Checklist for building an edge data center

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Building an edge data center to provide a cloud computing environment within a service provider central office can be a complex endeavor.

It requires lots of planning and preparation to ensure that it can deliver the necessary end goals. Service providers are increasingly moving towards leveraging the architectures and technologies of software-defined network (SDN) and network function virtualization (NFV) to be more agile—bringing new services online faster, and saving on both CapEx and OpEx through efficiencies. Convergence of wireline and wireless networks, and the need for higher bandwidth with lower latency is driving the cloud computing environments to the edge of the networks. Central offices (CO) are typically on the network edge as that is where the access network (fiber optic cables) terminate, and thus are prime locations for an edge data center. Because cloud computing and SDN/NFV technology is constantly evolving, the edge cloud computing environment design and supporting fiber infrastructure must take into consideration what the future may bring and how this new environment or "edge data center" might take advantage of this.

To help plan a successful edge data center, CommScope has created a preliminary checklist and tips to consider for:

1. Location
2. Power
3. Heating and Cooling
4. Design
5. Physical Infrastructure Layer

1. Location

Location refers to both the geographic area where a service provider plans to place or build an edge data center and the actual physical site itself. Once a possible site has been identified that seems to satisfy the requirements, the next step is to determine if the potential building can accommodate the needs of an edge data center.

- ☐ **What is the best location for the edge data center?**
  - *– How close is it to the desired target market?*
- ☐ **Is the geographical location prone to natural disasters such as earthquakes, floods, hurricanes, tornadoes, ice storms or excessive heat?**
- ☐ **How much square footage is available in nearby existing facilities or central offices?**
  - *– If an existing site has limited room, is there room outside of the building that can house a modular data center solution? Or, is there an opportunity to retire and remove old equipment?*
- ☐ **How many racks or cabinets initially will be installed?**
  - *– – What will the data center look like 3 to 5 years from now?*
- ☐ **Does the building already have any infrastructure already in place?**
  - *– – If not, how easily can this building be retrofitted?*
- ☐ **Does the building currently have sufficient power?**
  - *– – See Power below for questions to consider.*
- ☐ **Does this building have adequate heating and air conditioning?**
  - *– See Heating & Cooling below for more questions to consider.*
- ☐ **Can the building obtain multiple high-speed network links?**
  - *– Ideally, network connections should enter and exit at different points in the building.*
- ☐ **Does the building have a lot of windows?**
  - *– Windowless facilities are best to better control indoor climate and security.*
- ☐ **Are pathways such as doors, aisles, hallways and freight elevators large enough for equipment, racks and/or cabinets to be moved in and out?**
- ☐ **Do regulations or internal rules require that the edge data center area be physically separated from the rest of the telecom space in for example an existing central office?**
- ☐ **Does the edge data center space need to be separated by a physical firewall?**

2. Power

Power planning for today and for the future is one of the most critical items in the edge data center. To ensure the edge data center is always operational, consider redundancies that meet the service provider's requirements and plan accordingly.

- ☐ **Can the utility company or multiple companies provide enough power now and in the future?**
- ☐ **Can the building be serviced by multiple utility grids?**
  - *– In a best-case scenario, power should enter the facility from different entrance points.*
- ☐ **Can power be supplied directly or will conversion equipment be required?**
  - *– Consider conditioning the electrical power to avoid spikes or surges.*
- ☐ **Is there enough back-up power from the generators?**
  - *– Generators should be able to support the edge data center for at least 48 hours during a power outage.*
- ☐ **How many uninterrupted power supplies (UPSes) have been planned to be used?**
  - *– UPSes should support the entire infrastructure for at least 150% of the time it takes for generators to come online.*
- ☐ **What is the average power requirement per rack or cabinet?**
  - *– Typical data center racks require 5-10 kW of power while ultra-high density racks may need up to 50-60 kW.*

3. Heating & Cooling

Heating, venting and air conditioning (HVAC) is essential to the successful operation of a data center. Since nearly 50 percent of all power used by a data center is eaten up by HVAC, making this function as efficient as possible is vital to OpEx.

- ☐ **How many BTUs can the space/building support?**
  - *Ideally, the ambient temperature should remain around 70°–74° F (21°–23° C) with 45–50 percent humidity.*
- ☐ **How will the data center's temperature be monitored?**
  - *Utilizing temperature sensors on the racks are the best way to monitor temperature.*
- ☐ **How will the data center be cooled?**
  - *Using a hot-aisle/cold-aisle design can simplify temperature control.*
  - *Raised floors must be constructed if cooling the data center from below.*
  - *Slab floors can work well too, but often require in-aisle cooling solutions*
- ☐ **Consider a plan to minimize climate control costs.**
  - *Adopting a free-cooling design can also be a cost-effective solution to temperature control.*
- ☐ **Consider walling off or utilizing curtains to better control the climate off the data center equipment.**
  - *Controlling humidity and dust is critical to healthy servers and switches.*

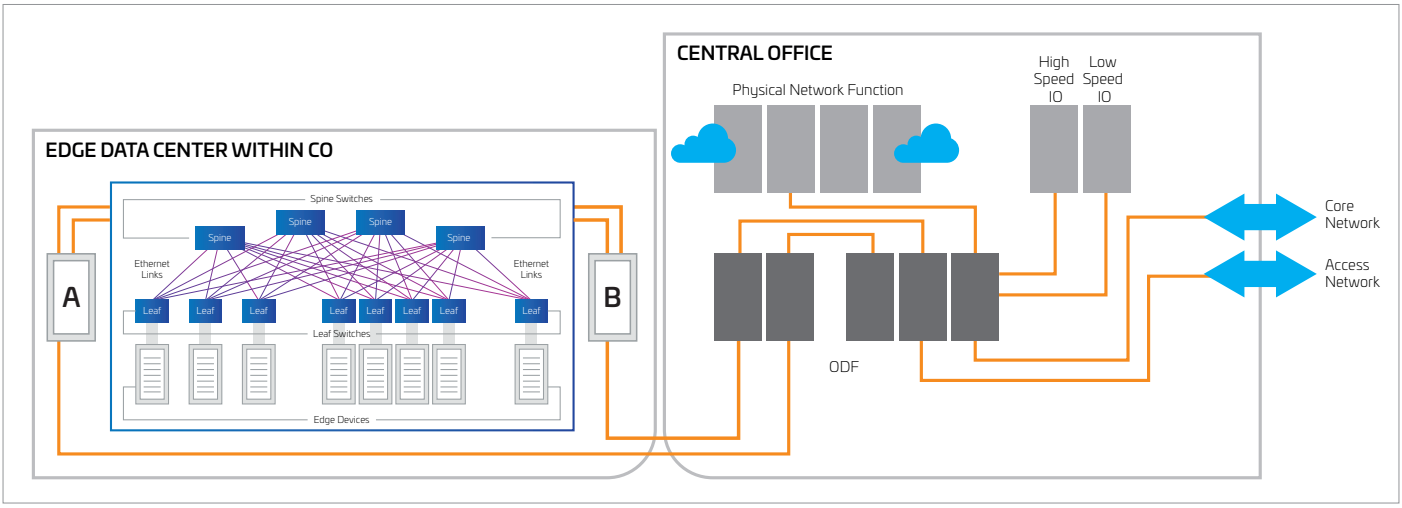
4. Design

Whether converting a telecom site like a central office or building a data center from scratch, one crucial part of design is planning the infrastructure. The following are a few questions regarding overall design and security.

- ☐ **Does the data center design account for lighting?**
  - *LED lighting uses the least amount of power and doesn't generate heat.*
- ☐ **Is there a plan to secure the physical premises?**
  - *Consider biometrics in addition to key cards for an extra layer of security.*
- ☐ **Consider a way of protecting rows or racks of equipment from visitors if creating a customer co-location area.**
- ☐ **Does the facility have enough fire alarms and escapes?**
  - *Local codes inform how fire safety preparations should be made.*
- ☐ **What kind of fire suppression system is right for the data center?**
  - *To prevent expensive equipment from getting wet, special inert gas fire-suppression systems are often employed.*

5. Physical Layer Infrastructure

To gain maximum benefit of cloud computing and software-defined networking/network function virtualization (SDN/NFV), the physical layer of the edge data center must be seriously examined. Since the lifecycle of most SDN/NFV equipment lasts about every 2–3 years, planning of the physical layer infrastructure to support future technology and connectivity is essential.



☐ **Consider a phased 3 to 5-year roadmap for the data center architecture.**

– *The physical layer infrastructure should be designed to support multiple upgrades— with migration paths that can support up to at least 400G.*

☐ **Because many carriers/service-providers will build the majority of their SDN/NFV or Cloud/ compute environments on the edge of the network (CO, MTSO, CRAN Hub, regional DC), the size and scale of these environments should be such that the physical infrastructure requirements can be supported by multimode fiber optic cabling.**

☐ **Data center designs that propose longer channel paths or extra connections should consider components that adhere to loss budget parameters.**

– *CommScope's unique design tools can help speed and simplify design and planning. Our application support guidelines provide the supportable distance limits for every supported application based on fiber type, connector type and number of connectors. Once the components are installed, our unique link loss calculator confirms the correct installation. Our link loss/ fiber performance calculator can be downloaded for free.*

☐ **The data center should easily support both duplex and parallel applications.**

– *Consider CommScope's MPO-24 with LazrSPEED OM5 to provide duplex and parallel fiber value and migration flexibility. The MPO-24 solution offers multiple parallel (MPO-8, MPO-12 or MPO-24) and/or duplex ports via a single MPO-24 trunk.*
For additional information on CommScope's High Speed Migration fiber infrastructure solutions please go to: www.commscope.com/hsm/

☐ **Is there a plan to manage the infrastructure and its connectivity as the data center grows?**

– *Consider using automated infrastructure management (AIM) systems to help the data center become more efficient—from tracking down ghost ports or switches and loose connections to providing detailed mapping for moves, adds or changes.*

Since there is so much that goes into planning and designing an edge data center, this checklist cannot possibly cover every detail of any given project. CommScope and our PartnerPRO™ network of local experts around the globe would be happy to work with you to make sure that a service provider's future edge data center becomes everything they want it to be.

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