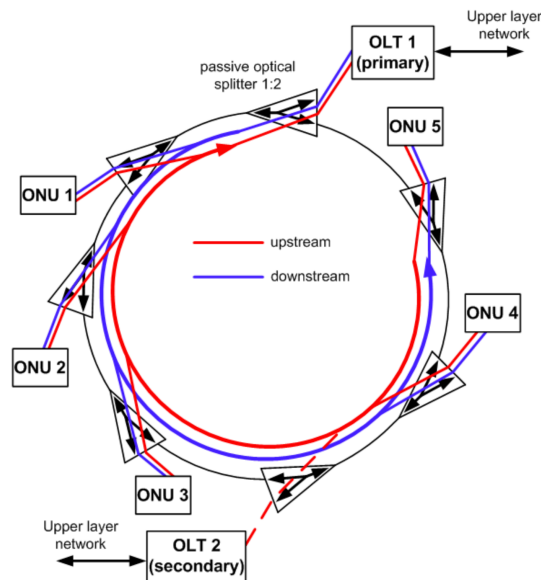
IT INFRASTRUCTURE FOR LARGE SCALE EVENTS

Challenges of a festival IT infrastructure

- Electrical power availability

- Cost-effective solution

- Ability to quickly implement infrastructure changes

- On-site initial deployment must be done fast

- Not ideal locations to host networking equipment

- N+1 redundancy in mission-critical points

- Providing Wi-Fi access for a large number of clients in a RF polluted environment
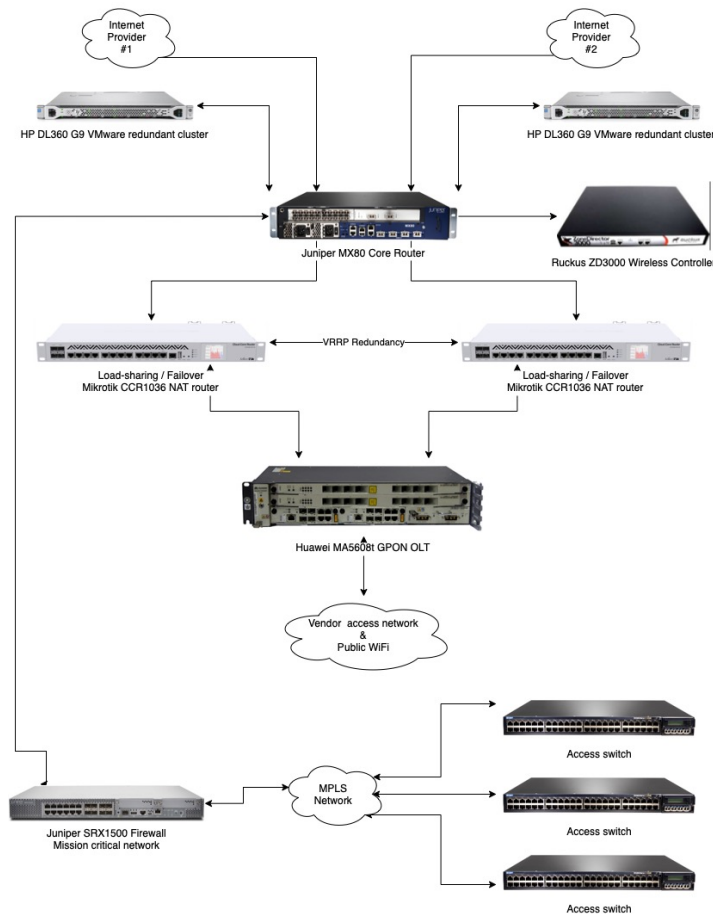
What is a Passive Optical Network ?

- A passive optical network (PON) is a fiber-optic network utilizing a point-to-multipoint topology and optical splitters to deliver data from a single transmission point to multiple user endpoints. Passive, in this context, refers to the unpowered condition of the fiber and splitting/combining components.

- In contrast to an active optical network, **electrical power is only required at the send and receive points**, making a PON inherently efficient from an operation cost standpoint.

Using a PON network for a festival has a major advantage: electrical power is not required anywhere in the distribution network making this solution cost-effective and high-capacity, solving the most important challenge we identified in this type of environment.

The fiber optic cable runs on a festival premise are not very long, this means we can accommodate a high splitting ratio without loosing optical signal and solving another challenge: ability to quickly implement infrastructure changes. For example if we identify a new location that needs network connectivity we can quickly add a 1:2 optical splitter and have that location fully functional in no-time.

Our network core design

All our engineers are Cisco CCNP or Juniper JNCIP certified and have a strong background of working into large service provider networks, we can accommodate any type of requirement coming from the festival tech team in a fast and reliable way.

Our typical infrastructure is divided into two segments:
- Vendor access network / public Wi-Fi infrastructure running on GPON infrastructure
- Mission critical network running over MPLS

We choose to run most of the network using GPON because of the obvious advantages of this technology but also maintain a separate network that runs in a ring topology backed-up by GPON interconnects for mission critical points like: payment terminals, streaming services, access control systems and ticketing, etc …

The advantage of using MPLS in our network is that we can provide redundancy and have a very flexible network, we can accommodate on-demand any type of Layer 2 circuits between any points of the festival, for example: we need to provide video streaming between two separate stages of the festival or we need a private LAN for all festival payment terminals.

Depending on the budget we can fully provide N+1 redundancy for the core network, currently the most cost-effective solution is to have redundancy only in key areas.

Fiber optic network

We provide full service for fiber optic network design and implementation on festival site meeting any kind of requirement.

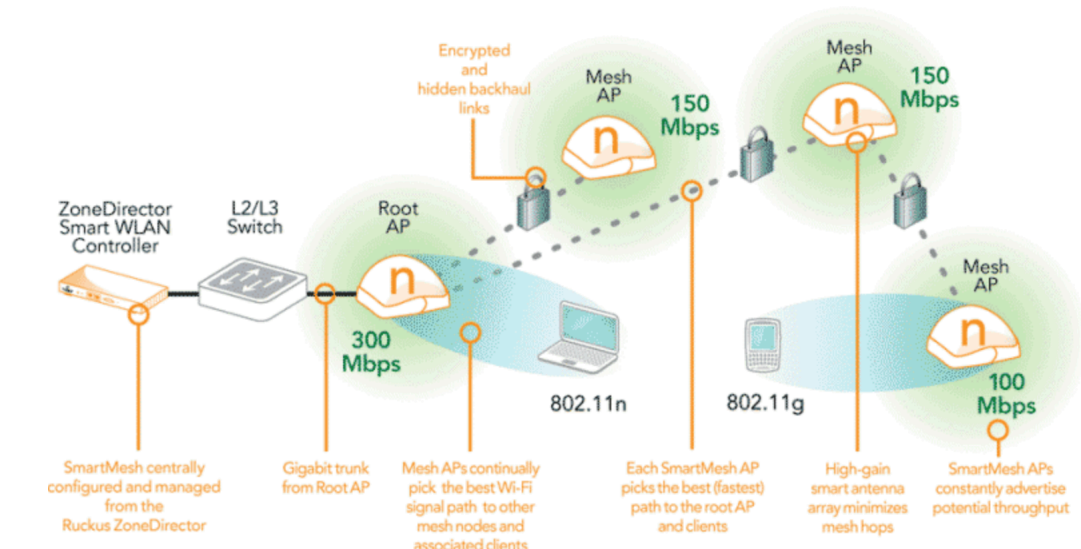We only use top of the line equipment from Fujikura and Yokogawa.

During the festival we always have a fully equipped fiber optic splicing and troubleshooting laboratory 24/7 on-site.

All our fiber optic engineers are certified and have a strong background of working in national wide fiber optic networks.

Wi-Fi network

It is well-known that the GSM network will most probably fail during a large scale event, that's why the Wi-Fi network is very important to be available and provide a good festival participant experience. Nowadays social-media is a big part of our lives, sharing media directly from the festival will not only increase the festival visibility but also keep the participants engaged.

We run our Wi-Fi solution on Ruckus equipment, a proven solution that works on some of the largest cities and stadiums of the world. Our network is fully meshed and self-healing, this means even if a fiber-cut occurs the network will still continue to function without any interruption.

We have our own ASN (as-number) and our own IPv4 blocks large enough to provide sufficient NAT pools for more that 100K people on-site.

To provide uninterrupted service we always have at least two upstream providers that we run BGP with, even if one upstream fails the switch-over to the backup upstream will happen seamlessly without causing any kind of service outage.

Our Wi-Fi platform can integrate captive-portal interfaces and other types of participant engagement tools. We can provide full statistics of usage and real-time data showing how many people use it in different areas.
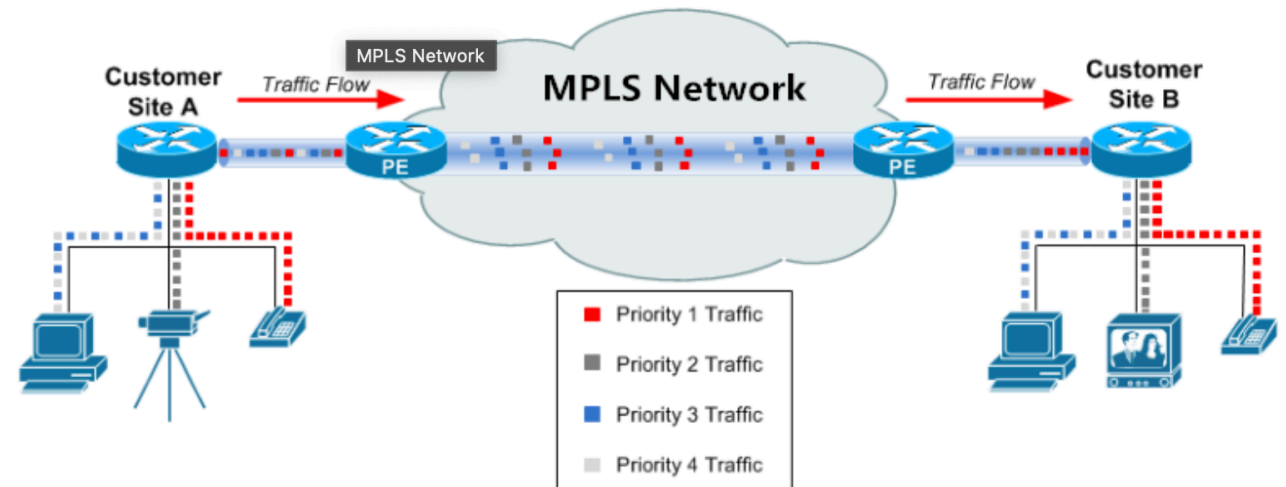
FAQ

1. What is a MPLS network ?

MPLS is a protocol for efficient network traffic flow between multiple locations. MPLS network provides customers with a method of prioritizing traffic, thus bringing a sense of traffic predictability within the network.

For example, MPLS allows us to differentiate video streaming traffic from other types of traffic, we can then assign a higher priority and be sure to have a high quality, uninterrupted video streaming service between festival areas or to social-media networks.

As illustrated in the figure, time-sensitive applications such as video and voice can take the highest priority while less critical applications would take the lowest priority and still function properly.
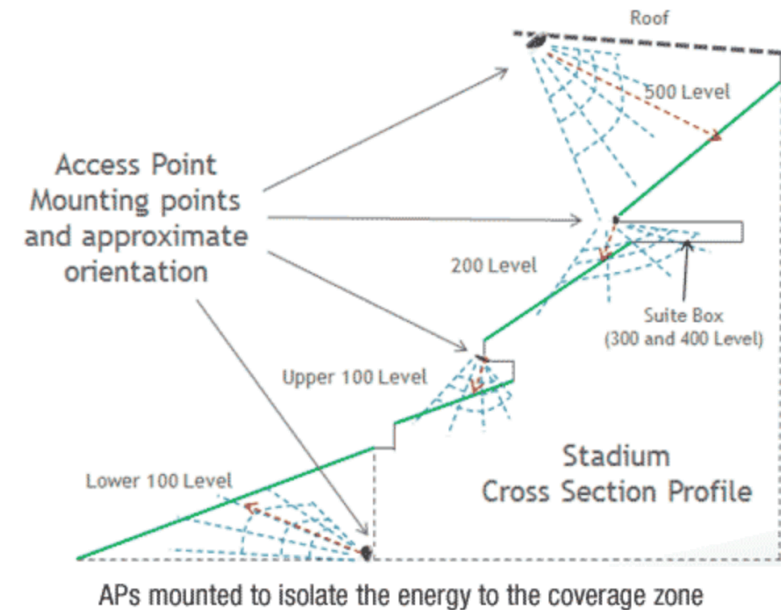
FAQ

2. How do you handle Wi-Fi RF interferences ?

We know that during a large festival the RF environment will be very polluted by a lot of end-user devices as well as other types of equipment like: wireless microphones, wireless video links, etc …

Ruckus BeamFlex is able to select antenna patterns that focus RF energy away from the direction of interference; thereby attenuating noise to the receiving station. This enables remarkable improvements in signal gain while at the same time reducing noise. Using these interference rejection and avoidance techniques, a single ZoneFlex AP can realize up to 9 dBi in signal gain and 17 dB in interference mitigation.

An interference avoidance algorithm enables the BeamFlex software to detect the direction of interference from, for example, a neighboring network, a microwave oven or a nearby Bluetooth device. In response, BeamFlex is able to select antenna patterns that direct energy away from the direction of interference, thereby attenuating noise to the receiving station.

APs mounted to isolate the energy to the coverage zone

FAQ

3. How do you monitor your network ?

We use industry standard software to pro-actively monitor our network, when an incident happens we are automatically notified and our engineers start working on the issue before anyone else even notices there's a problem.

We constantly monitor all our fiber optic signal levels from and to all PoPs, if an attenuation occurs we can quickly dispatch a fiber optic team equipped with the necessary tools to start troubleshooting. Since our network is designed with redundancy in mind the impact of a fiber cut would be minimal. Our routers will quickly change the active traffic path to another link that doesn't have issues.

FAQ

4. Can you provide usage statistics of the network ?

Ruckus SmartCell Insight collects data from wireless controllers, access points, clients and applications. A variety of standard reports support the most common requirements right out of the box. You can access top-level summary views with granular drill-down capability.

The SmartCell Insight Data Explorer feature makes it easy to create customized reports and dashboards. Focus on the network metrics and trends that matter most to your organization by tailoring reports to meet your requirements. An intuitive user interface and drag-and-drop data attributes and panels make it easy to create the views you need.

Further, we run NetFlow analyzers on our routers, we sort network traffic according to many criteria including IP address, port, Layer-7 (L7) application protocols, throughput, Autonomous Systems (ASs).