

How To Streamline Large-Scale Real-Device Testing in SQA Labs



The ThunderSync3-C10 hub

In software quality assurance (SQA), every bug missed in testing risks costly fixes, damaged reputation, and delayed product launches. QA teams conduct thorough testing on real devices across multiple OS versions, hardware types, and network conditions to ensure software works exactly as intended in the hands of users.

Whether validating a new OS release, regression testing an app update, or running performance checks across hundreds of devices, time-to-market is critical. And in competitive industries, SQA teams can't afford failures, device downtime, or inconsistent results within testing and the device lab setup.

This guide is for SQA engineers, lab managers, and test automation specialists who want to reduce prep time, minimize manual handling, reduce device dropout and failure rates, all whilst scaling testing capacity without sacrificing speed and accuracy.

Challenges of real-device testing at scale Through conversations with SQA teams and analysis of customer requests, we've identified the most common challenges slowing down large-scale software testing.

1. Manual device handling and preparation delays Before a test cycle even begins, devices often need erasing, restoring, updating, and reconfiguring. Doing this manually for hundreds or thousands of devices drains time and resources, while increasing the risk of human error and inconsistent test environments.

2. Inconsistent charging and battery health issues Intensive testing drains device batteries fast. Without intelligent charging, devices risk dying mid-test cycle, disrupting automation scripts and invalidating results. However, continuous device charging leads to damage battery health, wastes power, and alters performance metrics.

3. Space constraints and cluttered setups Many QA labs operate in tight spaces, juggling separate charging and syncing stations. Excessive cables, hardware, and scattered devices make it harder to manage workflows efficiently, causing delays and increasing troubleshooting time.

4. Hardware limitations and connection failures Standard USB hubs can't handle large device pools reliably. USB endpoint limitations lead to crashes, disconnects, or slowed transfers under heavy loads, forcing teams to restart test cycles, repeat restores, or limit the number of test devices due to limitations with the connected USB hub.

5. Slow data transfers and network overload Large firmware or app updates delivered over Wi-Fi can flood the network, causing slowdowns and failed installs. Even wired setups can bottleneck if hubs can't sustain high-speed data transfer to multiple devices simultaneously.

6. Mixed-platform testing complexity Testing iOS, Android, and Windows devices often requires separate hardware setups, doubling infrastructure, cables, and management time.

7. Lack of centralized monitoring and remote control Without a unified platform to oversee device fleets, teams must physically check connected device information, charge levels, connection status, and test readiness. It is time-consuming, especially in multi-location test labs.

How SQA teams overcome the real-device testing challenges Our SQA customers deal with the challenges by introducing the intelligent ThunderSync hubs into their workflows. Our multi-port hubs enable teams to build smarter setups which help avoid clutter and put thousands of devices into an organized structure with remote monitoring and control of each device.

Additionally, SQA teams achieve higher data transfer speeds, simultaneous firmware updates, intelligent charging and reliable connectivity throughout the entire device fleet to avoid failures under heavy testing.

1. Improve device allocation and cut prep time with smarter setups

The ThunderSync range is designed for both **desktop and rack-mounted use**, allowing SQA teams to configure their setups in whatever way best fits their environment. Whether you need a compact hub at arm's reach for quick testing cycles or a rack-mounted configuration to centralize device management, you can adapt your workspace for maximum efficiency.



By **combining charging and data syncing in a single hub**, you eliminate the need for separate stations, freeing up space and reducing cable clutter. This is particularly valuable for mixed-platform testing, as ThunderSync hubs **work seamlessly with iOS, Android, and other operating systems in the same setup**. Instead of splitting benches for each platform, teams can prepare and test all devices from one consolidated environment.

Choosing the right hardware setup is key to efficiently connecting and managing large numbers of devices. The ThunderSync hubs allow direct connection to a host computer as well as daisy-chaining to expand the testing volumes.

According to in-house testing, in a direct connection, a single **ThunderSync3-C10 restores 10 devices in 11 minutes**, while the **ThunderSync3-16 restores 16 devices in 10 minutes and 14 seconds**. By selecting a compatible host computer, you can connect up to three ThunderSync hubs to a single machine, tripling the number of devices prepared simultaneously without compromising performance.

To leverage the full potential of Thunderbolt technology, ensure your system meets the minimum technical requirements. You can find detailed guidance in our [Thunderbolt host computer recommendations](#).

For example, testing with a Mac Mini M4 and three directly connected ThunderSync3-C10 hubs, we efficiently **restored 30 iPhones in an average of 9.5 minutes**, dramatically reducing preparation cycles.

In a daisy-chained configuration, multiple Thunderbolt hubs are connected in sequence, increasing the number of devices restored simultaneously while using fewer direct Thunderbolt ports. Testing with six hubs **restored 60 iPhones in an average of 13.6 minutes**, making it ideal for high-volume or automation-heavy testing labs.



To learn more about setups, read this [recommendations document](#).

2. Overcome hardware limitations and boost data speeds with Thunderbolt technology

Standard USB hubs often hit endpoint limitations when multiple devices are connected, leading to dropped connections, slow restore cycles, or even complete failures during critical tests. The ThunderSync range uses Thunderbolt technology to remove these limitations entirely.

Thunderbolt is a high-speed interface technology, traditionally used in high-performance computing, designed to simplify and enhance the interaction between devices. The innovative way we've used the Thunderbolt technology capabilities **enables our hubs to eliminate the endpoint limitations** of traditional USB and allows significantly higher connection capacity and data throughput without sacrificing stability.

The ThunderSync hubs deliver a **guaranteed minimum of 1 Gbps and up to 4 Gbps per port**, which makes them up to 7 times faster than alternative USB hubs on the market. SQA teams can run parallel restores, OS reloads, and application installs without devices timing out or queues forming.

This performance advantage is especially valuable for real-device testing, where large files, operating system images, or multiple app builds must be deployed repeatedly. Instead of relying on slower network-based provisioning, Thunderbolt-powered hubs transfer data directly via USB-C connections, avoiding the instability that often comes with network congestion.

For example, when restoring a mixed pool of 60 devices, ThunderSync hubs maintain consistent per-port speed, ensuring that each device finishes its cycle without lag caused by shared bandwidth. This means teams can complete testing preparations in minutes rather than hours — freeing up valuable lab time for actual QA work.

To ensure the best performance of your ThunderSync hubs, we always recommend using **Thunderbolt cables certified by Intel®** and consider purchasing one of the following cable options:

- Up to 0.8 m passive
- Up to 2 m active

These are the maximum recommended lengths to make full use of the technology capabilities.



Ensure that the **Thunderbolt cable is connected to a Thunderbolt port** on your PC. While a USB-C port may allow connection, it will not provide the full functionality of the technology.

3. Maintain power and connection stability during heavy testing

Testing cycles can be intensive and prolonged, quickly draining device batteries. If a device falls flat mid-test, the results are compromised, and the cycle often has to be restarted. With hundreds of devices in rotation, recharging them quickly enough to keep workflows moving is a constant challenge. Traditional charging setups often compound the problem by pushing devices to 100% unnecessarily. In labs where devices remain connected for long periods, uncontrolled charging wastes power, accelerates battery wear, and generates excess heat.

The ThunderSync hubs **deliver up to 15W power output** for rapid charging while integrating **intelligent charging technology** that monitors each device individually. Power flow is automatically adjusted to maintain an optimal charge level, preventing premature battery degradation and ensuring consistent performance throughout repeated test cycles.

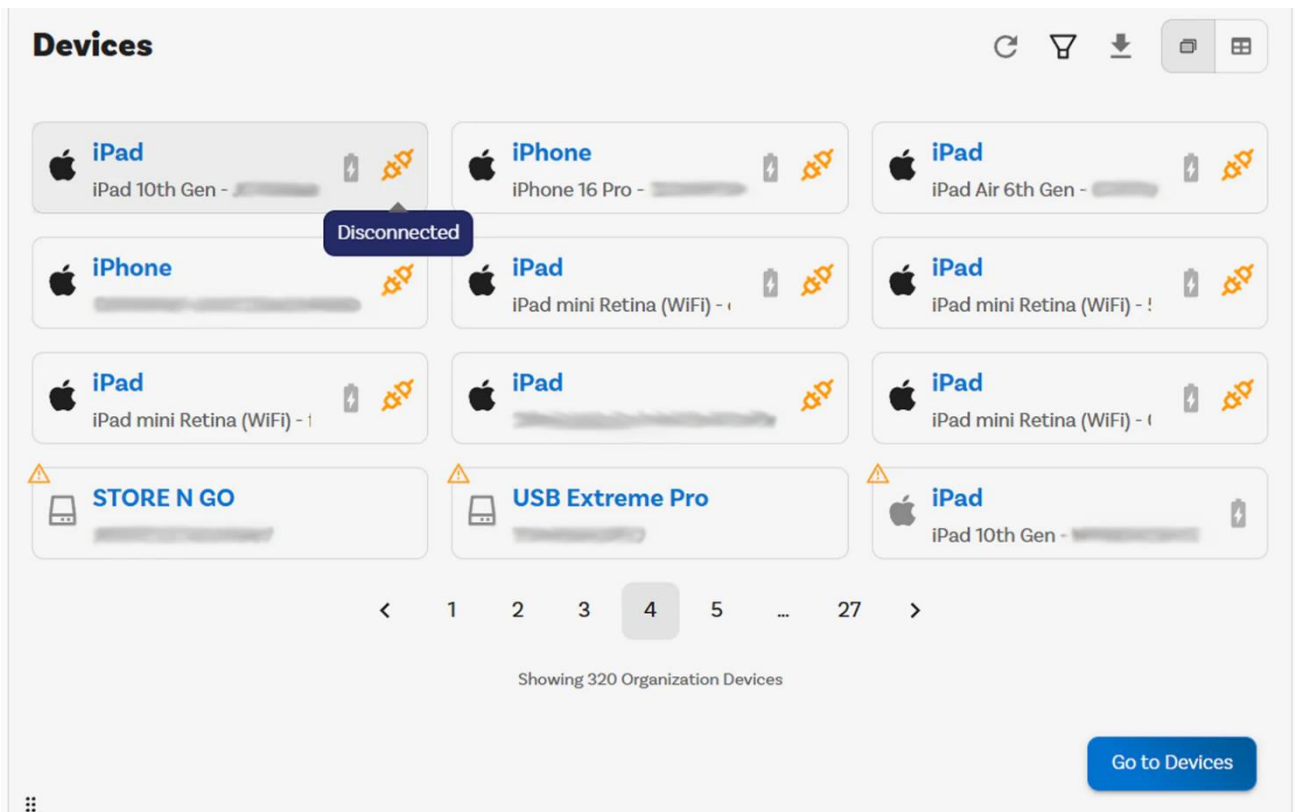
4. Centralized monitoring and remote control for smarter test management

Without centralized control, engineers often rely on manual checks to verify device readiness, charging status, or software versions, which slows down testing cycles and increases the risk of oversight. With the proprietary cloud-based software platform, [Cambrionix Connect](#), you can **access, monitor, and control every connected device**, whether you're in the lab or working remotely. SQA teams can:

- View live and historical device data
- Track utilization patterns
- Create device groups for specific projects or test scenarios
- Access role-based controls to collaborate while maintaining security across large, distributed teams.

The platform also streamlines firmware updates. Instead of relying on Wi-Fi and risking network congestion, updates can be pushed directly via USB, delivering fast, consistent results. Connect supports **simultaneous updates across all connected devices**, and API integrations allow teams to trigger update processes automatically as part of their existing CI/CD pipelines.

Cambrionix Connect reduces manual intervention, shortens preparation cycles, and ensures devices always run the required software version before testing begins.



Understanding the nuances of USB-C performance, device behavior during updates, and hardware capabilities is essential for professionals managing firmware updates. For more details, you can refer to our [firmware update guide](#).

The benefits of smarter workflows

By integrating ThunderSync hubs with Cambrionix Connect and building the right setups, software quality assurance teams turn complex, high-volume testing into an automated and predictable process.

- Run large-scale device tests 24/7 without hardware bottlenecks
- Cut preparation and setup with centralized device management
- Speed up erase/restore cycles by eliminating endpoint limits
- Manage and monitor all devices remotely, track performance, and push updates
- Keep devices test-ready, prevent unexpected battery drops and avoid overcharging

"Cambrionix's expertise in fast, reliable, and intelligent device connectivity solutions plays a critical role in supporting our uniquely complex testing and automation needs across a diverse range of mobile products — including phones, watches, and earbuds. Their high-speed, flexible USB hubs seamlessly integrate with our remote, low-touch back-end systems, enabling us to run broader and deeper test coverage within a single test fixture. This capability empowers our teams to address more edge and corner cases effectively, accelerating development that delivers improved product reliability to the end users" — Google.

For more details please contact Saelig Co. Inc.

