



WWW.STEINWURF.COM



NETWORK PERFORMANCE SOLUTIONS

About Us

Steinwurf is a deep tech software company that helps application and service providers ensure excellent quality of service for all ultra-low-latency and real-time applications and enables efficient multicast for updating 1000s of devices over the air. Our team has developed our technology and software for over 10 years, fixing connection issues related to packet loss which can seriously affect performance and the customer experience across multiple use cases.

Why work with us?

- ✓ Proven track record and software validation across numerous research and commercial integrations
- ✓ Implementations for all platforms and unrivalled support
- ✓ Hardware acceleration ensures minimum processing footprint and regular releases of feature and performance improvements

Our Use Cases



Low Latency

Steinwurf's Software solutions help service providers deliver their apps and services with the lowest possible latency for outstanding real-time performance.



SD-WAN

Our software helps SD-Wan providers ensure users can work and collaborate in real time whether they are working from home over WiFi, or over corporate fibre connections.



Multicast

Our next gen software can be used to quickly and efficiently update 1000s of devices at once with content and firmware updates, to easily manage and maintain IoT networks, V2X, Satellite connected devices, Industry 4.0 or inflight video.



Teledriving

Remote driving scenarios need instant feedback and reactions between driver and machine to operate safely and efficiently, Steinwurf's software helps solve this fundamental requirement.



Video Conference

Steinwurf helps ensure video conference solutions are smooth and glitch free, even when users experience network issues like packet loss.

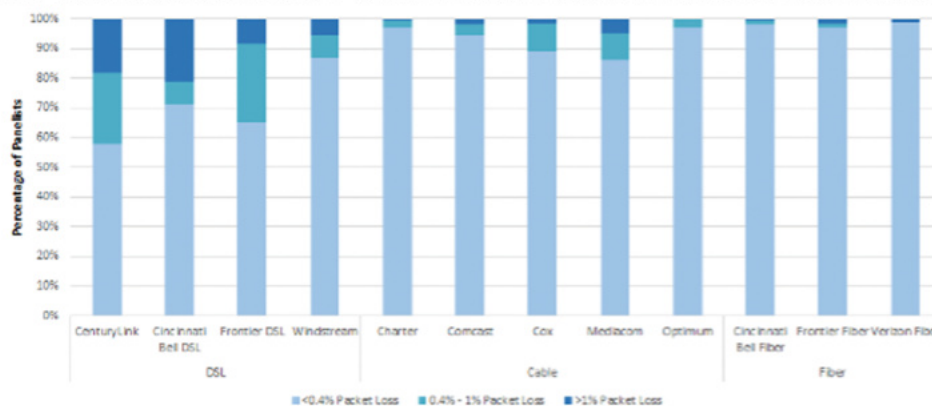


LOW LATENCY USE CASE

Steinwurf helps companies deliver low latency use cases

Modern applications require extremely low latency connectivity to deliver great quality of service, but without compromising reliability. Steinwurf's software solutions are foundational for ensuring high QoS for real-time applications, by repairing network issues like packet loss without affecting the user's experience.

% Of Customers With Associated Peak Period Packet Loss In US broadband Networks



source: https://www.fcc.gov/reports-research/reports/measuring-broadband-america/measuring-fixed-broadband-tenth-report#_Toc43144660

Even in highly developed countries like the US, broadband services have 40% of their customers experiencing peak packet loss of over 0.4%, which can seriously affect latency sensitive, real time applications like SD-WAN, video conference, gaming and remote driving. Packet loss can regularly get much worse in less developed countries, amplifying the latency problem for users in regions across Africa, Asia and South America.

Steinwurf's software is highly flexible and adaptive to network conditions and designed to specifically to meet these challenges and repair such issues in the background so users can continue to experience a great quality of service even if network quality degrades. Talk to the experts at Steinwurf today to learn how our software can help you deliver excellent low latency services to customers with minimum fuss.



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SD-WAN USE CASE

Steinwurf helps SD-WAN providers improve quality of service

SD-WAN Providers use Steinwurf's low latency software to deliver the next generation of performance to customers using all manner of cloud business solutions such as:



**Collaborative
working**



**Real-time
data sharing**



**Video
conferencing**



VoIP

- Improve quality of service for customers while reducing latency and increasing reliability
- Implement next-gen connection stabilising software that is fully hardware acceleration compatible, potentially reducing CPU usage while improving reliability and latency.
- Leverage bandwidth savings to lower costs and increase the user base using the same infrastructure, or serve more applications down the same pipeline without diminishing QoS
- Replace expensive MPLS solutions and improve reliability with our flexible, highly customisable solutions giving granular control where desired.
- Meet and exceed performance expectations for the modern, cloud centric business operations of the distributed workforce

Join Barracuda Networks and other leading SD-WAN providers worldwide who use Steinwurf's software in their SD-WAN solutions to help put the customer first.



TELEDIVING USE CASE

Steinwurf's Rely makes teledriving and remote operation safe and responsive enough for real world operation. The driverless experience requires ultra-low latency video communication from the vehicle to the teleoperator.

Whether you have remote operators controlling fleets of vehicles in logistics hubs from metres or miles away, or need to add a remote backup for autonomous vehicles when on board AI is not capable or not allowed to operate in certain areas, Steinwurf's software can ensure ultra-low latency connectivity even over wireless and cellular networks prone to packet loss.



Fernride is a Munich based market leader in teleoperation using Steinwurf's Rely low latency software in their end-to-end platform solution to enable truly driverless and safe logistics – so that operators and vehicles can behave as one cohesive unit.

Connect with our experts to learn how Steinwurf can help make your remote driving solutions ultra-safe and ultra-response too.



VIDEO CONFERENCE USE CASE

Video /Audio Conference Applications

Video Solutions are quickly becoming the new norm to bring businesses and customers closer together without the need to travel to events or businesses and replacing in person meetings for consumer services like banking, doctor's appointments, e-learning and other consultations.

Steinwurf's ultra-low latency software solutions can help such applications to operate at peak performance even when users are on imperfect networks with issues like packet loss. Given a compressed video 4 Mbit/s using 1360 byte packets the following table maps the residual packet loss to time between glitches.

Even low levels of packet loss are detrimental to live video applications, given a compressed video 4 Mbit/s using 1360 byte packets the following table maps residual packet loss to time between glitches.

Residual packet loss	Dropping one packet in	Produces a glitch every
0.1%	1000	2.6 seconds
0.01%	10000	26 seconds
0.001%	100000	4 minutes 23 seconds

Fortunately Steinwurf's software repairs packet loss issues of much higher magnitude without letting the application and user realise there are connectivity problems. So customers can continue to enjoy their conversations glitch free and without interruptions or stuttering audio and video.

Connect with Steinwurf to learn how our software can help your audio or video application perform smoothly for all your customers.



FAST RELIABLE STABLE

Our Solutions



Rely

Low latency, adaptive, connection stabilising software for all real time use cases like Video Conferencing, SD-WAN, Teledriving, Gaming, Remote Desktop and many more use cases.



OTAcast

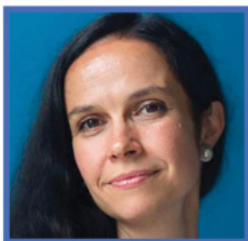
Software for highly reliable, fast and efficient multicast and broadcast of firmware and content to large populations of devices.



Kodo

Highly customisable connection stabilising software for more bespoke integrations and kernel implementations for low latency applications.

Our Visionaries



Muriel Medard
Co-founder & Chief Scientist

Muriel is the Cecil H. Green Professor of EECS at MIT and runs the Network Coding and Reliable Communications Group at the Research Laboratory for Electronics at MIT



Morten Perdersen
Co-founder & CTO

Formerly a PhD Student of Muriel and other co-founders, Morten has spearheaded the creation of Steinwurf's state of the art software for over 10 years.





RELY SOLUTION

Steinwurf's Rely for ultra-low latency applications
Rely is Steinwurf's next gen software library for use in latency sensitive applications and services.



Ideal for stabilising connections and fixing packet loss issues for ultra smooth, fast, reliable and low latency performance across modern real-time applications and services such as:

1. Audio and video conferencing
2. SD-WAN and VPN services
3. Gaming and esports networks
4. Remote driving
5. Remote piloting scenarios
6. Remote desktop and AR service support
7. All other real-time applications

Steinwurf's software can help to empower your service with the highest QoE for your customers even when their local connectivity suffers from issues.

With Rely in your corner, customers will continue to enjoy your service the way you intended, and won't even notice when their underlying connection is having issues.

Rely can even help increase your user base, as customers from further afield, outside well connected city networks find they are also be able to enjoy your service because of increased performance across the board made possible with Rely.

Speak to our experts today to learn how we can help.



OTACAST SOLUTION



Steinwurf's OTACast for multicast content updates

OTACast is Steinwurf's next gen software solution for efficiently updating 1000s of devices in a network with content, firmware or security updates.

Devices in today's networks, whether IoT, cars and trucks, drones, mobile devices, or sensors, need to be capable of receiving remote updates, otherwise an engineer may have to manually and physically connect to each device individually to keep them updated. This would be prohibitively expensive to maintain, be very time-consuming to carry out, or sometimes just practically impossible.

Required updates may be security or content related to ensure safe operation, or to add features and up-to-date content so a device can remain useful over time reducing its cost of operation and environmental impact.

So the ability to update many devices simultaneously, both efficiently and quickly, is vitally important to ensure minimal downtime and optimum quality service for your operations.

OTACast ensures that all data received by any given device in a network will contribute to the completion of the download, so the same data packet can be sent to every device and be useful, regardless of what has been received before, and sidestepping problems caused by other OTA systems which may need to track the level of completion at every device with feedback and retransmissions.

Your system and customers deserve to benefit from the most efficient OTA update solution. Connect with our experts to learn how our software can level up your systems with next gen OTA updates.



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KODO SOLUTION



Kodo

Steinwurf's Kodo

Kodo is our flexible software toolbox of high-performance software components upon which our other solutions are built. Steinwurf recommends using Kodo for:

1. Kernel implementations
2. Customized software solutions and extremely granular configurations
3. Low latency applications or multicast networks

We can help you efficiently integrate our solutions to power up your applications.

Our team of experts have been helping companies incorporate Kodo into their projects and products since 2011 in Satellite, IoT, wireless audio, robotics, connected cars, sports broadcasting, underwater networks and a wide variety of other projects and use cases.

Talk to our team of experts to learn how Kodo can help your applications and services step up performance.



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