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Welcome

Thank you for selecting Lumen as your content delivery network (CDN) provider. As a trusted provider of CDN services, Lumen is dedicated to making your experience with us positive in every regard. From sales to service activation and CDN operations, we strive to deliver uncompromising service.

Part of our commitment to you is to anticipate your needs and efficiently provide straightforward, thorough answers to your questions. To help meet that commitment, we developed this customer handbook to guide you through our support structure—no matter what solution set we are delivering.

Today, Lumen connects more people in more countries than ever before with next-generation voice, data, video and managed solutions over a seamless, global IP network. We are focused on continuously optimizing our processes, network and systems. This handbook is a reference to the people and processes you can rely on—from sales account teams to customer care, implementation, service management, billing and portals.

This customer handbook offers a quick-reference guide to:

- Account management
- Order management
- Service activation
- Billing
- CDN support
- Media portal

As always, we welcome your feedback. If you have questions or suggestions related to this handbook, please email us at CDNSupport@lumen.com.

We appreciate your business,

Your Lumen Team
Lumen CDN services overview

Lumen is changing the business of content delivery by combining the advantages of an industry-leading Internet backbone with a sophisticated and proven content delivery network (CDN) platform.

This combination allows us to connect you with the benefits of our high-performance, highly scalable service—and deliver those services in a simplified, cost-effective manner. Our full suite of CDN services also allows you the flexibility to move between our network services as your content delivery requirements evolve.

Business solutions

- **Built for success**—Lumen CDN services enable you to succeed online by leveraging the optimal blend of price, features, quality and ease of use—plus the scalability to support rapid and dramatic online delivery.

- **Built for your needs**—We recognize that each customer has specific objectives. Our CDN services can help you take advantage of our network scalability, global footprint and superior customer service. We combine our CDN services to develop content delivery solutions and configure a host of features to support your unique business objectives.

- **Streamlined delivery**—The Lumen CDN services offer a simplified way to deliver content with end-to-end support, all on the Lumen network.

- **Premium performance**—Lumen is committed to helping you deliver your content assets to your end users with speed and efficiency, to ensure an exceptional experience for your end users.

Lumen can help you deliver:

- Video downloads
- Streaming videos (both on-demand and live)
- Online games
- Software downloads and patches
- User-generated content (UGC)
- Music and audio downloads
- Websites
Account management

As a new customer, you can access knowledgeable resources for support across every step of service setup and delivery.

Account director

Your account director (AD) provides information about Lumen services and serves as your overall point of contact. Responsible for gathering and confirming the specifications and requirements necessary to submit an order, your account director works with you to execute all quotes and orders for new and additional Lumen services and assists you through the credit-application process.

Sales engineer

Your sales engineer (SE) works with you to identify technical options and define requirements for your services. The sales engineer is responsible for understanding your existing network, key locations and potential needs. This source for technical information works to help tailor network solutions to meet your specific needs and manages the engineering portion of your service quote as well as the inventory and capacity process for your orders.

Customer care manager

Your customer care manager (CCM) proactively manages your service needs to ensure the highest levels of customer satisfaction and serves as the conduit and escalation point for issues in the areas of order entry, order validation, service activation, disconnects and billing activities.

Activation engineer

Your activation engineer will contact you regarding the technical details of the service upon handover. Your activation engineer works to ensure that service activation meets the technical specifications of your order, addresses any issues with testing and turn-up, and handles technical account management.

CDN support technician

Your CDN support technician is your single point of contact for post-installation support, and handles service changes, account inquiries and service impairments. Behind the scenes, your CDN support technician monitors the Lumen Media portal queue for tickets pertaining to customer services and routes tickets to the appropriate internal and external support agents until your issue is resolved.

Billing coordinator

Your billing coordinator (BC) is your single point of contact for requests pertaining to billing inquiries, disputes, credits, balance and payment information. Your billing coordinator can provide you with an overview of the billing capabilities in Media portal and coordinate more advanced training as needed. Your billing coordinator will collaborate with other Lumen resources as needed.
## Your key contacts

<table>
<thead>
<tr>
<th>Issue</th>
<th>Contact group</th>
<th>Contact Information</th>
<th>Targeted interval</th>
<th>Hours of operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service activation</td>
<td>Sales engineer</td>
<td>Direct email and phone number for assigned SE</td>
<td>3 business days from customer signature</td>
<td>8:00 am–5:00 pm MT, M–F</td>
</tr>
<tr>
<td>Service changes</td>
<td>CDN Support</td>
<td><a href="mailto:CDNSupport@lumen.com">CDNSupport@lumen.com</a> 877-612-9015 720-888-0080</td>
<td>4 hours</td>
<td>24/7</td>
</tr>
<tr>
<td>Service impairments (trouble ticket)</td>
<td>CDN Support</td>
<td><a href="mailto:CDNSupport@lumen.com">CDNSupport@lumen.com</a> 877-612-9015 720-888-0080</td>
<td>15-minute response time 6-hour resolution time</td>
<td>24/7</td>
</tr>
<tr>
<td>Media portal issues (trouble ticket)</td>
<td>CDN Support</td>
<td><a href="mailto:CDNSupport@lumen.com">CDNSupport@lumen.com</a> 877-612-9015 720-888-0080</td>
<td>24 hours</td>
<td>24/7</td>
</tr>
<tr>
<td>Billing issues</td>
<td>CDN Support</td>
<td>Access account information in Media portal, or call 877-253-8353, option 3</td>
<td>Resolution by start of next billing cycle</td>
<td>8:00 am–8:00 pm ET, M–F</td>
</tr>
</tbody>
</table>
Order management

Accurate and timely order submission

Our goal is to meet your due dates and ensure your services are turned up on time. Your account director works with you to confirm we have what we need to complete your order. Once we gather your requirements, your account director will provide you with the necessary signature documents that authorize us to proceed with service installation.

Order types

Various order types may be used during your service activation process:

- **New service orders**—required for the installation of a new service on our network.
- **Service order change or reconfiguration**—a change to your service after it has been installed, including a decrement of service or partial disconnect.
- **Service transfer order**—moves a service from one account to another; used, for example, when a company acquires another company and needs to transfer an order under an existing or new billing account.
- **Renewal**—continues your service when your existing MSA expires.
- **Disconnect**—termination of an active service.

Key service identifiers

You may need the key service identifiers listed below to manage your services. Please contact your account director or sales engineer with any questions.

<table>
<thead>
<tr>
<th>Service ID</th>
<th>Example</th>
<th>Applies to</th>
<th>Used for</th>
<th>Where you find it</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property</td>
<td>cdn.example.com</td>
<td>Caching and download</td>
<td>CDN support reference Media portal</td>
<td>Activation email Media portal</td>
</tr>
<tr>
<td>Streaming ID</td>
<td>level3live-live or level3</td>
<td>Streaming</td>
<td>CDN support reference Media portal</td>
<td>Activation email Media portal</td>
</tr>
<tr>
<td>Ingest/Hostname</td>
<td>world.ingest.cdn.level3.net</td>
<td>Origin Storage</td>
<td>CDN support reference Media portal</td>
<td>Activation email Media portal</td>
</tr>
<tr>
<td>PIID (Product Instance Identifier) Service ID</td>
<td>ABCD1234</td>
<td>All services</td>
<td>Billing</td>
<td>Invoice activation email Media portal</td>
</tr>
<tr>
<td>SCID (Service Component Identifier) Supporting ID</td>
<td>ABCD12345</td>
<td>All services</td>
<td>Billing</td>
<td>Invoice activation email Media portal</td>
</tr>
</tbody>
</table>
Trialing CDN services

To trial any of the CDN services, please contact your account director. Your trial experience will follow the same processes outlined in this document, through service activation and CDN support, so you experience the end-to-end operational touchpoints. This includes access to Media portal for online management of your services.

Service activation

Once your service is activated, you will receive a service connection notice containing the technical details and support information for your service.

This email includes:

- Key service identifiers (outlined above)
- Configuration technical details
- Log file details (if applicable)
- CDN Support contact information
Billing

Invoicing
Lumen provides you with a monthly invoice for all installed services, with the details you need to verify charges. Depending on your services, your charges may include:

- **Monthly recurring charges (MRC)**—billed in advance
- **Non-recurring charges (NRC)**—may be billed in advance or in arrears
- **Usage charges, if applicable**—charged one month in arrears.

Billing cycles and delivery
Your Lumen invoice is delivered monthly. If you have a US billing address, invoices are mailed in paper or electronic format. If you have a non-US billing address, invoices are first emailed to a central depository in London, then printed and distributed from there.

If your bill only includes a partial month, it is prorated based on a calendar month. All undisputed invoices are due in accordance with your master service agreement (MSA). You have the option of sending electronic payments to Lumen via electronic funds transfer (EFT). Please contact your account director about using EFT.

Questions about your invoice
If you have questions about your bill or find issues, you can open a billing request in Media portal and then track, update, or cancel requests. You can also communicate with your billing analyst.

Non-payment
Payment is governed by the terms and conditions of your MSA. Failure to make a payment when due may subject your service to interruption and result in termination of your service agreement.

Early termination
If you choose to disconnect service prior to the end of your service term, early termination charges may apply. For services nearing the agreed-upon termination date, the disconnect request must be received 30 calendar days prior to the contract termination date. Otherwise, your service may continue to be provided by Lumen on a month-to-month basis or as otherwise set forth in your MSA. If the cessation date is the same as your service term end date, no termination fees will apply.
CDN Support Center

Lumen is dedicated to providing you with ongoing support. We embrace a strong operational philosophy that is customer focused and highly responsive. Strict performance metrics drive our internal organizations to deliver quality service to you on a consistent basis. In the event an issue arises with your service, we work to quickly to answer your questions and resolve issues.

CDN support locations and schedule

The Lumen CDN support centers operate 24/7 in the following redundant operating locations:

- Broomfield, CO
- Tulsa, OK
- Dublin, IE
- London, UK

Multi-language support is available upon request.

CDN support technician

Once your Lumen service has been installed, a CDN support technician will be your single point of contact for service-related issues. The CDN support technician is trained to quickly address technical issues related to your service. The primary objective of a CDN support technician is to provide start-to-finish accountability for network service performance and to drive the resolution of issues based on the first call.

You can reach a CDN support technician at any time. The CDN support technician will create a ticket with a reference number for tracking. Your technician will initiate several tests and processes to determine a fault and fix agent. The technician will either solve the problem or collaborate with internal or external fix agents until a resolution is established.

Customer reported service impairment

If you experience trouble with your Lumen service, we will work to resolve your issue in the shortest time possible. To facilitate troubleshooting, please be prepared to provide the following required information:

- Lumen Service Identifier (provided upon installation)—see the key service identifiers table in the Order Management section.
- Description of the problem and alarm information
- Time the problem first occurred
- Contact information: name, email address, telephone number(s) and alternate or after-hours contacts
Network monitoring

The Lumen CDN network operations center (NOC) is responsible for all facilities and network management, monitoring and repair. The organization staffs highly trained operations managers and network technicians at regional monitoring centers located in Broomfield, CO and Tulsa, OK. These centers enable geographically diverse, 24/7 network management.

Lumen has uniformly implemented operational processes across all Lumen Gateway Data Centers globally. By maintaining this consistency, we enhance effectiveness and efficiency—resulting in swift fault isolation and repair.

The CDN NOC performs regular network connectivity performance reviews. If a problem is detected, the group follows documented procedures to restore service. The CDN NOC is responsible for performing the following repair-related functions:

- Proactively monitoring, managing and controlling the network
- Managing recovery and repair processes across internal and external organizations
- Acting as an escalation resource for the CDN support technicians and giving status to CDN Support for all service issues; CDN Support, in turn, informs customers of problem resolution status and an estimated completion time.
<table>
<thead>
<tr>
<th>Severity value</th>
<th>Definition</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urgent</td>
<td>Reserved for network-wide impact to multiple customers</td>
<td>• Origin storage network outage causing substantial geographic impact</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• System failure</td>
</tr>
<tr>
<td>High</td>
<td>Issue indicating large geographic impact to serving content for a single</td>
<td>• Critically high reject rate (5XX status codes)</td>
</tr>
<tr>
<td></td>
<td>customer or exposure to invalid content serving</td>
<td>• Severe performance reported from monitoring tools across multiple</td>
</tr>
<tr>
<td></td>
<td></td>
<td>geographies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Authentication errors allowing unauthorized access</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Token set up incorrectly or not operating as expected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Geo-blocking set up incorrectly or not operating as expected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Content rights issues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Content served is incorrect (stale content)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unable to publish to live streaming ingest</td>
</tr>
<tr>
<td>Medium</td>
<td>Significant performance issue, possibly regionally isolated or inhibiting</td>
<td>• Significant performance problems across isolated geographies (single</td>
</tr>
<tr>
<td></td>
<td>proper content serving</td>
<td>city or market)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Higher than expected reject rate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Invalidation issues, unable to invalidate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Portal issues related to service add or change requests</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Impact to streaming playback</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unable to upload new content to Lumen origin storage</td>
</tr>
<tr>
<td>Low</td>
<td>Isolated performance issue, non-content serving related issue</td>
<td>• Logging issues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Localization issues, poor routing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Non-critical Media portal issues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Client has small number of users experiencing performance issues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• One client cannot access streaming video</td>
</tr>
</tbody>
</table>
**CDN support escalations**

Escalations happen when progress is not being made. You have the option to escalate to any level in the Lumen organization at any time:

<table>
<thead>
<tr>
<th>Escalation level</th>
<th>Contacts</th>
</tr>
</thead>
</table>
| **First level**  | Name: CDN Support
Title: Support technician
Phone: 877-612-9015 or 720-888-0080
Email: CDNSupport@lumen.com |
| **Second level** | Name: Chris Smith
Title: Sr. manager, CDN Service Management
Phone: 720-888-7436
Email: Chris.Smith@lumen.com |
| **Third level**  | Name: Rick Gibson
Title: Director, CDN Operations
Phone: 720-888-7085
Email: Rick.Gibson@lumen.com |
Network maintenance and notification

There are two different types of network maintenance: scheduled and unscheduled. To ensure top performance and grow the network, Lumen performs scheduled network maintenance. Unscheduled maintenance happens, but we are ready.

Scheduled maintenance

We plan scheduled network maintenance with as much advanced notice to you as possible. Our standardized methods and procedures ensure efficient and prompt handling of all changes, to minimize the adverse impact of change-related incidents on service quality.

Lumen sends email notifications about scheduled maintenance events that address:

- Description of the work
- Date and time (GMT) of the scheduled maintenance
- Expected impact to the listed services
- Location of the maintenance
- Contact information for questions or concerns

Support

877-612-9015 or 720-888-0080
CDNSupport@lumen.com
Media portal

Lumen Media portal provides secure and private access to your network and billing data. You can view and download invoices, generate service order requests, run network traffic and performance reports, open trouble tickets, and more:

- **Reporting**—historical usage reporting and real-time traffic statistics for caching, streaming, and storage; network performance data
- **Managing CDN services**—add new service on the Services Dashboard; invalidate content for specific assets; test and troubleshoot Flash streams
- **Invoicing**—electronic copies of the current and recent invoices
- **Ticketing**—submit trouble tickets

Take advantage of convenient customer self-service for delegated access management, and self-provisioning for additional properties.

You will receive your portal credentials upon completion of the first CDN service that you order from Lumen.

We designate one user—typically the customer’s technical contact—as the first delegated administrator for your Media portal accounts. Use this administrator account to create additional user accounts and assign permissions for those users.

**Sign in to Media portal:** [https://mediaportal.lumen.com](https://mediaportal.lumen.com)

## Glossary of terms and acronyms

<table>
<thead>
<tr>
<th>AD</th>
<th>Account director</th>
<th>Your point of contact for all your sales-related issues.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCD</td>
<td>Customer commit date</td>
<td>The date that Lumen expects to deliver service to you.</td>
</tr>
<tr>
<td>CDN</td>
<td>Content delivery network</td>
<td>A network of distributed servers facilitating content delivery services.</td>
</tr>
<tr>
<td>CCM</td>
<td>Customer care manager</td>
<td>Manages order entry and service implementation.</td>
</tr>
<tr>
<td>EFT</td>
<td>Electronic funds transfer</td>
<td>A Lumen form that must be completed to make your payments electronically.</td>
</tr>
<tr>
<td>GMT</td>
<td>Greenwich mean time</td>
<td>The time zone assigned to network event notifications.</td>
</tr>
<tr>
<td>ICB</td>
<td>Individual-case basis</td>
<td>A determination upon analysis of your specific type of service and requirements.</td>
</tr>
<tr>
<td>MSA</td>
<td>Master service agreement</td>
<td>A contract that documents the terms and conditions applicable to your services.</td>
</tr>
<tr>
<td>MTTR</td>
<td>Mean time to repair</td>
<td>A standard measurement for service restoration.</td>
</tr>
<tr>
<td>MRC</td>
<td>Monthly recurring charges</td>
<td>Charges that are billed every month on your account.</td>
</tr>
<tr>
<td>NOC</td>
<td>Network operations center</td>
<td>The Lumen CDN NOC is responsible for all Lumen facilities and network management, monitoring, and repair 24/7.</td>
</tr>
<tr>
<td>NRC</td>
<td>Non-recurring charges</td>
<td>A one-time charge on your account (i.e., activation fee).</td>
</tr>
<tr>
<td>NSA</td>
<td>Non-service affecting</td>
<td>Any scheduled maintenance activity that will not impact your service.</td>
</tr>
<tr>
<td>SE</td>
<td>Sales engineer</td>
<td>Your point of contact for technical service information and network design issues.</td>
</tr>
<tr>
<td>SA</td>
<td>Service affecting</td>
<td>Any scheduled maintenance activity that will directly impact your service.</td>
</tr>
</tbody>
</table>