WHITE PAPER

Technology Transformation with Managed and Professional Services

A Framework for Success

LUMEN®

Welcome to Lumen®

Many enterprises increasingly find that their IT infrastructure must support growing demands requiring greater computing power, lower latency for applications and workloads, increased storage, more bandwidth, and higher availability. Scaling within your in-house data center or server room is no longer viable, and not all workloads are ideal for a centralized cloud.

The preferred modernization model for digital workloads is a hybrid approach – neither purely on-premises nor cloud, nor totally edge or centralized. Instead, enterprises choose the right venue for the job and increasingly orchestrate digital workloads across a multi-tier architecture.

Lumen Managed & Professional Services enables customers to elastically scale compute demands seamlessly in current, new and expanding geographies around the globe. Leveraging our infrastructure, platform, Edge and Container services empowers IT teams to focus on their business-driven critical priorities instead of spending this valuable time on infrastructure maintenance, support, operational tooling and disaster recovery functionality far from digital interactions where data is acquired, analyzed and acted upon. Customers save time and resources, as well as gain increased cost-effectiveness by eliminating deployment expenses, and can transition into an OpEx model to platforms with constantly evolving and improving capabilities.

Updating and transforming IT infrastructure can be challenging for customers who do not have robust global staffing or vast experience in modernizing complex, hybrid environments. Lumen recommends seeking advisory and project experts to help you easily plan and implement next-gen technology without disrupting your business.

Using proven processes and solutions designed for seamless migration and transformation of workloads and technology, Lumen believes you can reduce risk with little to no IT resources of your own—even in complex and heterogeneous environments.

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Taking your business to the next level requires an experienced partner like Lumen, who can help define a strategy and execution aligned to achieve your business outcomes. Our services professionals can provide advisory, design, and management services for your cloud workloads and our cloud experts can consistently deliver the infrastructure you need.

Lumen has one of the largest network and edge infrastructure footprint, especially in emerging, metro and hard-to-reach places. For example, an edge private cloud, combining the key attributes of both on-premises computing and managed cloud infrastructure, offers a strong choice in digital workload executions. Such an approach provides the dynamic, operating expense characteristics of cloud computing coupled with secure, low-latency and high-performance workloads of an edge venue – key requirements for enterprises supporting critical industry edge use cases.

Enterprises typically consider a range of IT venue execution requirements when thinking about modernizing and supporting their industry workloads – baseline capabilities like the cost and availability of supporting technologies, application transformation, data security, and sovereignty considerations. Beyond that, many digital workloads won't run optimally (and fail to deliver mission-critical business outcomes) without high-performance, low-latency connectivity and compute infrastructure that can support real-time transactions and insights.

While the majority of cloud platforms can run enterprise workloads, there may be better-optimized locations for specific workloads, use cases, or business processes. When determining the best execution venue, organizations need to account for a wide range of variables. Some of these include latency tolerance, data volume, high-speed networking

availability, security requirements, regulatory compliance, data sovereignty/ locality considerations, agility to market, and requirements around operational control. With this in mind, there are emerging options that bridge the gap between the as-a-service functionality of the public cloud and the operational control and single-tenancy of the private cloud. Lumen and its Technology Transformation offer value to the enterprise. This service has been tested and validated by Lumen customers for over a decade resulting in faster time to market, with fewer workarounds and optimal run states.

Why Technology Transformation with Managed & Professional Services?

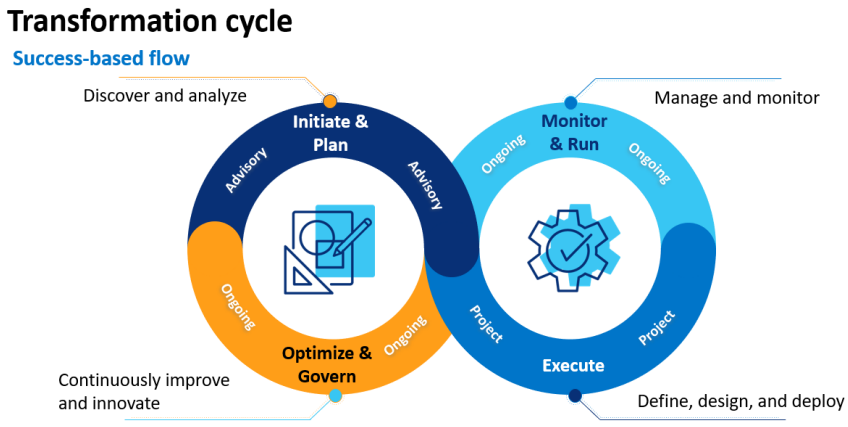
Lumen's Technology Transformation with Managed & Professional Services assess and conducts the migration of a business's entire data center to a new computing environment. These data center migrations can consist of everything from basic applications and storage systems to servers, complex network infrastructure, and various information security elements. Migrations that include network infrastructure can often entail technology transformation to SD-WAN with uCPE in many locations with connectivity support to hyperscalers. [2]

Lumen can migrate customers from any source(s) to any target(s). Database migrations usually require a combination of export/import or database replication configurations depending upon the application uptime requirements which are incorporated into the migration methodology.

Lumen's standard migration pace averages 30 servers per week, and our teams can scale up to meet any pace/servers per week but is entirely dependent upon what pace the customer can sustain – as well as what the infrastructure can support – usually limited by available migration network bandwidth and replication requirements.

Each migration event follows a Technical Implementation Plan that includes a properly orchestrated accounting of all tasks required for success. This includes agreed-upon communication events, all technical execution steps, success rollback criteria, and detailed rollback steps. These Technical Implementation Plans are reviewed several times prior to execution to ensure that all stakeholders are in agreement and ready to proceed.

Our Process



[2] Source: SD-WAN, Software-defined Wide Area Network with a universal customer premises equipment for virtualized functions and services.

The Framework for Success

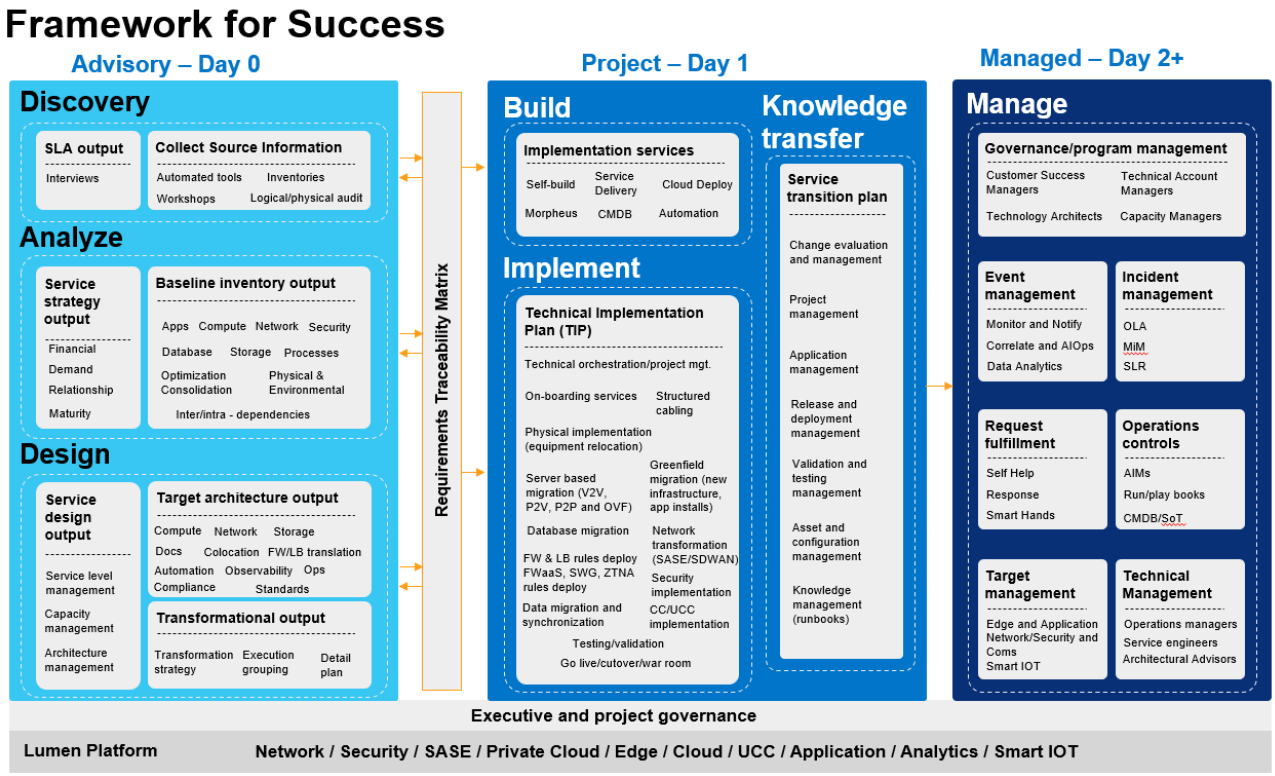
Lumen Technology Transformation follows a strictly tested methodology that delivers value-added services across our different technologies and can be identified by advisory, project, and managed services.

The framework for success consists of three core pillars that serve as the foundation of Technology Transformation with Managed & Professional services.

1. Advisory services
2. Project services
3. Managed services.

These three components outline an effective and proven process for technology transformation.

Lumen Framework for Success



Why choose Lumen?

Lumen's Technology Transformation offers a unique feature, the Requirements Traceability Matrix (RTM). This is a core artifact that is instrumental in reaching the target end result that has been promised at the start of the transformation. Every requirement that is identified, uncovered, and agreed upon, is documented in the requirements traceability matrix. It begins with expected outputs and requirements that are defined in the Statement of Work (SOW) and gradually includes and identifies every technical key decision that has been made and agreed upon. The RTM defines why the decisions have been made, their purpose and helps ensure a mutual understanding of the intended plan between the customer and the Lumen Team.

Lumen is the global-scale operator that empowers your data and applications, providing consistent service delivery worldwide on edge to cloud data center.

Lumen prioritizes and builds customer relationships to nurture reciprocal growth. We have completed many successful transformations, and when finished, most leadership teams weren't aware we had transformed due to no issues being present throughout the process.

Every step and detail is accounted for; this resulted in delivering a solution that is reliable, scalable, resilient, and in most cases, transparent.

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Advisory

Discovery

Phase one of the technology transformation process kicks off with the discovery process and assessment services. A collaborative schedule and project plan are created upon project commencement. These are living and breathing documents that guide the duration of the engagement. The Lumen Team conducts thorough assessment interviews and human workshops to collect data on everything from internal SLAs to business rules and requirements. Automated discovery tools are installed to gather data-driven details of the source infrastructure, while workshops and interviews gather customer tribal knowledge. If needed, logical and physical audits may be undertaken as well to document the entire network operations center. The Lumen workshops continue throughout the discovery phase to make sure all the information is well understood by everyone in the project.

Lumen's standard discovery process includes a 30-day automated data collection scan that captures key server metrics and server-to-server communication details. During the analysis workshops, this data is used to create the wave plan and Technical Implementation Plans per wave.

Analysis

In the analysis phase, the acquired and collected information from the discovery stage is compiled into a service strategy output and baseline inventory output.

During this step, finances and customer requirements are accounted for, and the relationship between the customer and Lumen is analyzed. The analysis and design output is the collection of detailed plans - migration and target state architecture - that are needed to deliver the expected outcomes and services.

A thorough and detailed analysis is conducted covering all of the customer's technical details such as compute and storage, applications, network and security, optimization consolidation, physical and environmental aspects, and the inter/intra-dependencies between all the physical and technical assets are identified. Simultaneously, all project requirements are documented in the RTM – Requirements Traceability Matrix. Examples of these requirements include specifics like recovery point objectives (RPOs) and recovery time objectives (RTOs) of data recovery solutions, capacity, throughput, resilience, security, backup, and manageability requirements. Everything that is identified as a requirement is documented to work towards the same successful output.

Design

Once the analysis is complete, everything from service level management, capacity, and architectural management is used to create technical build documents. Lumen Teams create detailed build documentation needed to successfully deliver the needed solution. Everything that is needed for Lumen to build and construct the technical target state infrastructure is

reviewed in the design stage. This includes high and low-level storage and network designs, colocation, firewall, load balancing translation, automation compliance, and detailed build requirements. The same methodology is followed throughout, and detailed design documents are created.

An extensive migration strategy document is crafted, outlining how to arrive at the end state. A migration strategy path is then established, and key decisions are made for data synchronizations, server-based migration tools, exports/imports strategies, and storage to storage migration. Migration methods are documented with the explanation as to why and how the selections were made and are included in the RTM. It is crucial for the entire project team (customer included) to understand what is being planned and the reasons for key migration plans. The assessment concludes with a defined clear set of requirements. The customer then approves the target state architecture, migration strategy, wave planning, and application grouping from the analysis and design phase.

Lumen uses an automated data capture tool to gather information from the source environment for 30 days. This tool is instrumental in collecting individual server usage and connectivity data. Most critically it gathers the connectivity data documenting which servers talk to one another - in some cases down the database level. This data is then used to properly define the application groupings and wave plans to be scheduled.

The design plan incorporates everything in the migration; nothing is left behind. Orphaned applications or database servers result in applications that are likely straddling the source and target infrastructure and may even break something or degrade the level of service to the point of an outage. Application groupings must be properly agreed to and clearly understood in order to move forward safely and successfully.

Project

Build

In the build stage, there are various global solution implementation services to be self-built, fast-tracked, or streamlined. This depends upon the solution sold and infrastructure involved and many Lumen teams that can get involved in a target infrastructure buildout.

Retention of IP addresses is sometimes possible and is dependent upon the networking capabilities of the source and target infrastructure that is included in the design; however, the retention of IP addresses usually adds substantial complexity to a solution.

It is essential to understand that migration planning varies directly with the size and complexity of the infrastructure and applications involved. Migrations do not happen overnight; they require full participation from the customer in close orchestration with all delivery teams - Lumen and any 3rd parties involved. This factor can be a challenge for customers because they are the primary source of information for what needs to be done. Lumen has been performing technology transformations for over a decade. Our depth and breadth of transformation experiences across a wide array of customers, enterprise applications, and complex technologies afford us the ability to exceed virtually any migration velocity that a customer requires.

Migration velocity or speed depends on the customer's ability to assist and provide resources, while Lumen does the bulk of the heavy lifting. Lumen's deep migration expertise allows the project team to focus on the right priorities throughout the engagement leading to delivery success. In many cases, Lumen is chosen as the migration partner that delivers where other migration providers have failed.

Your engagement management team runs executive and project governance. Lumen's executive sponsors are available throughout the project to facilitate escalations if needed. Executive sponsors can assist with projects for all platforms.

Implement

Once built, the Technical Implementation Plan is applied. This plan is constructed for every execution wave, detailing all steps required minute-by-minute. Application remediation due to IP address changes (internal, external, public-facing, load balancer VIP, etc.) are our customer's application SME responsibility but are included in our Technical Implementation Planning. We can virtualize (physical to virtual) servers during the migration window to transform a physical source server into a virtual machine in the target. Documented application testing of each migration wave is critical to the success of each migration event.

The TIP can include:

- Technical orchestration and project management aspects.
- Any on-boarding services.
- Equipment relocations.
- Cabling changes.
- Server-based migration (V2V, P2V, P2P, OVF).
- SAN to SAN data migrations.
- Large scale imports or exports of already virtualized infrastructure.
- Database migrations.
- Firewall & load balancing rules deploy.
- Testing and validation.
- And detailed go live and rollback plans.

Clear roles are determined for these rules along with the integration of required customer test plans to define criteria for success. All of this is tracked and followed minute-by-minute throughout execution.

Knowledge Transfer

During the building of the Technical Implementation Plan, everyone is working through the knowledge transfer requirements, including everything gathered during discovery and analysis. This step helps ensure that the steady-state team is ready to support the infrastructure and relevant applications following the customer's identified change (if any) in management and project management methodologies.

The service transform plan can include:

- Application management.
- Release and deployment management.
- Asset and configuration details.
- Validation testing that was done during migration waves.
- Knowledge management (runbooks).

All of this information is transferred into steady-state services.

Ongoing

Management and Steady-State Operations

The knowledge transfer is implemented into steady-state operations and management. These services have the potential to be permanent and are delivered to sustain the new environments that have been built by our teams. Steady-state support teams rely on our knowledge of the project and are dependent on us for the appropriate functionality, longevity, and success of these operations.

The Lumen team governs and oversees program management for customer success managers, technology architects, and technical account managers.

We take control of all customer success programs with day one day two steady-state support for:

- **Event management** - we monitor, correlate, and notify of routine operations and any abnormalities.
- **Incident management** - we provide a root cause analysis and propose resolutions.
- **Request fulfillment** - Help desk, NOC, and Smart Hands are available to assist.
- **Operational controls** - Change Management, Run/Play books, and CMDB/SoT.
- **Target management** (in some cases) - application, network, and security.
- **Technical management for service delivery** - security managers, service engineers and network managers can be readily available on-site for maintenance and repair.

Make your technology transformation seamless when you rely on Lumen's world-class design and transformation team. Our experts help you easily plan and implement next-gen technology without disrupting your business.

Questions? Let's talk.
Contact our team to get the assistance and answers you're looking for.

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