

interact Office



Case study

Smart buildings: the next generation

Convergence is key at Atea Stavanger's new state-of-the-art facility

Dogfooding 2.0: the advantages of a living lab

Way back in the 1990s, “dogfooding” was the gold standard for demonstrating technology leadership. Short for “eating your own dog food,” dogfooding was the practice of a technology development company using its own software or products as a way of putting themselves in their users’ shoes.

Eventually, though, as software programs and other forms of technology became more complex and specialized, dogfooding fell out of favor: development teams no longer represented the user communities for which they were creating applications. User research became the new touchstone for system design and testing, but at the cost of deep customer knowledge and understanding.

Technology has taken enormous leaps forward since the 1990s, of course, but the emergence of smart systems for general end-users has brought the technology leadership conversation full circle. Smart cities, smart buildings, and other Internet of Things (IoT) systems have moved applications out of computers and specialized devices and into the spaces that we all use every day—including office workspaces, retail shops and malls, hotels, and city streets. Using your own solutions as a way of testing and validating them has once again become a viable and effective way of taking customer experience and business excellence seriously.

Nowhere is this renewed emphasis on “drinking your own champagne” more evident than it is at Atea, the leader in IT infrastructure for businesses and municipalities in Norway and the Baltics. The new Atea office building in Stavanger, Norway, has been conceived from the ground up as a living lab—a test bed and showcase for connected and integrated systems.

“By saying that this building is a living lab, we’re thinking of it as a place where we do our proof of concepts,” says Espen Riska, smart buildings director at Atea Stavanger. “By being in a living lab, we are constantly evolving, we are constantly trying and testing our own products and our partners’ products by using them ourselves.”

The living lab concept has given Atea new insights into its customers, the challenges they face, and the best ways to help them overcome those challenges to achieve operational excellence. But the building has also become an essential element in helping Atea expand its business model.

“Atea is a very experienced service provider in networking and a reseller of equipment for the IT business,” says Riska, “but this is also making a lot of new opportunities for us because we have never sold equipment to be able to maintain a facilitated building before.”

As part of their effort to move beyond IT infrastructure and into smart building solutions, Atea has partnered with Signify, the world leader in connected lighting systems for the IoT, and with networking and telecoms giant Cisco. Together, the three companies designed and engineered a truly integrated smart building from the bottom up. The new Atea building features a converged IT infrastructure for integrating systems and collecting rich, actionable data for monitoring, modeling, and AI applications. The connected lighting system and Interact Office software from Signify give Atea a platform for distributing intelligence throughout the building’s illuminated spaces.

For Riska, the converged IT infrastructure forms the foundation on which a business can build what he calls “plays,” systems and applications that leverage common resources and that can share data for deep functionality and intelligence. “The infrastructure for enabling lighting, for enabling sensors, for enabling video and Wi-Fi and everything, that infrastructure is very important,” Riska says. “And adding the lighting part is adding another ‘play’ onto our IT infrastructure.”

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Espen Riska,
Smart buildings director at Atea Stavanger





Design it, live it, show it

As a smart office solution showcase, the new Stavanger building allows Atea to demonstrate to their customers what they can do with a converged infrastructure and its various “plays.” But because the building also houses Atea’s Stavanger workforce, the company must maintain something of a double focus: employee comfort and productivity is as important as showcasing multiple smart solutions and how they can be integrated.

Riska notes that smart technology can be embedded into an office environment in a way that supports both employee well-being and operational efficiency only if you plan for it from the earliest stages. “You have to be in that drawing process, you have to be in the architect’s mind, and you have to be really prepared to meet new issues along the way,” Riska advises.

Now that the building is open and occupied, Atea brings potential customers in on a regular basis. “The building itself drives a lot of people to come here,” affirms Atea sales manager Kjetil Vasbø. Indeed, visitors have been coming from all over Norway and abroad to see for themselves how smart buildings can be configured, maintained, and managed.

Vasbø notes that the IT industry in Norway is very old-fashioned, and it’s a big advantage to be able to demonstrate a more

modern approach to building management in a real-world setting. Visitors experience first-hand such features as the bio-adaptive lighting in the building’s glass-roofed atrium, the integration of HVAC and occupancy detection in meeting rooms, and indoor navigation throughout the building.

More people visited the new building in six months than had visited the old Atea building in over ten years. “We have experienced a lot of interest from the industry,” Vasbø affirms. “Once a customer comes, we plan a meeting together with Signify and Cisco and we take them through the experience. We give them some good advice for the future, and what they should be aware of and think about for whatever project they’re starting.”

Evaluate it, test it, improve it

Installing systems in their own building also allows Atea engineers, developers, system architects, designers, and others to evaluate and test systems in a real-world context that can't be replicated by a simulation or a prototype. The building is designed to allow for experimentation with different solutions, which can be rapidly upgraded or restructured to improve and verify effectiveness.

"The technology is developing constantly, and we wanted the newest technology available," says senior network engineer and system architect Pål Bjelland. These new technologies include a personal control app for the lighting system, a highly accurate indoor location system that uses a combination of LED lighting and Cisco DNA Spaces, multisensors, and even Li-Fi for light-based, high-bandwidth wireless communications.

"We are now starting to use these technologies together and will do an evaluation," Bjelland says. Bjelland expects that making improvements will be an ongoing process, as technologies continue to evolve and as Atea's understanding and experience continue to deepen.



Converging on intelligence

In the Atea building, all systems are on a single converged IP network. This represents a meaningful step forward over earlier generations of smart buildings, such as The Edge in Amsterdam. The converged IP network powers and integrates all of the building's different systems, from scheduling systems and meeting room video cameras to Wi-Fi and lighting.

Employing a single network consumes less energy than running multiple separate systems. It also offers advantages for data collection. "It's easy to pull out the sensor data from one network instead of having lots of different systems talking different languages," Riska explains. Additionally, a converged IP infrastructure allows building systems to be flexible, dynamic and scalable, especially when those systems use open APIs for back-end integration and data exchange.

The Atea Stavanger building uses an Interact connected lighting system from Signify not only to illuminate the working environment but also to collect data on the building's workspaces and the activities taking place within them. The building currently contains around 700 luminaires—including Philips PowerBalance PoE troffers and Philips CoreLine LED downlights from Signify—which are equipped with multisensors for measuring environmental factors such as presence, temperature, daylight levels, and humidity.

"You will always need light, so why not utilize the ceiling and put in sensors connected to the same infrastructure?" Bjelland asks. Leveraging the lighting system this way is a new approach to creating the smart office. "Altogether, this will give more accurate information than traditional workspace design, and will support better decision-making."

At Atea Stavanger, the connected lighting system is an integral component of the building's IoT platform. Connected luminaires and their multisensors transmit data via the IP network, which is deployed using Cisco Ethernet switches. Many of the building's luminaires connect to the converged IP infrastructure using Power-over-Ethernet (PoE). This means that these luminaires can be powered and controlled without the need for electrical wiring. It also means that they're able easily to transmit the data they collect to the cloud.

"What we also need is software," Bjelland explains, "and the software is analyzing the data and makes decisions." Also required is a dashboard or other user interface that facility managers can use to monitor, manage, and control the building's systems.

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Data analytics: challenges and opportunities

With sensors collecting information from the lit environment on everything from temperature to humidity to occupancy and more, the building generates a large amount of data. The building systems themselves also generate data on status and operations. This data is potentially valuable, but it must be analyzed and interpreted before it becomes actionable.

Atea brings to the table a great deal of experience in data analytics. The company is involved in many projects with public sector communities in Norway and elsewhere in Scandinavia. Data analytics are becoming quite important to communities who need to know where they should spend their money and where they should focus in the future.

“By interpreting large data that they already have from open data sources, we can help them with data analytics and help them to gain insight,” Riska explains.

Atea understands the challenges that big data poses from the inside out, as they have had to make similar decisions in their own building about what kind of data to collect, how often to collect it, how to store and remove it, and how to analyze it and use it for forecasting and reporting.

Atea didn't know ahead of time how large the building's data pool would be or what data capacity they really needed. As it turns out, Atea is collecting much more data from the building than they initially anticipated. “That's why we use our cloud service providers,” says Riska, “to have a kind of expanded possibility.”





Twinning is winning

Because they need to combine the data collected from different systems and sensors together to generate new insight, Atea put quite a bit of thought into how to display the data to make it meaningful. One approach that has worked well for them is the *digital twin*.

A digital twin is a three-dimensional model of a space that you can move through in the same way that you can move through a virtual world in a first-person video game. In fact, engineers at Atea Stavanger created their digital twin by putting the architect's 3D building information model (BIM) into a gaming engine. Information from different systems and sources are funneled into the digital twin, where they can be visualized in context in a three-dimensional virtual space.

"You can think of the digital twin as a bridge between the physical and digital worlds," explains system architect Bjelland. "This pairing of the virtual and physical worlds allows analysis of data and monitoring of systems to head off problems before they even occur. You can prevent downtime, and you can develop new opportunities or even plan for the future by using simulations."

APIs pass data from the building's systems and other sources into the digital twin. Real-time data from Cisco DNA Spaces, a wireless location-based services platform deployed in the building,

displays people counts in meeting rooms and common spaces. Real-time sensor data from Signify multisensors appears in the digital twin as temperature and humidity measurements, while real-time data from the building management system (BMS) shows how much power the building is using. Data feeds from weather and other informational websites show the current conditions outdoors, alongside such information as power generated by solar cells on the roof and CO₂ levels per building floor.

Facilities managers can even drill down on a specific feature or product represented in the digital twin to view technical documentation for management, operations, and maintenance purposes. Technicians can track when maintenance was last performed on fire extinguishers or in rest rooms.

By using a gaming engine to render the digital twin, developers were able to reduce the size of the building model from about 25 GB to only around 50 MB. This means that technicians can run the digital twin from a smartphone as well as from a dedicated workstation, making it that much easier to access the twin remotely to troubleshoot and fix real problems as they occur within the physical building.

Space is the place

The Atea Stavanger headquarters integrates several capabilities to deliver location-based services to both the users and the managers of spaces within the building. These services, which make use of a sophisticated indoor location system based on Cisco and Signify technologies, support indoor navigation and other capabilities.

For employees, indoor navigation can reduce the amount of time spent searching for available meeting rooms or an open desk. For managers, space optimization reveals traffic patterns, hot spots, and underutilized areas within the building, allowing workspace planners to design the ultimate floorplan based on understanding where people tend to hang out.

The indoor location system in the Atea building combines Wi-Fi triangulation based on Cisco DNA Spaces with visible light communication (VLC) from the Signify luminaires and Interact Office software to create a dense indoor positioning grid. VLC technology uses the modulation of the LED light itself to transmit a unique identifier that can be detected by a smartphone camera. Interact Office Indoor navigation software stores each luminaire's position on a map of the space.

The system then delivers location-based services to the employees via the app. Cisco DNA Spaces offers a resolution of about 5 to 10 m, but VLC increases the resolution to an

astonishing 50 cm, making it possible to locate people and resources with a high degree of accuracy.

Atea has integrated Interact Office and Cisco WebEx with calendars and scheduling within Microsoft Exchange, allowing users to easily find and book free rooms to reduce the amount of time wasted walking around searching for available meeting spaces—up to 30 minutes per day per employee, according to one industry estimate.

Location-based services also support several important space management features at the new Atea headquarters. "In meeting rooms, we've also used Cisco WebEx technology, where we actually use the meeting room camera to count the number of people inside the meeting room," explains Pål Bjelland.

Because the HVAC and Cisco capabilities share data over the same converged network, the system can be configured to automatically optimize conditions in meeting rooms based on occupancy and other factors. For example, the HVAC system automatically kicks in when there are more than 12 people in the room, or when CO₂ levels rise above the threshold defined for maximum comfort and alertness.



Working well, being well

“The work environment plays a big role in both the physical and mental well-being of employees. It can influence how people think, feel, and behave on a day-to-day basis.” So writes Kasia Maynard of global workplace experts WORKTECH Academy. Atea has taken the need for employee well-being seriously in its design of the Atea Stavanger building, from the lighting to the cafeteria and beyond.

“You can have all the machines and the sensors and everything, but as long as the employees are not happy with it, you’re unsuccessful,” says Espen Riska. “We have lots of happy employees, I would say, and I think that’s because of the environment that we’ve created with the lighting and so on.”

Getting the proper light throughout the day is crucial for maintaining the human body’s natural circadian rhythm, which governs alertness and a healthy sleep-wake cycle. Because people spend so much time indoors, especially in office environments, artificial lighting can disrupt this rhythm and interfere with employees’ concentration, energy, and productiveness.

To support employee well-being at Atea Stavanger, a glass-roofed atrium in the center of the building introduces generous amounts of natural light. The atrium roof also features a bio-adaptive lighting application that uses dynamic Color Kinetics ColorGraze MX Powercore LED luminaires from Signify together with Interact Office software to reinforce employees’ circadian health.

The Interact Office Bio-adaptive lighting software uses a lighting “recipe” based on research into the effect of light on the human circadian cycle throughout the day. The lighting slowly changes intensity and color temperature depending on the hour of the day—brighter, bluer light in the morning to energize; softer, redder light toward the end of the workday to relax, for example. The system runs automatically so that employees don’t need to think about it, but they reap the benefits in terms of enhanced alertness, comfort, and productivity.

Riska points to the building’s personalization features as another important method for promoting employee well-being. “Instead of me as a leader just saying you will sit there and you will have these kinds of features and so on, the personalization of the lighting is great because then you have the possibility to build your own kind of workspace,” Riska says.

Employees can personalize the lighting and other environmental factors such as temperature using the Signify Personal Control App (PCA), which leverages the building’s indoor positioning system, multisensors, and HVAC integration.

“It’s all about freedom of choice,” says Bjelland. “The multisensors in the luminaires are able to detect noise, presence, and temperature. If you need a less noisy location with the perfect temperature, the system can find that location for you.”





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Espen Riska,
Smart buildings director at Atea Stavanger

Staying green—for good

What’s next for Atea? The company has ambitious plans to continue innovating and creating ever more sustainable facilities.

“At Atea, we have a green focus all along the way, and the building that we’re in now is carbon zero and energy neutral,” Riska proudly reports. “It’s made for the future. Our challenge is to keep pace and to keep updating and constantly evolving and constantly moving on.”

Atea is now constructing a new building in Oslo, where the company’s main offices are. As at Stavanger, the focus for the Oslo building is sustainability and efficiency, as well as reducing work-related costs for employees while supporting health and well-being in the building.

Sales manager Kjetil Vasbø sees the Atea Stavanger project as the first of its kind, and looks forward to applying successes and lessons learned not only to the new Oslo building but also to projects with new customers in the smart office space.

“Together with Signify and Cisco and the lighting system we have installed here, we are discovering new ways of working, new ways of being innovative, and new ways of bringing new projects to life,” Vasbø says.

Riska agrees. “This building has really given us a showcase to demonstrate to our customers our main focus of keeping a green line in all that we do. In the coming years, we will explore new possibilities within the smart building and the smart office.”

Riska understands the effort and commitment that this will take, but he’s clearly ready for the challenge. “In the green building environment, we’re constantly working and have to work for a greener environment.”

Riska pauses and smiles. “I’ve said it to my employees: we’re not finished and we probably never will be.”

