Zoom
Architected for Reliability

Zoom unifies video conferencing, a modern cloud phone solution, group messaging, and software-defined video conference rooms into one easy-to-use platform. Our solution offers the best video, audio, and screen-sharing experience across Windows, Mac, Linux, iOS, Android, BlackBerry, Zoom Rooms, and H.323/SIP room systems such as Polycom and Cisco.

This guide will provide insight into Zoom's innovation and best-in-class architecture, which provides a seamless and unified end user experience for video, voice, chat, and collaboration.

Built from Experience

Zoom is the most reliable and innovative video conferencing solution available, largely because we have the world's most experienced engineering team in collaboration technology. Eric S. Yuan, Zoom's founder and CEO, is a web conferencing industry leader who was the heart and soul of the WebEx product from 1997 to 2011. Eric left WebEx in 2011 with an all-star, hand-picked engineering team to build the next generation of online video conferencing. Zoom's engineers have over 900 years of combined experience working on real-time collaboration software – the most in the industry – and their mission is to make video communications frictionless.

Zoom's proprietary software was created with the future of video communications in mind. Zoom is architected with a video-first philosophy and delivers in the UCaaS market from a different angle. Zoom has a full-stack engineering team with dedicated members for each layer of our architecture and each supported device. This distinctive approach allows our engineers to innovate faster and continue to grow a high-quality service that scales with ease.

Over **300,000** companies trust Zoom

94% of IT organizations would recommend Zoom

87% say Zoom has superior reliability

92% say Zoom has superior quality

techvalidate.com/product-research/zoom

# Innovation Creates the Difference in User Experience

Zoom's unique approach to the way we've architected our service means that Zoom has features that other solutions just can't provide, at a scale, and with quality that is unmatched.

Unique host & attendee capabilities include:

- Show a video clip (either from a URL or your desktop) with audio in a meeting – no uploading required
- Co-annotation
- Video breakout rooms (up to 50 rooms per meeting)
- Mobile screen screen sharing though iOS Airplay
- Zoom's cross-platform messaging service provides a directory for point-to-point calling

Zoom's vision of making video conferencing frictionless means delivering great video meeting experiences for desktop, mobile, and conference rooms. The meeting experience across all of these devices and environments is seamless. And through integrations and APIs, organizations are able to incorporate video meetings within existing workflows and systems.
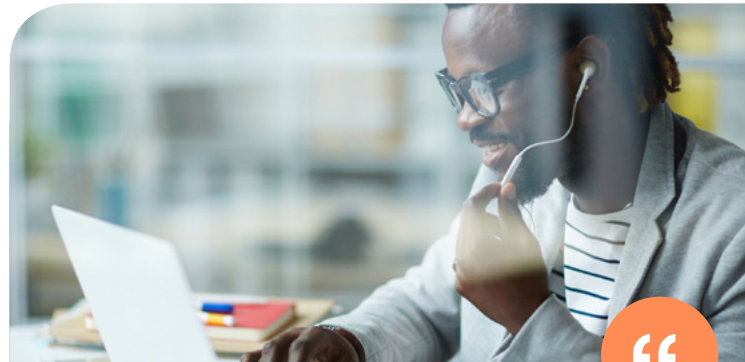
"Zoom has changed the way we collaborate. Every employee can use Zoom and it has revolutionized how we do business."

**Conrad Liwanag,
IT Administrator,
Logitech International**

Architected for Quality and Reliability

Zoom's unique cloud architecture makes all of this possible. Our architecture starts at the base with the Intelligent Transport Layer, which decides if UDP, TCP, TLS, or HTTPS on the client layer is the best experience for connectivity based on different proxy settings and the need to go through firewalls. Reliable UDP is used for content screen sharing. Zoom will detect client geolocation and assign closed resources. It may impose private links for cross international countries.

The next layer is the Reactive Quality of Service Layer. Zoom is the only service to have this, and it is a critically important layer in the stack because it reacts to real time network and device status. This layer not only monitors the client's bandwidth, packet loss, latency and Jitter, but also collects the client's CPU usage, memory and network I/O. It notifies the up layer to take the best action within adaptive technology.

Traditional | Zoom

Centralized | Distributed

Zoom's Adaptive Codec in Session Layer, unlike that of other providers, is created with proprietary coding. The multiple layers around this codec optimize the video frame rate and resolution and provide superior quality and reliability for various network environments and different devices. Zoom uses multiple streams, allowing the application to toggle between streams to ensure that the best quality video gets delivered to end users. Because of Zoom's compression technology, the system can operate well in an environment with up to 45% packet loss. In these instances, Zoom will prioritize audio over video, because audio is more crucial in business discussions and collaboration. Zoom's multi-stream technology handles bandwidth adjustments for the end user to improve their quality based upon their ability to receive data.

The Distributed Conference Layer utilizes subscription information for switch technology with no transcoding or mixing. Traditional conferencing services always transcode the streams and mix them together. Zoom's switching method uses less CPU and memory, giving our system a massive scalability difference. One server can handle 2000 clients. Zoom uses globally-distributed technology based on user geolocation and optimized network path. The meeting participants are always connected to a nearby data center and assigned to the least loaded server. On the other hand, meeting participants will be aggregated to same server if they are in same place. This architecture also satisfies flexible on-premise and hybrid deployment models and provides traffic cascading delivery for enterprises.

The Meeting Server is our MMR (multi-media router), and MMRs are grouped in a "Meeting Zone." Zone Controllers manage all of the MMRs and report their status to the Global Cloud Controller for each Meeting Zone. The Meeting Zones are duplicated for each data center with the exact same architecture and we can easily add more zones on-the-fly for added capacity in each region. The three layers (the MMR, Zoom Controller, and Global Cloud Controller), are used to balance resources in different locations. If just two participants are in a meeting,
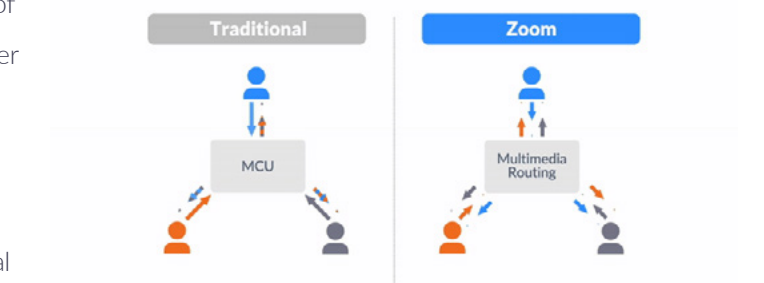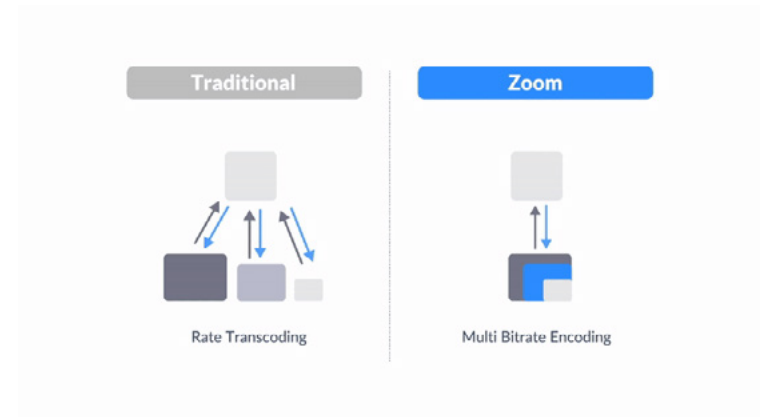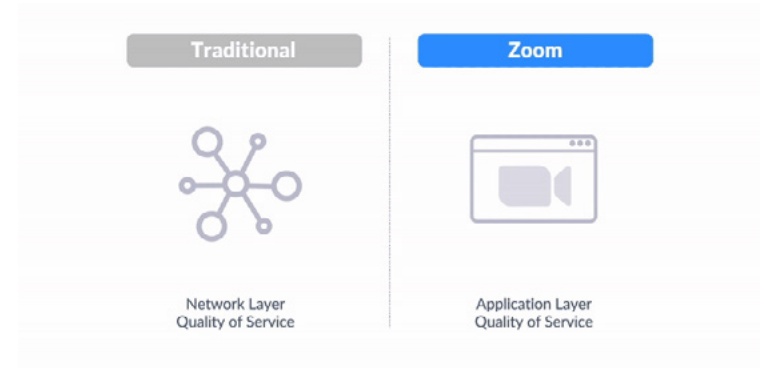
Zoom will utilize peer-to-peer connections for excellent speed and reliability. All of this allows Zoom to maintain meeting services availability of 99.99% uptime and deliver the most reliable video service.

Options for On-Premise & Hybrid Deployments

Offering an on-premise deployment option allows a higher degree of security and performance. This capability allows segmentation of users across both on-premise and cloud environments. Zoom Pro and Free (Basic) user types will use the cloud, and Corp user type will use the on premise.

Offering a hybrid delivery option allows a higher degree of flexibility and performance. Internal users connect to hybrid servers, while external users automatically connect to the public cloud.

Both cloud and on-premise solutions are designed with failover and load balancing mechanisms when deployed. Zoom monitors the zone level with multiple VMs, and if a zone is approaching a threshold or fails, it will move to the next zone. Similarly, at the VM level, if a VM fails or is approaching threshold, the connection moves to the next VM.

Global Distributed Data Centers and Redundancy

Zoom has brokers and communications servers distributed among multiple interconnected datacenters across the globe, including super nodes in China and India. We are constantly evaluating our datacenters and Internet service providers (ISPs) to optimize performance for our customers in regards to bandwidth, latency and disaster recovery isolation. Our datacenters are situated in secure co-location facilities that are ISP carrier neutral and provide physical security, redundant power, and simultaneous access to top-tier ISP's and peering partners. They are built with fault-tolerant architecture with full redundancy and rapid failover capability. Zoom dynamically load balances the communications servers to automatically move new sessions to the datacenter that has the best response time.

Capacity

Zoom maintains 50% excess capacity in all aspects of our infrastructure to accommodate our growing business and to meet peak usage requirements. We are confident in our ability to provide service and scale based on our current and future customer needs.

Bandwidth

Zoom is located in premier co-location facilities that are ISP carrier neutral. Zoom has five ISPs (Level 3, NTT, Cogent, Tata and XO) and is a multi-home BGP. Failover between ISPs is automatic. Even if four ISPs were down, the Zoom service would still work. Zoom supports up to 80G bandwidth and US data center racks are provisioned with a massive amount of bandwidth, each with 40 Gbps of connectivity, for phenomenal performance.

Disaster recovery

Disaster recovery (DR) tests are performed quarterly. Because Zoom uses Active/Active architecture for the meeting service with redundancy in each scope or layer, there is virtually no risk of interrupted service. All data centers are also fully redundant with power, cooling and network carriers. Multiple power feeds, fiber links, backup generators and battery systems provide reliability.

Conclusion

Zoom's innovative approach in delivery and features provides a consistently superior video conferencing experience. End users appreciate the innovative features, ease of use, reliability and incredible video and audio clarity. And IT managers are assured that the solution is globally available and designed to scale with security and dependability.