



Kontiki Enterprise Content Delivery Network

Best Delivery and Highest Quality Video for All

Video is one of the most powerful forms of communication, and one that is increasingly used by leading global companies. Today, many companies count on video to help engage their distributed workforce. These companies invest time and effort in creating high quality video content from executive updates to HR initiatives, and everything in between.

While high quality content is important in facilitating employee engagement, it is only one part of the equation. The other part is the viewing experience. If the content is engaging, but the viewing experience is poor, or if the content cannot reach its fully intended audience, then the video will fail. In order to create a truly engaging experience, your video delivery method needs to ensure high quality video delivery across the entire enterprise.

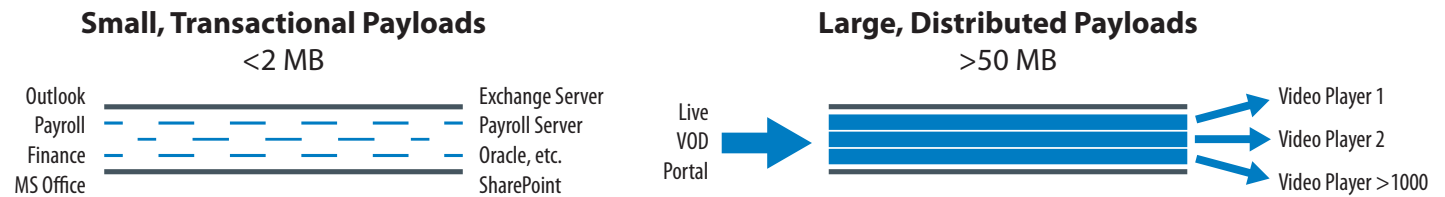


The Kontiki Enterprise Content Delivery Network (ECDN) enables high quality holistic video communication with global reach that is secure, reliable, and network friendly. Kontiki’s ECDN helps dispersed organizations reach everyone across the enterprise with video, no matter where they are. Companies using Kontiki’s ECDN benefit from 100% reach of high quality video delivery across the enterprise. And, Kontiki’s cloud-based solution works in conjunction with your existing network infrastructure, so you don’t have to spend money and time on costly network upgrades. With implementations of over 250,000 simultaneous users and over 10 years’ experience, the world’s largest and most demanding enterprises trust Kontiki.

Demand for Video and the Impact on the Corporate Network

As corporations increasingly turn to video to foster alignment in their organizations and the appetite for video in the social enterprise accelerates, businesses must examine their own capabilities and how best to meet these needs. With this growing demand for video, many companies are finding that their corporate networks can’t handle the data upsurge. Network traffic is shifting from small, transactional payloads to large

distributed payloads, driven primarily by increased demand for video. This shift has created major challenges for corporate networks, which are generally not designed to handle these large, distributed payloads. The result is an overburdened network. When this happens, the business is negatively impacted, as business-critical traffic can’t get through, and/or the video experience suffers.



Video Delivery Done Right™

Kontiki’s ECDN was specifically built to address this crisis of capacity. Kontiki delivers any type of large file, but is specifically optimized for large video files, both on demand and live, providing efficient delivery, regardless of network topology or bandwidth constraints. Kontiki’s robust ECDN is able to overcome network challenges such as significant packet loss and latency to provide a consistently high quality viewing experience.

There are three important elements that enable Kontiki to efficiently distribute large volumes of high-quality video through your existing infrastructure:

- **Peer-assisted Software Delivery** – Every client computer is a server. Peer-assisted delivery is not peer-dependent, which means if peers are unavailable, a copy of content is always available from the origin servers, which guarantees reliability.
- **Topology Awareness** – Distance vector optimization determines peer proximity, ensuring most efficient, timely, and complete delivery.
- **Deferential Delivery Protocol** – Patented Kontiki Delivery Protocol (KDP), unique in the industry, is network-friendly and circumvents congestion in your network.

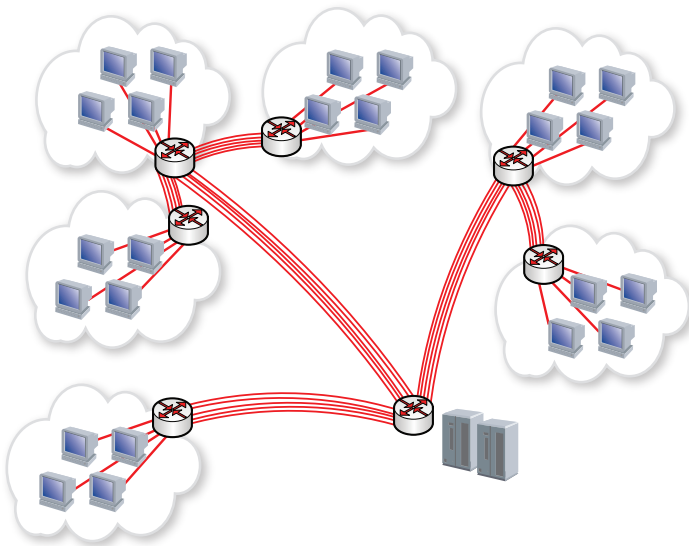
In addition to its robust delivery technology, the Kontiki ECDN offers enterprise-grade security, storage, monitoring & reporting, and integration capabilities.

Peer-assisted Software Delivery

With Kontiki's patented peer-assisted delivery model, every client computer acts as a server. Instead of each client needing to get data exclusively from central servers, computers using Kontiki get their video from another client computer that is physically closer than the central server. This dramatically improves the

utilization of your existing networks as the burden moves from the Wide Area Network (WAN), where the central servers are, to the Local Area Network (LAN), which results in less congestion in your network.

Traditional Distribution

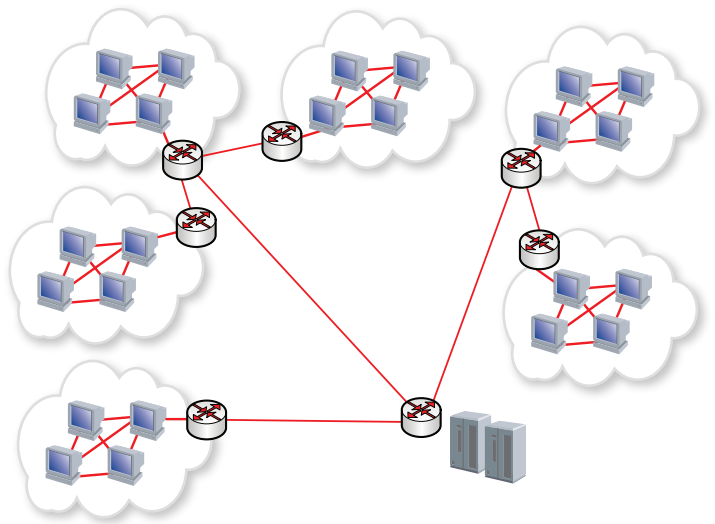


The peer-assisted network acts as a "shock absorber" for the network during sudden spikes in demand. At the time of the first request for a newly available content item, only the origin servers have the content. The servers do the initial work delivering content or "seeding" the peer-assisted network. As a few clients each obtain part of the content item, they are able to

Bandwidth Smoothing

Even though Kontiki was designed to handle network congestion, you can also choose to deliver content subscriptions during off-peak hours to avoid network congestion. The Kontiki client polls on a schedule specified by the content provider to check automatically whether a new delivery is available and if so, it begins downloading it. These deliveries can be scheduled to take

Kontiki-powered Distribution



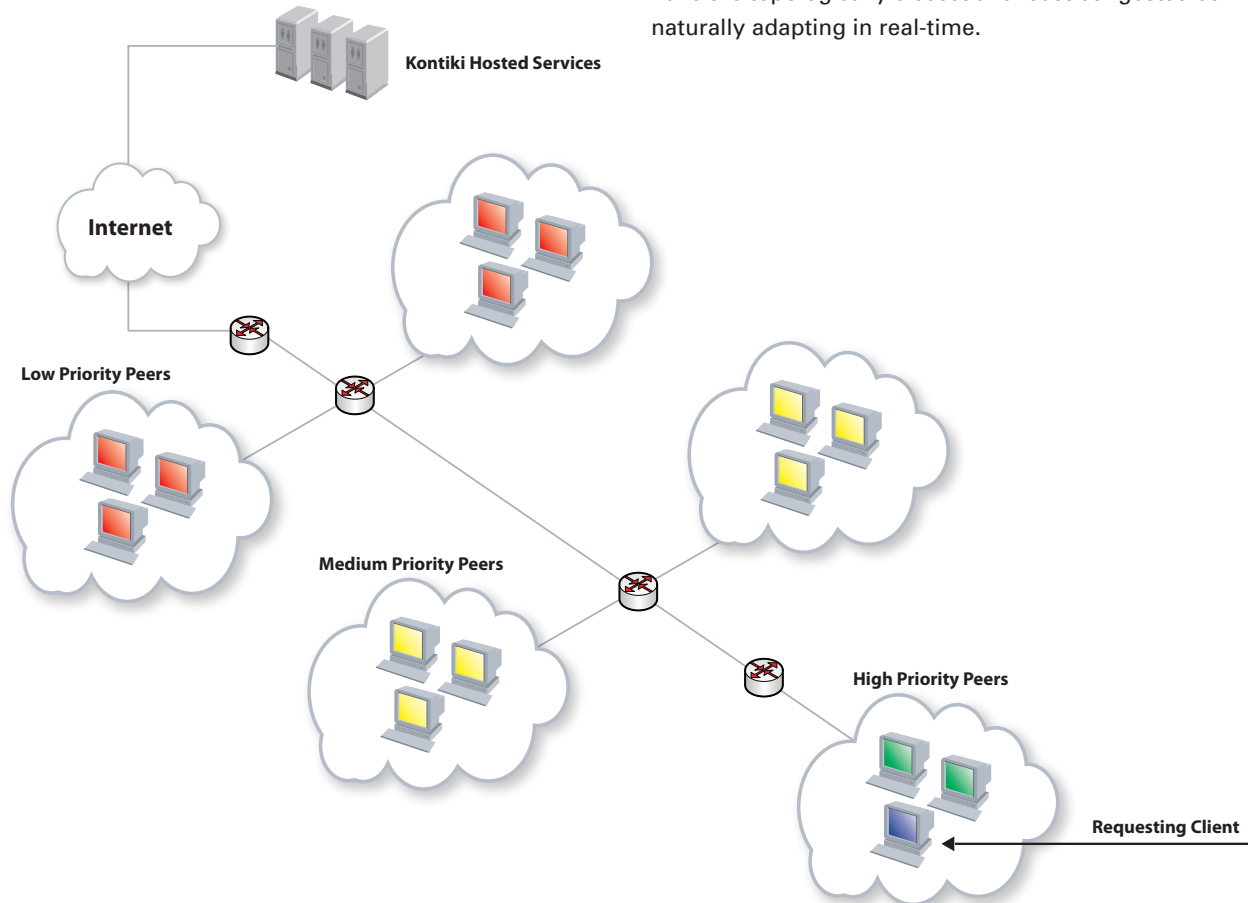
begin serving the part they have to other clients, thereby increasing the serving power of the network beyond the central servers alone. After many clients have downloaded large portions of files, the number of clients available to serve the content will begin to exceed the number that are still requesting data. This then becomes the steady state of the network.

place during off-peak hours in order to reduce network congestion and usage during peak hours. This process of publishing subscription updates during "quiet" times can also serve to "seed" the peer-assisted delivery network with a critical mass of clients available to serve the content on demand when large numbers of machines turn on in the morning.

Topology Awareness

In deciding what peers can serve other peers, Kontiki employs distance vector optimization to determine what peers are close to one another. Requesting clients are provided with a list of the nearest peers that have recently checked in with the service. A centrally provisioned directory server that dynamically determines the network layout and reacts to current conditions manages this activity.

The directory server uses a set of heuristics to automatically provide lists of peers that are as close as possible to the requesting client. The Kontiki client software monitors the response times and available bandwidth of each peer that is serving the file, and adaptively requests more data from the computers that provide the best throughput. The clients in the ECDN will automatically optimize to focus on the computers that have the topologically closest and least-congested connections, naturally adapting in real-time.



THE KONTIKI ADVANTAGE

Greater Reach, Engagement, Intelligence

- 100% reach across the enterprise, even in remote offices.
- High quality video viewing experience on the desktop or mobile device, Live, or VOD.
- APIs enable flexible integration of rich content into portals and management systems.
- Detailed metrics and viewer reports on content consumption and network efficiency.
- Social engagement around video through consolidated corporate portal.

Secure and Scalable Technology

- Cloud-based software-only solution utilizes your existing network infrastructure (no hardware upgrades!) to scale rich-media delivery at a lower cost, without sacrificing quality.
- SOC 2 certified managed services delivered from our central application and storage servers located in Tier 4 data centers.
- Peer-assisted model based on patented Kontiki Delivery Protocol (KDP) enables optimal network efficiency with only 1 copy of a stream delivered to each office.
- IT can set network policies and control access to authorized users.

Deferential Delivery Protocol

Kontiki's technology is set apart by its proprietary delivery protocol, the Kontiki Delivery Protocol (KDP). In addition to being topologically aware, KDP is network-friendly and deferential to other network traffic. Many other popular protocols, such as HTTP, want to obtain the maximum transfer speed possible while fairly sharing congested links with other traffic. In heavily used networks, this can lead to the presence of packet loss or unacknowledged packet receipt. This packet loss is the primary means for determining when one or more links are congested, causing network connections to slow down and perform poorly.

KDP works differently from most protocols in that it never facilitates packet loss on the network. It does this by measuring the round-trip time (RTT) that it takes for one computer to send a packet and for the receiving computer to send an

acknowledgement. If the connection is stable, KDP will attempt to increase its connection speed to take advantage of available bandwidth. If the RTT increases, the KDP will notice and stop sending data packets, thus seeking to avoid packet loss.

KDP is an intelligent protocol that will continue to monitor the current RTT. It does this by sending small probe packets. When the RTT drops back down to an uncongested level, it will resume sending full data packets. This process goes on continually, causing the KDP to "soak up" unused bandwidth without interfering with other network traffic. This optimization of network usage while avoiding packet loss allows Kontiki to send tremendous amounts of high quality video using existing network resources without causing network congestion.

Security

Kontiki's ECDN includes an end-to-end security framework that ensures enterprise-grade control over video delivery. The security features include:

- Only authorized users can request, receive and publish content
- Information cannot be "sniffed" while traveling over the wire
- No malicious users or PCs with viruses can disrupt or alter the video content

Federated Services and Access Control

Kontiki provides federated services support via SAML 2.0 integration. Authentication and access control is provided via integration with a corporate user directory such as Active Directory (or any LDAP compliant directory system). This security overlay allows administrators to govern privileges throughout the supported workflows ranging from specifying which groups of users can upload video, approve or reject published videos, police metadata, moderate comments, brand the end user experience, promote content on key pages, syndicate to existing intranet sites, create channels or assign content to channels, and more.

Only content that is published to the central system by an authorized publisher is delivered by Kontiki. To publish video for distribution, a publisher must authenticate by logging into to a central server. Once authenticated, the publisher can upload a video either by transferring it via SSL or having our central server(s) pull and broadcast it from the live video source, such as an encoder. Videos published through Kontiki are virus checked and encrypted for storage.

Point to Point and On Disk Encryption

All video transfers within Kontiki are secure, using either the Kontiki Delivery Protocol (KDP) or SSL over HTTP. KDP is based on industry standards for signatures and encryption. Each KDP message and response is signed and encrypted using the following standards:

- Public/private key pairs are generated using RSA algorithms implemented by the OpenSSL library. Kontiki uses a 1032-bit key pair.
- Encryption is performed using the Blowfish algorithm implemented by the OpenSSL library with a 128-bit symmetric key. The PKI key pair encrypts and transfers these keys. These 128-bit keys are generated on the fly and only used temporarily during data transfers.
- Signatures are based on the SHA-1 hash algorithm, implemented by the OpenSSL library.
- Signature generation on the Java Web Application servers is implemented in a standard Java Security Provider library.

Videos are encrypted as they are uploaded to Kontiki and reside in encrypted form on the central content servers. Content also remains encrypted as it resides on the PC and is decrypted on the fly only when the media player is streaming the video. This level of security helps ensure that a user can't redistribute sensitive information and that the content will remain protected even after it is delivered to the desktop

Content Integrity

Kontiki's ECDN ensures the integrity of all content delivered, so that a malicious user or PC with a virus can't produce an altered copy of content that propagates through the network. Kontiki's ECDN generates an SHA-1 digest for every "block" of a video file published into our ECDN. This digest then becomes part of the content metadata for that content item. Every receiver of content also generates its own SHA-1 digest of each delivered

block and compares it against the original SHA-1 digest that is part of the metadata. If any block fails a check, the client will not source any more data from that server and will delete the bad blocks. Through this method, the system can guarantee a bit-perfect copy of every video stream received by every user.

Storage

Content is stored in Kontiki's enterprise service cloud, which is a multi-tenant and shared server environment hosted by Kontiki in a secure data center. Content is stored at a shared location %ALLUSERSPROFILE%\Documents\My Deliveries. This includes thumbnails, video files, and any other large content items delivered by the service. This location can be moved to any fixed disk location. The permissions on this folder and its subdirectories and files are changed so that users cannot navigate to the content items directly unless they have Local Administrator rights. The disk space used at this location is governed by preferences that can either be controlled centrally or modified by the user.

Shared metadata and log files are stored at %ALLUSERSPROFILE%\Application Data\Kontiki. The metadata database (SQLite format) stored here grows with the amount of content downloaded, but typically does not use over 1MB. The log files stored at this location are primarily used to debug client behavior. They automatically rotate at 2MB and replace the previous rolled log. These log files cannot grow over 4MB.

Monitoring and Reporting

Kontiki offers smarter monitoring and reporting by providing insight into delivery status and network efficiency patterns, including:

- In progress deliveries, completed deliveries, halted deliveries
- Percentage of bytes delivered via LAN (peers) vs. WAN (peers) and WAN (origin servers)
- Total gigabytes delivered
- IP addresses of serving nodes
- Real-time information on bytes delivered during a live event
- Real-time feedback on the quality of experience (e.g. buffering)

Integration and the Kontiki API

The Kontiki ECDN was built to offer easy integration with your existing systems and applications. Our solution includes a robust REST-based application programming interface (API) that enables access to core features of the platform, including our powerful delivery technology.

The Kontiki API

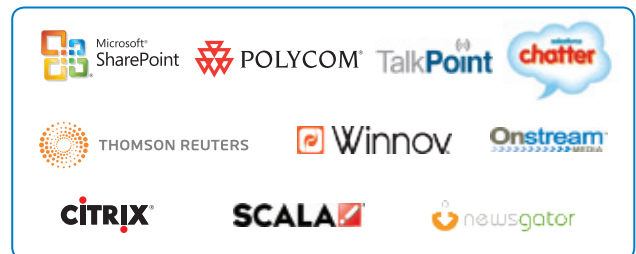
Kontiki's API enables you to create a customized experience for your business. The API set includes features such as:

- Content ingest & publishing
- Content display
- Discovery & security
- Content metadata management
- Content delivery



Third Party Integration

Kontiki is committed to our integration services and we've partnered with a number of third party applications in order to offer a comprehensive and engaging social experience for users.



Learn More

Questions? We'd love to hear from you!

- **Contact Us.** Go to <http://www.kontiki.com/forms/contact.html> and fill out the short form. One of our experts will reach out to help you find the solution that's best for you.
- **Start Your Free Trial.** Go to <http://www.kontiki.com/forms/freetrial.html> to sign up for a free trial of Kontiki's Enterprise Video Platform.
- **Learn More.** Read the latest and engage in the conversation:
<http://www.kontiki.com/>
<http://www.facebook.com/KontikiEnterpriseVideo>
<http://twitter.com/#!/KontikiBizVideo>
<http://www.linkedin.com/company/kontiki>

Company Overview

Powered by innovative technology, Kontiki pioneered the enterprise video platform and enterprise content delivery network markets, providing superior cloud-based content delivery across the enterprise. Kontiki's video solutions enable consumer-grade video engagement with enterprise-grade control over video delivery for the world's largest companies, including American Airlines, Wells Fargo, Nationwide and Nestle, serving nearly 1.5 million users worldwide. Kontiki offers organizations the unique ability to globally deliver video on demand or live broadcasts to 100% of their employees, regardless of location, and to the full range of today's business devices, including smart phones and tablets, without congesting networks or compromising video quality



KONTIKI

Visit www.Kontiki.com for more information.

CORPORATE HEADQUARTERS
 1001 W. MAUDE AVE.
 SUNNYVALE, CA 94085

TEL 888-317-9283
FAX 408-215-6401
EMAIL info@kontiki.com

EMEA +44 (0)800 242 5602