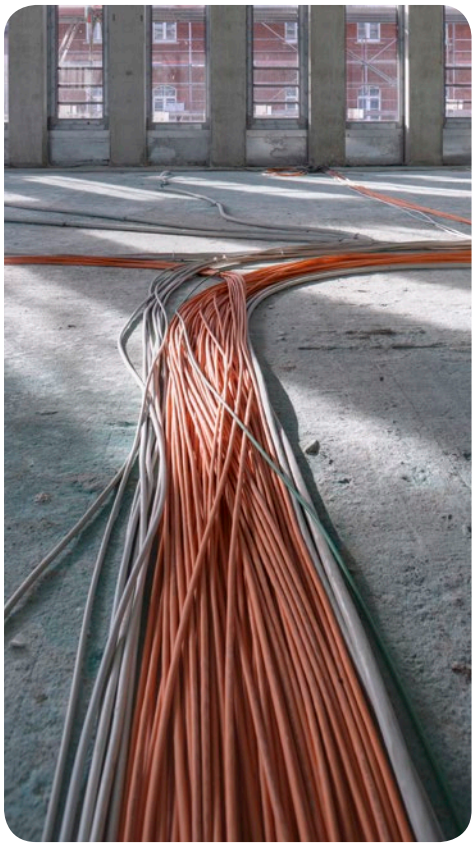
The New Normal: Multi-Everything

The State of the Cabling Certification Industry



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Introduction

Today's IT discussions are filled with terms like Cloud, Virtualization, SANs, BYOD, SaaS, and SLAs. Rarely is the physical layer – Layer 1 of the 7-Layer OSI Model – part of the buzz. But at the end of the day, all network technologies lead back to that critical, foundational layer and the cabling infrastructure that supports it. If it doesn't work, nothing works. And like the technologies around it, it is changing. Consultants and network owners that do not embrace this change, and address the mounting complexities of installation and certification, will struggle for profitability and the very survival as a business.

This white paper explores the state of the cabling industry – where it has been and where it is going. It evaluates what it takes to succeed in the face of an exponentially greater need for cabling contractors to manage multiple environments, media, standards, and technologies. In this new multi, multi, multi world – the new normal – what do cabling professionals need to do differently to ensure success and profitability? What is needed to properly navigate the changing landscape of media, standards and more? And how can we, as a professional community, change the project management game?

The Evolution of Datacom Cabling

Data centers and the networks that fan off from them, settled into a fairly archetypal design right around the year 2000, and haven't altered dramatically since then. The data centers themselves were comprised of racks of servers and tiers of switches. And, the copper connections ran to desktops, routers connected to the Internet, and appliances were inserted for security, storage and other applications. The No. 1 challenge for cabling contractors: speed of certification.

But, big changes are afoot. Standalone servers and storage have been virtualized, and that virtualization is driving increased density, and subsequent demand for ever-better performance, in the data center. The classic data center network, built on a three-tier architecture of access, aggregation and core switches, is collapsing into a single-hop network fabric that promises to help deliver dramatically better performance. Organizations are starting to displace proprietary switches with Software Defined Networks built on commodity hardware and open source traffic management software.

80%
of organizations allow BYOD

In the horizontal leg of the network, the Ethernet connection is being overlaid by an increasing number of Wi-Fi connected devices. The era of BYOD (Bring Your Own Device) is driving significant impact on networks – surveys indicated that more than 80% of organizations now allow users to bring personal devices onto the wireless LAN. And with its issues of propagation, interference, rogue access, constant evolution, etc., Wi-Fi adds strain and complexity to the underlying infrastructure.

A key reason for the stasis in the networking industry over the past decade had been the effectiveness of 1 Gbps copper connections. These cables were common, inexpensive, fast enough and relatively straightforward to install and repeatedly test. But, that era is coming to a close as we move from 1 Gbps copper to 10 Gbps copper, and to 40 Gbps and even 100 Gbps fiber. As more data travels over each connection, each cable is that much more critical.

62%
of copper installs at cat 6 or above

Evolving Challenges

Complicating matters further is the issue of evolving standards. Where Cat 5 cable used to rule the day, now there's Cat 5e, Cat 6, Cat 6a or Cat 7 copper, and multiple types of fiber. There's a broad range of industry standards, measurements and compliance requirements – TIA vs. ISO, EF, TCL, CDNEXT, TCLT, ELTCTL, etc. And for Wi-Fi, there's 802.11a, b, g, n and soon ac (gigabit) and eventually ad (7 gigabit). The traditional notion of "pull this Cat 6 and connect it to the server rack, pull this Cat 6 and connect it to the switch, pull this Cat 5e for the LAN" is going away.

41%
of project managers lack the tools to test to new standards

Simultaneously, the people who are responsible for deploying and maintaining this infrastructure – the cable installers, project managers, network administrators, etc. – are wrestling with limited resources. Time and money are certainly the most obvious constraints: the need to get more done, faster and for less.

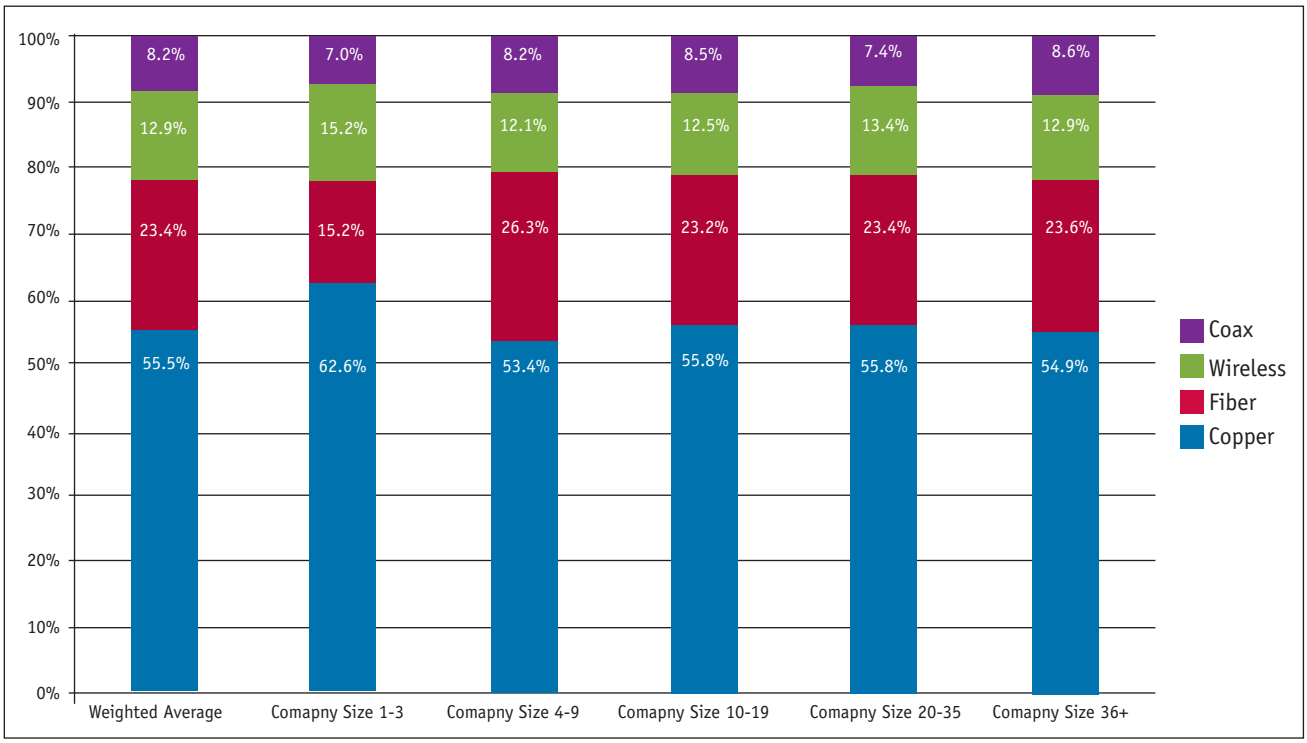

Figure 1. U.S installs by company size.

Less-recognized issues are the twin constraints of manpower and expertise. There are fewer trained personnel available to do the work (specifically in terms of ratio between installer/installation), and those that are available may have limited expertise. As with many industries, there's a growing divide between the project managers, who have professional certifications and substantial expertise across a broad range of installation and testing requirements, and the techs or installers, who have more limited training, isolated expertise, and may even be temporary workers.

Not only is complexity increasing, but the volume of cable installation and certification is still high (see Figure 1). According to surveys, nearly 93 percent of contractors expect to certify the same (59 percent) or a higher volume (34 percent) of links next year (see Figure 2).

Testing and certification are key requirements for these installations, and not just for the obvious need to make sure that everything works. Certification reports are generally required for payment, to comply with manufacturers warranties, and to facilitate troubleshooting.

Yet because of the volume of work and the scarcity of resources, roaming install/test teams and separate service tiers are common. Almost 90 percent of these links are typically fixed individually and immediately, meaning that if a tool or expertise is not available, work stalls until it gets there. And the test equipment travels with these teams: 55 percent of installers in a recent survey moved their tools several times a month, not just from one site to another, but back again.

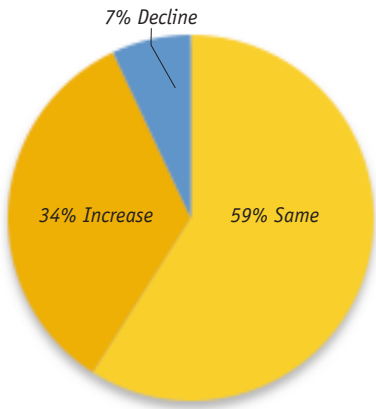

Figure 2. Nearly 93% of installers expect volumes to maintain or increase in 2014

Adding to the complexity, installations are not problem-free: In recent Fluke Networks' customer surveys, 91 percent of U.S., 90 percent of Asian and 97 percent of European installers report at least one problem. More than half of the respondents from the U.S. and Europe report seven or more problems. In Asia, that climbs to 10 or more problems (see Figure 3). While those problems are frequently issues with the cable or installation itself, they are as likely, if not more so, to be errors in process: incorrect test limits; misconfigurations or parameters; test data spread across multiple testers; mismatched results, incomplete testing or reporting, etc.

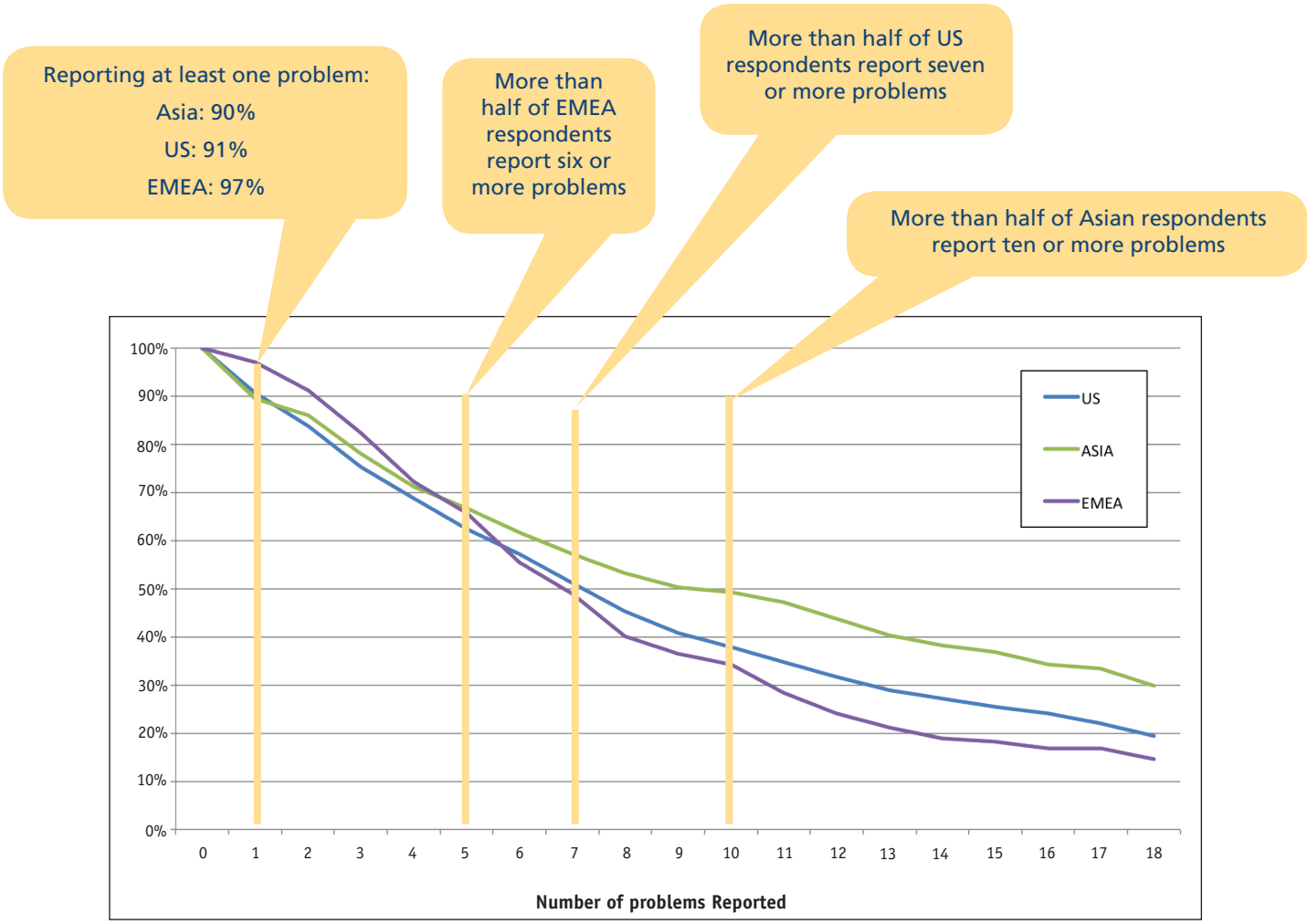

Figure 3. Network problems reported by region.

And those problems add up, according to the research. In total, in any given month, more than 22,000 hours in the U.S., 18,000 hours in Asia and 4,000 in Europe are spent resolving cable infrastructure issues. That works out to 45 hours (U.S.), 61 hours (Asia) and 26 hours (Europe) per 1,000 cable links on average, depending on region. In simple terms, the mistakes, complexity and rework can add a week to a week and a half of labor to a typical 1,000-link project. This is a worldwide problem, with global scope but unique geographic impact.

44
Average hours spent globally testing issues per 1,000 links

Right now, the industry is awash in "multiples" – multiple cables, multiple standards, multiple teams, multiple tools, multiple projects, multiple test regimes, multiple skill levels and more. That puts two opposing forces – increasing complexity and thinly stretched expertise - on a collision course that affects the fundamental connectivity of technology.

45,000
Hours spent trouble-shooting cable infrastructure per month worldwide

Critical Point

The implication is that if something doesn't change, then some other factor has to give. If complexity continues to increase, and resources don't increase commensurately, then there will be a steady increase in either time or cost per install. It will either take longer to test and certify links, slowing growth until volume, complexity and resources reach an unsteady equilibrium; or the cost will begin to rise, allowing additional expertise and resources to catch up to growth in volume and complexity.

Imagined Potential

54%
of network managers who think installation process is too slow

Clearly what's needed is better efficiency and agility, and that means tools that can assume a larger role in the installation process, thereby delivering a greater impact to the business. Yet over the last decade, the nature of that efficiency and impact has evolved.

When Fluke Networks originated the modern cable certifier, the DTX CableAnalyzer Series, in 2004, it met the demand for speed in testing each link. The DTX revolutionized the industry, delivering accurate and reliable results many times faster than anything else on the market. As a result it is the leading solution in the industry, and has been for nearly a decade.

But as the industry has evolved, so too must the tools. As much as testing and troubleshooting are the core of certification, there is an even greater opportunity to wring time, cost, complexity and errors out of the rest of the process. Let's take a look at what that certification looks like at the project level (see Figure 4).

Figure 4. The six steps of a certification process.

Planning – The first part of the install and certification process is typically left to the project manager. Most installers these days are managing the testing and certification of multiple jobs simultaneously, each with multiple teams, test tools and requirements. This is not only time consuming, but the increased complexity can, and is, leading to costly errors.

Setup – The next phase is setup, ensuring that the requirements are known and the tool is correctly configured to test those parameters. Complexity is growing in this area as well: we have multiple media types, different categories and varying standards. For frontline technicians, the impact is either in needing to wait for a particular expert to set up the tool or run the risk of making costly errors that require rework.

Testing – Testing can always be faster. But again, the speed of current testers is such that the ability to gain huge advantages in this part of the process is limited – there are now much greater gains to be had elsewhere.

Troubleshooting –The varying skill levels of technicians, or even simple lack of familiarity with certain types of installations or different standards, typically means that projects are delayed until the needed expertise is available to troubleshoot.

Reporting – In many ways, reporting has become the bane of installation. Not only is it increasingly complex – working in an environment with multiple testers, teams, standards and test regimes makes generating the requisite reports a time consuming process – but this is also the point at which errors and oversights from earlier in the certification become apparent, resulting in delays.

System acceptance – This is a growing challenge for customers. If installers, who live and breathe cabling, are overwhelmed by the increasing complexity, one can only imagine what it's like for customers. Multiple complex reports, varying test regimes, etc., can all impact system acceptance.

The Future of Certification

All things being equal, a possible answer to these requirements would be adding more expert project managers to the process, so that they could apply the insight, training and oversight needed to eliminate errors and improve efficiency. Unfortunately this isn't economically feasible.

61%
of large installers lacking sufficient project management expertise

The solution then is a testing tool that helps take on that role, managing the test process as well as the test itself.

What's needed is a new solution that would be much more agile, able to address every part of the certification process from planning through system acceptance, and multiplex testing scenarios. It would also incorporate built-in intelligence and a revolutionary touch-screen interface that would walk technicians through testing and project requirements, regardless of training. It would be built from the ground up for the "multi" environment, and help project managers and technicians meet the evolving challenges associated with cable certification.

Looking at the six-step certification process again, such a solution would deliver significant benefits:

Planning – The appropriate tool would incorporate project management capabilities to seamlessly plan and manage multiple jobs, different cable types or testing regimes, multiple teams, and more. In short, it would be adept at simultaneously handling all the complexity thrown at the typical cable infrastructure installation, thus improving efficiency and eliminating costly errors.

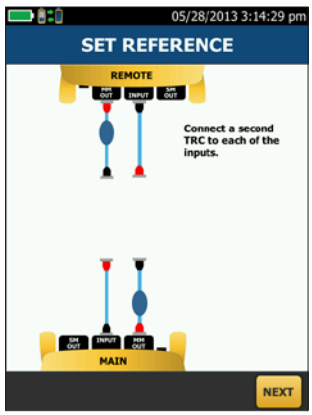

Figure 5. Setup wizard

Setup – Test setup wizards would deliver guided referencing and link budget configuration, as well as incorporating built-in standards to ensure the right tests are performed (see Figure 5). This approach eliminates the "wait for an expert" delay as well as further reducing errors.

Testing – As we've said, testing can always be faster, and tools continue to improve in speed. More importantly, built-in wizards and a graphical interface will quickly get the user to the right test configuration, also improving speed.

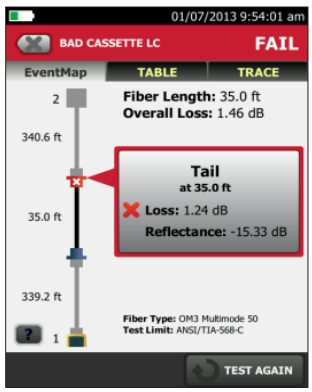

Figure 6. Testing

Troubleshooting – The ability to drill down to identify root cause (see Figure 6), as opposed to a simple pass-fail, is critical to effective troubleshooting. This drill-down, along with precision graphical wiremaps, allows technicians of varying skill levels to quickly pinpoint and correct problems.

Reporting – Reporting, as we've shown, is evolving and the need for flexibility and agility never ends. To eliminate this challenge, test tools should incorporate a project system that manages results across multiple teams, media and testers to control and integrate results into a single report across an entire project (see Figure 7). Moreover, the dramatic improvements made in earlier segments of the certification process should largely eliminate common errors and oversights, speeding project completion.

System acceptance – If complexity tends to "complicate" system acceptance, then the antidote is a clear system that uses concise statistics, event maps and ISO Level V accuracy certification to deliver instant insight into job quality without the need to page through thousands of reports.

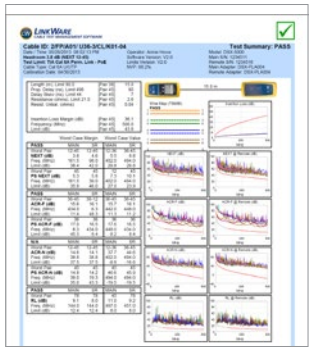
Figure 7. Consolidated project reporting

Remain Agile

If the future of cable infrastructure, and technology in general, is ever increasing complexity, then we must demand more from our tools to keep up. We must be more agile. And today that means much more than just raw speed. Keeping the cable infrastructure healthy and on-pace with the rest of the industry means focusing on the entire certification process, optimizing workflow as needed around the ever-increasing multitude of job requirements to speed system acceptance. Contractors that do not successfully evolve to address these complexities will simply be replaced by those that can.

CABLING INFRASTRUCTURE IS EVOLVING, FAST. EVERYTHING ELSE MUST EVOLVE WITH IT.

About Fluke Networks

Fluke Networks is the world-leading provider of network test and monitoring solutions to speed the deployment and improve the performance of networks and applications. Leading enterprises and service providers trust Fluke Networks' products and expertise to help solve today's toughest issues and emerging challenges in WLAN security, mobility, unified communications and data centers. Based in Everett, Washington, the company distributes products in more than 50 countries. For more information, visit **www.FlukeNetworks.com** or call 400-688-2580

**All research in this white paper is based on a Fluke Networks research study.*

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