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Navigating the BEAD Program

2) Network Design, Build and Operate Phase

GENERAL NOTE | BEAD implementations can vary significantly by state. It is critical that broadband service providers (BSPs) understand the specific requirements of each state program they are interested in participating in.

PHASE 2

Network Design, Build and Operate

Once you receive funding for a territory, the next step is to turn your high-level network proposal into a detailed network design. The BEAD project's broadband network design focuses on building a resilient, flexible, and operationally efficient network. This network should be easy to deploy, simple to operate, and capable of scaling cost-effectively throughout its lifetime. In addition to providing network connectivity for broadband services, the network must be ready from day one to support the service provider's BEAD project obligations, which entail having a high network availability, meeting network capability requirements like minimal service speeds and latency, compliance with Build America, Buy America (BABA) requirements regarding U.S. domestic content procurement preference, meeting project deployment deadlines, benchmarks, and service obligations throughout the network lifetime and the project duration. Failing to consider the project's total cost of ownership has profound implications and risks for delivering an economically sustainable solution for your BEAD project.

Here are the key considerations and guiding principles for the BEAD project network:

1 NETWORK PLANNING, DESIGN, AND BUILD

Effective network planning is crucial. This involves assessing the physical infrastructure (cables, conduits, utility poles, etc.) and environmental impact of unserved and underserved territories, and developing strategies to deploy networks cost-efficiently into the BEAD territory.

- First, determine the population's (residential, business, etc.) broadband service needs and the gaps within the target boundary, size, and also consider potential economic growth for service expansion.
- Deploy a BEAD-compliant network solution that complies with the Build America Buy America requirements set out by the NTIA waiver for outside plant (OSP) fiber, aggregation, access, and premises domain.
- Use an end-to-end network design approach versus a "price per port" approach, which emphasizes optimizing outside plant requirements, including the optical distribution network (ODN) routes, number of systems, enclosures, power, cooling, land, and permits required to connect subscribers with minimal systems deployed in a territory. For instance, in deployment scenarios requiring more remote nodes, huts, and cabinets, inefficiencies arise that impact operational costs related to power, real estate acquisition, and increased truck rolls costs throughout the network's operational lifetime. Permitting costs can quickly accumulate, exceeding your budget and negating any savings from lower item-based equipment costs per port. Furthermore, managing multiple sites increases project risks and project delays in connecting and delivering services, affecting project deadlines and benchmarks and ultimately affecting revenue generation.

- For premises applications, utilize single system solutions that integrate the ONT, residential gateway, and wireless functionality. Single systems are more cost-effective than two-system deployments, offering advantages in reducing SKU management, stock, and support costs, as well as simplifying installation and management, and lowering operational costs. The BEAD project funds only cover infrastructure to deliver broadband service to the premises; with a two-system solution, the Wi-Fi RG router is considered CPE and not covered by BEAD funding, further increasing your capital needs or placing a burden on subscribers.
- BSPs deploying BEAD projects must consider implementing networks that minimize outages. Establish a network redundancy plan to ensure resilience and maintain network uptime, delivering highly available services. Identify where and how you aggregate services and connect to Internet Service Providers (ISPs), content providers, and other services. For maximum resiliency, BSPs should consider using geographically diverse connections to ISPs and content providers.

2 OSP FIBER DEPLOYMENT AND ENVIRONMENTAL

Fiber buildout ensures high-speed broadband services reach unserved and underserved communities. The key to OSP deployment is identifying the utility right-of-way, working with the utility company to obtain easements on poles, and allowing for easy fiber deployment. Identify new areas requiring trenching and fiber buildout, and ensure right-of-way, environmental compliance, and permitting. Finally, identify network equipment, central offices, remote cabinets, and remote node locations. Leverage broadband system solutions that can reach the most subscribers while reducing the number of locations, especially remote nodes. This will reduce overall project capital and operational expenses.

Leverage existing design considerations, including:

- **Centralized Splitting:** This method uses a central point to split the fiber signal to multiple endpoints, which is efficient for densely populated areas.
- **Distributed Splitting:** This approach distributes the splitting points closer to the endpoints, which is suitable for rural areas with dispersed populations.
- **Distributed Tap:** This design allows for flexible network expansion and is helpful for future-proofing the network.

Distributed tap fiber deployments are more cost-effective for areas with a reduced fiber count, simplified network design, lower installation costs, improved scalability, efficient signal distribution to multiple users, minimized splicing requirements, and future-proofing capabilities by enabling easy expansion to accommodate additional users on a fiber optic network.

3 NETWORK AND SERVICE OPERATIONS

The network must be designed to be operationally efficient, ensuring that it is easy to deploy and simple to operate over its lifetime. This includes considering end-to-end subscriber support and network management requirements. Consider deploying solutions that provide simplicity and the highest amount of operational workflow automation for provisioning, troubleshooting, upgrading, and proactive monitoring.

- One primary operational consideration for deployment is accelerating the integration time and effort between the network and the back-office systems. Ideally select integrated systems that utilize open APIs that abstract services from the underlining network infrastructure. The hardware independence and services abstraction allow for innovations to be introduced quickly to the market while reducing integration effort and time. The open approach accelerates deployment time from weeks to months and eliminates the risk of project delays, thereby speeding up the time to revenue. In addition, deploying solutions abstracted from the network makes it easy to introduce new capabilities without impacting service integrations.
- The key to maintaining financial sustainability in BEAD funding projects is automating broadband operations and ensuring simple and efficient workflows for provisioning, health, monitoring, and troubleshooting. This reduces the stress on BSPs' resources, allowing them to focus on high-priority and revenue-generating projects instead of network operations. Focus on automation that simplifies provisioning, reduces truck rolls, and enables CSRs to resolve customer issues while maintaining high service availability quickly.

4 NETWORK SCALABILITY AND MODULARITY

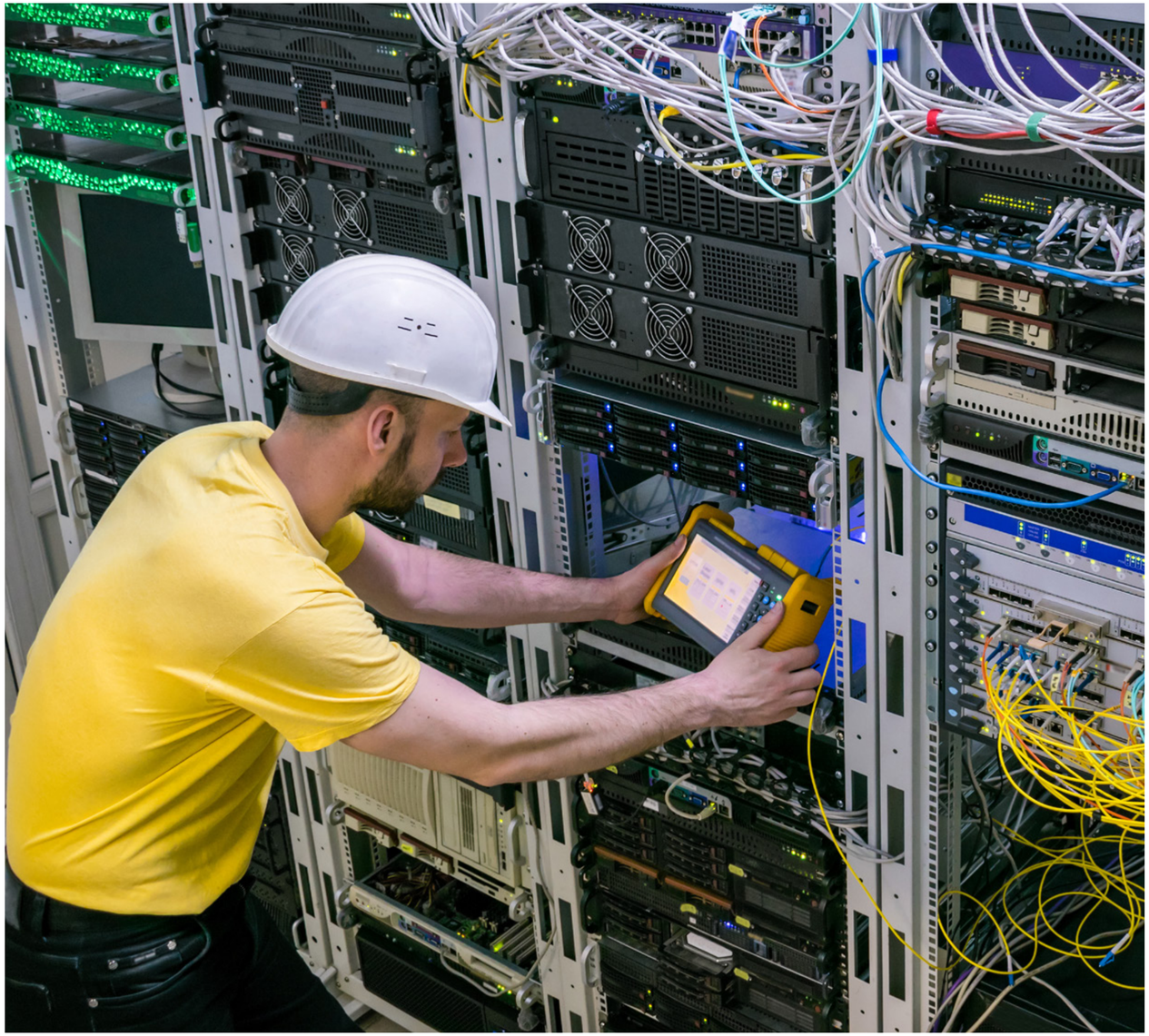
The network deployed today is expected to last over 10 years, and this investment is anticipated to stimulate growth in the communities it serves. The broadband network must be scalable and modular to accommodate future growth and changes in demand. Deploying networks that scale cost-effectively in response to growth is vital for addressing business and service growth opportunities. Look for network infrastructure that has modular attributes, allowing for incremental capital investment that aligns with revenue growth. This ensures the network can adapt to the community's evolving needs and deliver financial sustainability.

5 SERVICE PERFORMANCE

BSPs must ensure that the BEAD project network consistently meets service speed and performance requirements and report the results of active subscriber testing to the NTIA to comply with program funding requirements. For many BSP-operated funding programs, verifying that network capabilities align with program expectations is often addressed only after the network and operational systems are established. This usually means that compliance testing and reporting capabilities are subsequently added to existing systems.

However, incorporating testing compliance into operational workflows complicates processes and incurs additional costs that affect the project's total cost of ownership (TCO). By integrating funding, testing, and service performance compliance into operational management systems from the outset, deployments can be streamlined, and workflows can be automated as part of the subscriber lifecycle, thus reducing operational costs.

Service performance testing provides benefits beyond compliance; it allows field teams to validate service activation and generate a "service birth certificate." This testing equips customer support with tools and reports that enable them to efficiently address and resolve customer issues. It also supplies the operations team with tools to detect network problems, identify their root causes, and quickly restore subscriber services. All these efforts contribute to faster repair times, higher service availability, and an enhanced customer experience.



Leveraging broadband platforms to address the network deployment and operational challenges of the BEAD project

Building a government program-funded network presents several challenges, particularly regarding project milestones and the additional obligations required to secure funding. Typically, Broadband Service Providers (BSPs) are responsible for integrating network, operations, and compliance solutions to support project builds. However, this integration often demands significant time, specially skilled resources, and considerable effort for ongoing operational integration throughout the network's lifetime.

A more effective strategy is to utilize integrated platforms that specifically cater to the operational needs of funding programs. Implementing simple, automated workflows that require common skill sets can streamline the process. This platform-based approach offers greater flexibility in reallocating resources and funding toward higher-priority projects that deliver the most value for your business. Broadband Service Providers (BSPs) deploying BEAD projects can benefit significantly from using a platform for broadband networks and operations. Here are the key reasons:

1. **Resilient, Highly Available Network**

   A resilient and highly available network foundation that enables BSPs to deliver services is essential for enhancing the subscriber experience, reducing operational costs, and giving BSPs confidence in launching value-added managed services that offer differentiation and support business growth.

2. Operational Efficiency

Platforms simplify network operations and provisioning by consolidating multiple workflow functions. Automation of critical network tasks shortens time to market and increases network performance by distributing network intelligence closer to the subscriber. Fast service creation, delivery, and support over a wide range of managed residential and business services help you reach new markets and subscribers quicker at a lower cost. Platforms reduce operational costs by employing automation to decrease manual administration of equipment-affecting work orders, reducing truck rolls, technician dispatches, and problem escalations. They also help in reducing support call volume during outages through integrated outage notifications.

3. Proactive Experience Management

Cloud-based network management helps BSPs evolve from reactive network management to proactive experience management. This includes automated alarm notifications, health alerts, and geo map visibility to quickly identify and respond to outages and fiber cuts, reducing mean-time-to-repair (MTTR) and improving subscriber experience.

4. Scalability and Flexibility

Platforms enable rapid innovation, operational efficiency, and subscriber growth while scaling cost-effectively as the business expands. They offer integrated and seamless software-defined access, premises systems, and Cloud management for flexible deployments.

For more information on the Calix Broadband Platform, click here.

To review your BEAD project network and operations design in depth, schedule a BEAD Network Design Consultation with a subject matter expert.

Schedule a consult

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