



Proactive Asset Decommissioning in Critical Facilities to Accelerate Energy Management and Sustainability on the Road to 10G

A Case Study of How Comcast is Embracing Sustainable Asset Lifecycle Management to Power the “Future of Awesome”

A Technical Paper prepared for SCTE by

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1. Introduction

In-rack assets in datacenters and other critical facilities continue to contribute significantly to the energy usage at cable companies. SCTE•ISBE has championed Energy 2020 as an Energy Management Program to provide cable system operators with the new standards, technology innovation, organizational solutions, and training desired to drive continued cable telecommunications network growth, availability, and reliability. While there is a lot of excitement for a new product/application launch and deployment of assets, decommissioning has been an afterthought for many organizations. Instead, companies have been focused on delivery of new projects to optimize service delivery and revenue. With advancements in technology many compute, storage, and networking assets are able to increase their useful lifespan to 5-10 years for certain non-demanding or legacy workloads. This results in little desire or incentive for the planning of asset retirement. New assets and infrastructure have always been priority, and organizations have been squeezing every last drop of productivity out of their assets, extending the asset lifecycle well beyond the manufacturer's End of Service Life (EOSL) dates.

Cable system operators can significantly and immediately impact their bottom lines by deploying solutions that can reduce data center power needs and increase energy efficiency, according to a presentation at the Smart Energy Management Initiative (SEMI) forum by the Society of Cable Telecommunications Engineers (SCTE).

At Comcast NBCUniversal, teams hold themselves accountable to be environmentally responsible. Kicking off a proactive asset decommissioning program was a step in the right direction to help achieve our asset retirement and sustainability goals. This technical paper will highlight how we were able to apply a renewed focus on asset retirement and how this helped with keeping our utility bill flat in 2019/2020.

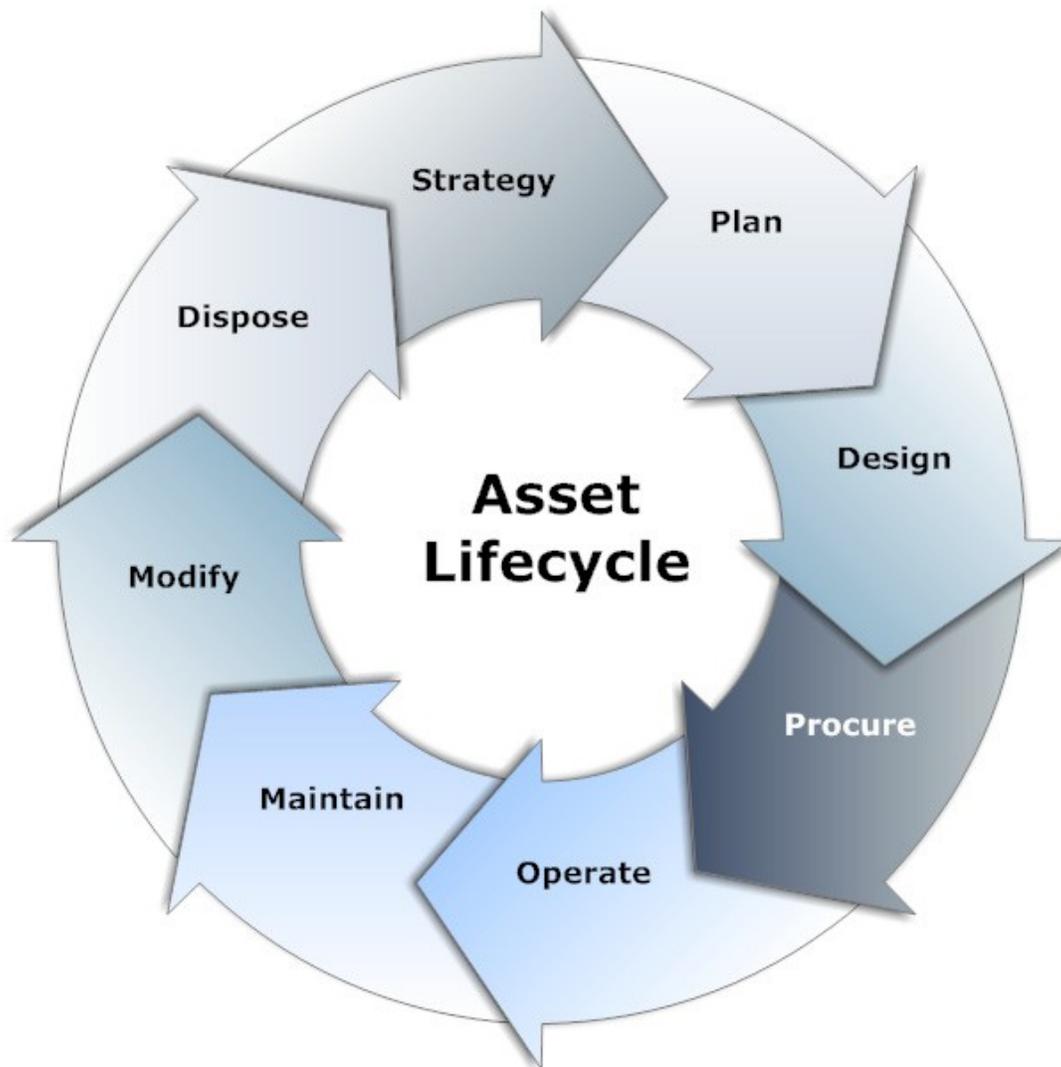


Figure 1 - Typical Asset Lifecycle (NIST SP 1800-5)

2. Benefits

The benefits of proactively running a Decom Program are numerous and include energy savings, reducing security risks, better inventory management, sustainability, reduced capital, and software spend. These are described below:

Energy Savings – Getting unused devices off your raised floor can have a significant impact on your organization’s energy bill. Furthermore, newer servers are usually more energy efficient which should be an incentive to get aged devices out the door to help with your organization's goals for overall energy conservation.

Security Risk mitigation – Unused equipment and other aged devices may not be able to receive the latest patches and updates, and this can be cause for major concern due to lack of awareness of these vulnerable systems. Unpatched servers lead to persistent backdoors for hackers and increasingly unpatched servers are becoming a target for cyber-attacks, exploiting vulnerabilities in our organization. Keeping up and patching these systems when we know the ownership and applications being hosted on them is hard enough for any organization. The added burden of patching older abandoned and unused servers can turn into an impossible task. The benefits of retiring these systems early not only reduce risk but also reduce potential business intrusions caused by downtime. This is where a Decom Program can assist and get these unused vulnerable systems off your organization's network and help reduce unnecessary risk.

Help institute better Inventory Management – Getting your organization on board to focus resources on the proactive planning and retirement of unused and aged servers also has a direct impact on your organizations ability to track and inventory assets. Performing a book to floor and floor to book audit of all facilities housing your company's assets is step one of standing up a decom program. Knowing where all your assets are and who owns them is critical to success and this will force your organization to not only get a better understanding of what you own but will also open up the opportunity to better the process in managing these assets going forward. According to a recent Mercer report, the average employee turnover rate was 22% in 2018 which is a nightmare for asset management and keeping application ownership aligned. Getting ahead of the next re-org by understanding who owns and supports your organization's business applications and underlying assets and putting in a process to maintain this information will save your IT department countless hours down the road. This exercise will also help identify orphaned assets which would be ideal decommission candidates and lead the way to costing savings.

Sustainability – As your organization's compute and storage requirements grow, you will want to find ways to not only find alternative sources to power your data centers but also figure out ways to reduce the overall energy footprint. This is where retiring older assets and buying more energy efficient devices combined with the ability to do more with less will empower your organization to meet your individual sustainability goals.

Reduced Capital Spend – Many legacy systems are not cloud-ready, which emphasizes the need to stay lean and avoid the need to expand your physical footprint as eventually most if not all of your organization's workloads will be headed to the private or public cloud. Removing unused and aged devices and leveraging capabilities to optimize workload efficiency will ensure your organization is on the right side of change with shrinking and not growing their physical footprint.

Optimized Software Licensing – Software assets are a major cost in an organization's overall IT spend. The first step in optimizing these costs is knowing what you are consuming and then identifying opportunities to reduce your footprint. Reduction in software licensing and maintenance costs will be an indirect benefit your organization will receive by proactively decommissioning your physical assets. Not only will this result in huge savings, but this may also help your organization stay on side with your licensing obligations to your vendors.

Optimize overall Costs of IT - With the rising cost of IT including capital and operational spend, organizations are trying to find creative ways to avoid costs and save money. According to Gartner, worldwide IT spending will grow 4% in 2021. A major part of this increase and overall spend is associated with Data Center Systems and Enterprise Software. Standing up an Asset Decommissioning Program will directly attack both of these costs contributors and lead your organization not only into substantial cost savings but also provide an optimal setup for your organization to start optimizing IT

spend through virtualization and consolidation of workloads. Knowing what you own and what is and is not being used is step one to any organization's journey into standing up a Decom Program.

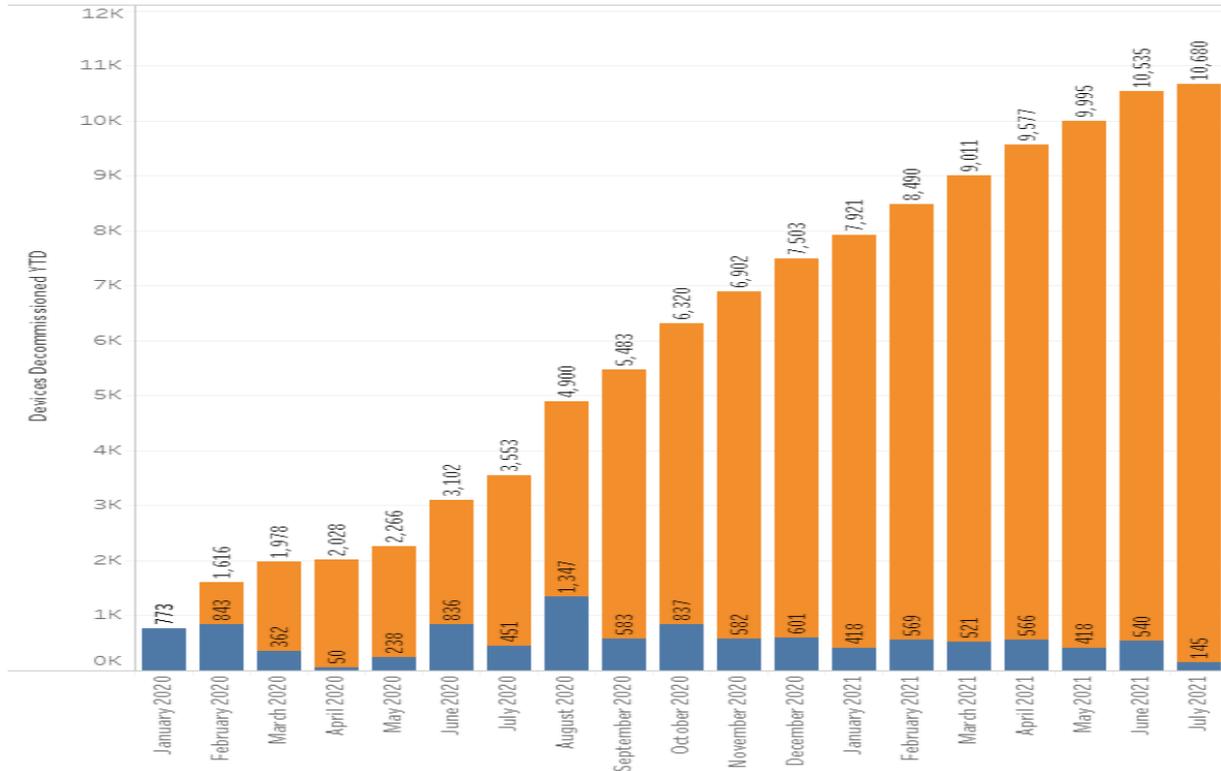


Figure 2 - Decommissions 2020-2021 (YTD)

3. Why is this not already a priority at many organizations?

Focus on new deployments – Generally speaking, there is a lot of excitement and related prioritization for effort involving new product launch and related new asset deployment. There is not as much focus on decommissioning those applications and assets as time passes.

Silos and reorganizations – The life of in-rack assets could be as long as 5-7 years. Many large companies go through multiple reorganizations of teams in such timeframes. This causes lack of ownership of these assets for the new teams. Also, organizational silos impact the ability to see an application retirement, asset decommissioning, and its sustainable disposal end-to-end.

Lack of proper inventory management – A well-maintained inventory with right CDEs (Critical Data Elements) and ownership is a necessary ingredient for a successful decommissioning program. Many companies are not able to create or manage this inventory as new assets come in and teams are reorganized.

4. Comcast Case Study

Why we did it?

Historically, the decommissioning of data center assets has been an afterthought for most organizations. This often results in abandoned physical workloads sitting collecting dust in critical facilities. These abandoned assets not only consume valuable resources but also pose a security threat to the organization. Our journey at Comcast began in late 2018 as we started to cleanup and get a better handle on our assets. We worked to proactively optimize our decommissioning process to avoid the common pitfalls that a lot of organizations find themselves in, where unused assets are left in the racks, collecting dust, consuming power, and occupying space.

After realizing these potential impacts, Comcast embarked on the journey to shift from a reactive state to proactively managing decoms, similar to how assets are planned for and deployed during project delivery. The need for this was long overdue and some of the sure tell-tale signs were:

- Finding powered off or non-functional assets in our data centers during Data Center audits.
- Finding mismatches in asset status in various asset inventories.
- Finding sudden power drop offs in devices through our DCIM system.
- Finding gaps in our current Decom process, resulting in failed asset decoms.

Inventory Management

With the focus on physical device decommissions, it was very important that we did a floor-to-book and book-to-floor inventory of all our physical devices across all sites. This inventory was updated in our DCIM tool and reconciled with our CMDB to help identify ownership for each device. The team assessed various sources of inventory that can help identify the Critical Data Elements needed for each asset that would drive the identification of the initial assets to target:

Table 1 - List of Critical Data Elements needed for each asset to smoothly run through Decom process

Critical Data Element (CDE)	Note
Make/ Manufacturer	E.g. Hp/Dell/Cisco/Juniper to identify the OEM
Model Number	E.g. DL-360 to match up with EOSL list
Serial Number	E.g. 1234567 to uniquely identify each asset
FQDN/IP Address	E.g. billing-server1@comcast.com to identify network name and IP address
Application	E.g. Billing System
Application Owner	E.g. Consumer Billing Ops team@comcast.com to work with for decommissioning process

Gaining buy-in from all stakeholders

The ability to proactively stand up a program around an area that has been historically ignored for years was an easy sell once the business case was developed and presented to leadership. The opportunities as discussed earlier were a clear and the thought of not moving forward with this was highlighted as a risk our organization was not willing to take.

Besides gaining senior leadership buy in, it was critical that we communicated the importance of this to all stakeholders, including both those submitting request to decommission and those fulfilling the downstream process to get decommissioned assets powered down and unracked. This was especially important because, like most organizations, the resources doing the deployments were the same resources that would be helping with the decommissioning of assets.

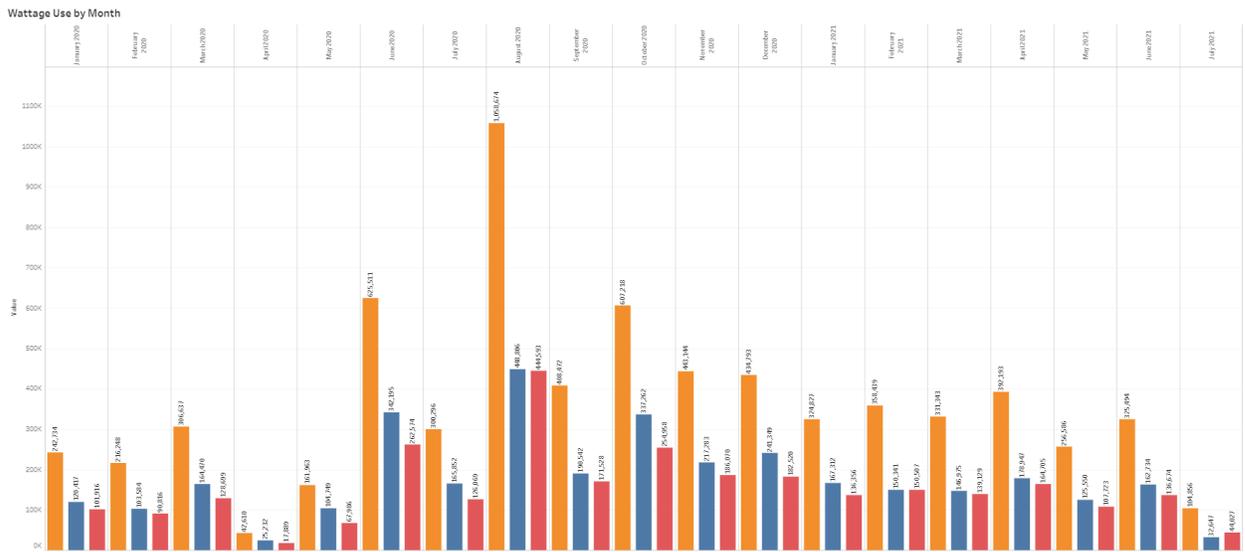


Figure 3: Power watts saving per month 2020-2021 (YTD)

4.3 Evolving the process

Evolving the process involved reviewing the current process and looking for ways to optimize. Looking for opportunities to streamline the process across different areas of the organization and cover various decom scenarios was a critical part of getting started. This involved removing unnecessary steps and introducing critical controls and checks and balances to avoid potential fallout.

4.3.1 Decom request submission

Without having the time or development resources to overhaul the current process, we put checks and balances in place to be notified of any decommission request that was being submitted. This simple step gave our team the power to see decoms through to the end, catching any fallout from decom rejections and potential failed changes.

4.3.2 Decom Governance & Control

The addition of governance tasks along with critical controls, really helped give us get a good handle on our decommissioned assets while we refined the existing process.

A few examples are listed below:

- We made sure new deployment projects highlighted hardware slated for decommissioning upfront so it could be flagged in our CMDB as a potential decom candidate. This really gave us a good handle on decoms associated with tech refreshes and data center migrations.
- We implemented a tool change that no longer allowed teams to diassociate their devices from their respective applications in the CMDB without a valid request to decommission the device. This ensured that we had a valid owner group associated with all devices until they were successfully decommissioned. Along with the above, we also ensured that the device state could not be updated to “decommissioned” without a valid change request to decommission the system. This would help address the concern we found where states were being flipped to “decommissioned,” but the actual devices never got decommissioned from our critical facilities.
- Lastly, it was very important to align our decom program with our hardware maintenance process for our physical compute and storage devices. This helped us to identify potential decom candidates when devices are taken off maintenance and vice-versa.

4.3.3 Decom Fulfillment

The decom program showed early signs that the workload was putting a strain on fulfiller teams, and as they tried to balance the challenging task of giving decoms the same prioritization as new deployments, the queue backlogs showed that something was clearly not working.

The backlog of queues showed that tasks near the backend of the process, including port and IP reclamations, firewall entry removal, and unracking of the devices, were getting squeezed for resources, as these activities were involved the most risk and time to execute.

To address this issue head on we met with the teams to find alternative solution for these risky and time-consuming steps as the benefits of this program were much less appealing if assets just sat awaiting decom for months, especially when one use case we were trying to address was to minimize security threats.

After meeting with the teams, we were quickly able to enhance the current process by removing some of the more time-consuming steps that did not need to be in the actual decom flow. The teams flagged their work through the tasks and executed the work through a pre-approved change outside of the current decom process.

Critical Facility Decommission Process

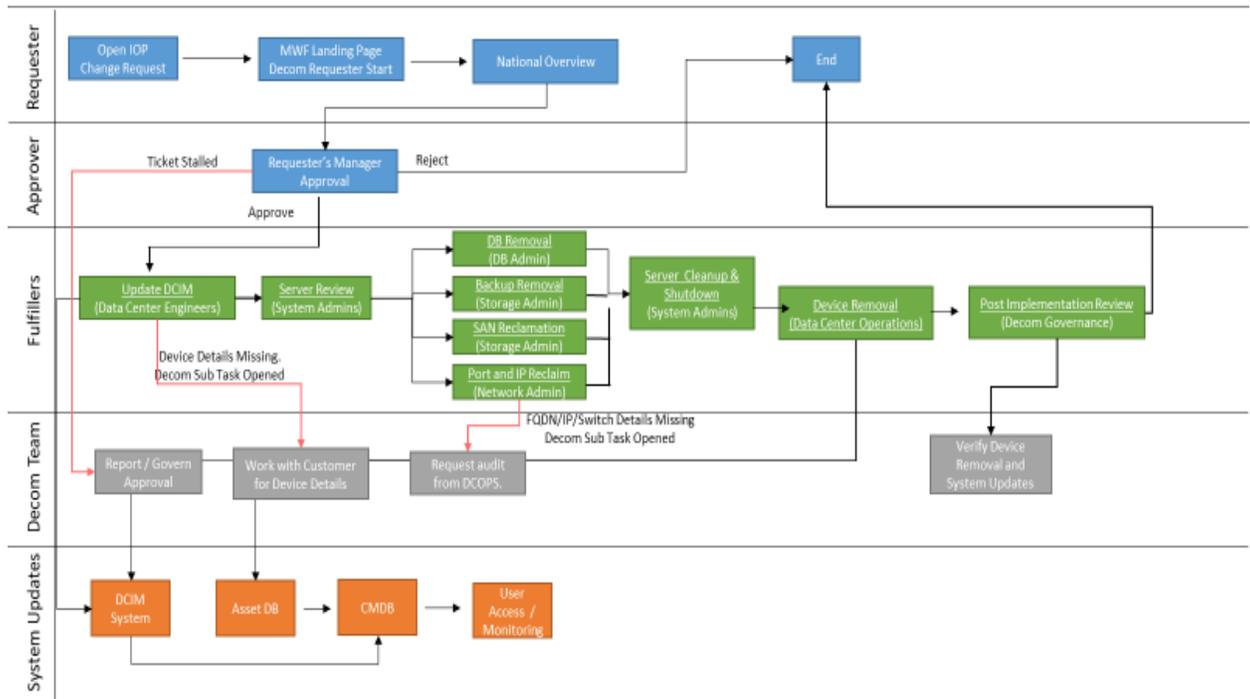


Figure 4 - Example Decommissioning Process

4.3.4 Orphaned Devices

Shortly after standing up the decom program and aligning with our CMDB as the source for ownership relating information, we launched our “Abandoned Server Decom Process” to address devices without ownership or other critical data elements. A few identifiers that we used to determine potential abandoned devices were:

- No ownership in our CMDB - This was the primary indicator.
- State mis-matches between our data sources.
- Powered down or off-network devices.
- Aging devices that were in service longer than 10 years or off maintenance.

In a very controlled manner we went through a 7 step process to turn down orphaned devices and ultimately decommission them if no one raised their hand within 30 days of shutdown. The steps were:

- Try to identify ownership through various sources and resources.
- Perform a physical audit to see if anything can be determined from the device itself. Check if it’s even still racked, plugged in or on the network.
- Check for patterns in power usages and network traffic.
- Open a Change Ticket and get approval for disconnecting or disabling the network port.
- Send out mass communication to Change Management ditro and all hardware service desks and monitoring teams.

- Disconnect or disable the network port.
- Wait 30 days and un-rack the physical device.

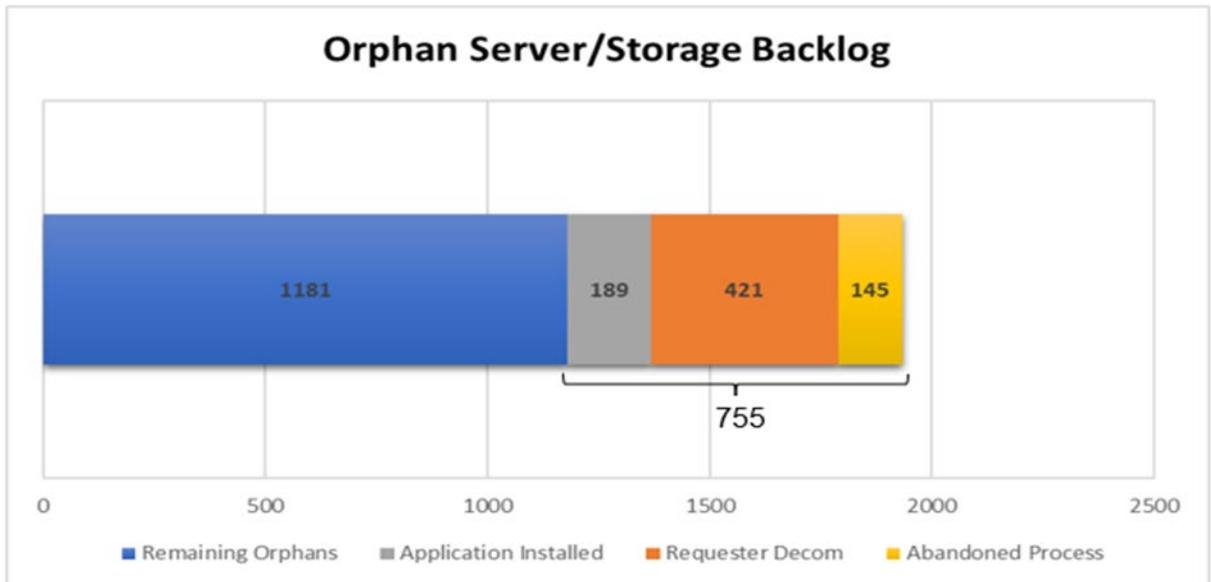


Figure 5 - Orphaned Device Progress Tracking

4.3.5 Remote Sites

The more labor-intensive tasks related to decommissioning of physical servers were still having trouble prioritizing the decom of the physical devices, especially at our non-staffed remote sites. To address this, we were able to generate dashboards and reports highlighting and grouping server decoms by site. This helped our data center teams prioritize and group deployments and decommissions at our remote sites, avoiding additional operating expenses that would have resulted in separate visits to our sites by our vendors

Since inception, we have successfully identified and decommissioned over 12,000 servers, including hundreds of abandoned servers.

5. Next Steps

Building on the success of the program, the team has further evolved the process to manage end-of-life/end-of-service makes/models to drive them thru the decommissioning process with advanced planning. The team is also enhancing the portfolio of the assets to include other appliance-like devices to help expand the scope. Teams are also discussing expanding the portfolio to other sites not in the program scope at this time, including all critical-facilities types, like our Headend & Hubs.

The evolution of the decom program will align with the One Network Program and will require partnership and collaboration across the entire organization. As we move forward we will continue to onboard teams and rationalize tools and processes so that the benefits of this program can be realized across the company.

6. Conclusion

If your organization has not already shifted from a reactive to a proactive approach to handle asset decommissioning, you may find that obsolete assets are taking up valuable resources and possibly draining your IT budget.

Since inception, Comcast has successfully identified and decommissioned over 12K servers including hundreds of abandoned servers and realizing a significant amount of power savings. This would not have been possible without the great work and prioritization given to this program from our Data Center partners and other fulfillment teams at Comcast.

Abbreviations

EOSL	End of Service Life
Decom	Decommission
CDE	Critical Data Element
DCIM	Data Center Infrastructure Management
CMDB	Configuration Management Database

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