



# CASE STUDY

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## SDVoE Deployed at Norway's Largest University

With 40,000 students, the Norwegian University of Technology and Science (NTNU) is Norway's largest university and its premier institution for educating engineers. As an institution, it practices what it preaches. It not only teaches technology but also uses it dynamically and creatively in its teaching environment. It saw the opening of a new building as a great opportunity to enhance the student learning experience and improve flexibility of teaching by creating a fully interconnected AV suite of lecture rooms and laboratories. The vision was to enable collaboration not only between the teaching spaces on each campus, but also between campuses. This required sharing high quality content in real time.

### Challenge

The NTNU main campus is in Kalvskinnet, Trondheim, and it has additional campuses at Gjøvik and Ålesund which are 40 and 30 miles away respectively. NTNU has ambitious expansion plans, and recently opened Akrinn, a new building for technology education at Kalvskinnet. Additional new buildings are planned at all three campuses. Creating the initial tender for the AV system was shared between multiple departments in the University, and the IT department was involved in assessing bidders. The project was ultimately given to the University's IT department to manage.

Atea, a leading system integrator and specialist in IT infrastructure for businesses and public-sector organizations in Europe's Nordic and Baltic regions, bid for the project. Christian Brondbo led the successful bid team, and describes how they saw the challenge, "The University requirement was for the distribution of uncompressed 4K with pixel-for-pixel accuracy and very low latency between all twelve lecture rooms in the Akrinn building as well as other teaching spaces such as workshops and laboratories. NTNU already used Skype for Business to

interconnect its campuses, so the solution we provided needed to be compatible with that.

"We saw immediately that an IP-based solution was the right approach yet the network backbone at the site was just 1Gbps. We would need 10Gbps to support uncompressed 4K so there was no question that a dedicated network would be required."

### Solution

By specifying ZeeVee ZyPer hardware, Atea was able to build the network using standard Ethernet components, the foundation of the Software Defined Video over Ethernet (SDVoE) platform. NTNU's IT department is very used to working with and managing these technologies. Brondbo commented, "We already have a relationship with the University IT department, and understood the technology and the approach that they are comfortable with."

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**Jostein Arve Grytdal**  
Campus Development, NTNU

Using 150 ZeeVee ZyPer 4K encoders and decoders, Atea has created Europe's largest AV-over-IP network. Each of the lecture rooms and classrooms in the Akrinn building is connected to a state of the art video distribution system that transmits uncompressed 4K and UHD content over an Ethernet network with zero latency. The 12 lecture theatres on the site are equipped with cameras and screens, allowing content to be shared between them instantly and at will. The workshops and teaching laboratories on the site are similarly interconnected. The rooms with

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ZeeVee ZyPer4K hardware also have video conferencing systems allowing content to be shared with the campuses at Gjøvik and Ålesund.

Adding a dedicated set of network cables to the building as it was fitted out was straightforward and economical. The dedicated IP network for the AV transmission not only ensures sufficient bandwidth is always available for the high level of AV traffic without compromising other services, but also enhances security.

To achieve the very low latency required, Atea built the backbone using high performance hardware. The network is constructed using standard Cisco Nexus 5624 Ethernet switches and Cat 6A cables. The switches are configured with 24 10Gbps ports, plus six 40Gbps QSFP fiber ports. The network has a capacity of 80Gbps between switches, and delivers signals between rooms with a latency of no more than 20-30 microseconds.

Jostein Arve Grytdal, Campus Development at NTNU added, "The content distribution network created by ATEA and ZeeVee is easy to manage and popular with users. The management panel allows us to quickly and easily configure the installation – for example opening an additional lecture theatre almost instantly should an event overflow. The interconnected network just opens up so many possibilities for us. For example, we now record lectures for uploading to the student portal, and in the future it may even be possible to allow students to join lectures from home if they choose to. Lecturers also have a lot of flexibility in terms of content that they can access during their presentations. For example, a video conference can be introduced with an authority elsewhere, live or recorded broadcast footage can be added and so on."

He continued, "We are already planning stage two, in which the Atea and ZeeVee network is extended to a building, which is currently under construction and expected to open in December 2017. Fiber cables laid under the street will join the two sites, which from an AV perspective can then act as one."

Kim Levy Arntzen, IT engineer at NTNU concluded, "We are particularly positive about the fact that, using ZeeVee 4K encoders and decoders, uncompressed AV signals can be distributed across an entirely standard Ethernet network. It is always a concern if a network delivering critical services relies on non-standard or proprietary technologies, supported by a single vendor or limited vendor base."

A key advantage for NTNU has been the stability of the system. The ZeeVee and Cisco hardware has been completely stable since installation, and has resulted in almost zero call-outs to the maintenance team.

Christian Brondbo of ATEA added, "Selecting a vendor to support a critical part of a project for a key customer is always a challenging decision. We had no hesitation in specifying ZeeVee. They were very reliable and committed to finding a solution for any challenges that we encountered. ZeeVee even provided a technician to help us configure the network switches."

## Benefits of SDVoE Technology

SDVoE reaches beyond existing standards to provide benefits no other technology can claim:

- A complete ecosystem – SDVoE Alliance members are manufacturers with expertise in signal distribution, display manufacture, IT infrastructure, chip design and AV software. The integrator has dozens of partners to align with and products to choose from.
- A flexible yet simple software platform – the SDVoE API allows rapid development of highly specialized software, custom-tailored to the needs of a vast array of end users.
- A full OSI stack solution – only SDVoE offers the simplicity of a complete top to bottom solution, fully encompassing infrastructure, transport, processing, and a simple control layer.



For more information about ZeeVee's ZyPer4K SDVoE solutions, visit [www.zeevee.com](http://www.zeevee.com)

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