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BLUESKY—A WORKPLACE RENOVATION FOR FUTURE GROWTH

The face of the modern workplace has officially changed. Employees are no longer part of cube farms with staid interiors that can often stifle creativity in its tracks and contribute to a legion of sleepy, bored workers. Today, employees are looking for flexible, open spaces—something that can allow easy collaboration and not leave them feeling tied down. They need to be able to move around and change their scenery in order to maintain a high level of performance.

This new style of work prompted Georgia-Pacific (GP) to take a look at the business process and operating procedures in GP Center, its headquarters in downtown Atlanta, leading to a complete overhaul of the workspace. GP and companies involved in the renovation called the project BlueSky.

FACING THE CUBE FARM FACTS

The way people work has changed since the GP Center was designed in the 1980s. GP Center was no longer an efficient or desirable office space. The design of the office space offered only individual offices or cubicles and generally large collaboration spaces like conference rooms. The design and furnishings were outdated, which did not foster innovative thinking and did not support attracting and retaining talent. GP Center was unable to handle immediate and future business and capability needs. Meeting spaces, for example, were equipped with different forms of technology throughout the building, requiring additional effort to connect equipment.

GP needed room to grow efficiently—as it was challenging to find space for new employees—but it also needed to eliminate waste through more innovative uses of resources, such as office space, electricity and water.

BlueSky would be a major improvement project on all GP-occupied floors and to many common systems at GP Center. It would significantly improve the work environment for employees and enhance the company's position both as a great place to work and as a top office building in downtown. More importantly, it would provide a more effective environment for the company to grow and create value by enabling greater productivity, innovation and new ways of working.

Most of GP's major competitors for talent had workspaces that were significantly more updated than theirs.

The new GP Center would be designed and equipped to accommodate the way people are working now and will work in the future.

Employees would be able to thrive in any setting with minimal productivity loss from signing in and navigating their new-found digs. They would also be able to choose the environment where they would be most productive, thanks to multiple available workspace options.

A NEW WAY TO WORK

BlueSky began in 2017 and was completed in 2019. The remodel covered 23 floors, roughly 558,000 square feet of office space, which seats about 3,100 employees. In addition, 186,000 square feet of workspace was opened up for company growth or third-party leases.

Most of the GP-occupied floors had not received significant improvement investments since the company opened in 1982. The space was not configured efficiently or designed for the technology and work habits of today's collaborative and mobile workforce. And, the building's heating and air conditioning, wiring, lighting, restrooms, break rooms, furniture and fixtures all needed replacing.

To assist with the remodel, GP created a project team consisting of a workplace design firm and internal representation from corporate real estate, human resources, information technology, facilities management, corporate communications and public affairs, tax, and representatives of other groups involved in recent renovations to other floors. In addition, each business and capability team had a representative collaborating with the project team on the specific needs of their group.

A group of employees was also assembled to be an extension of the project team; all of the chosen workers were picked specifically because of their ability to influence others and help drive important changes in office culture, work habits and etiquette in the new space.

Together, the groups worked on a renovation that addressed myriad problems within GP Center's current workspace. The updated version replaced dated design and infrastructure with modern office designs and furniture, and it added new energy-efficient ventilation and lighting; many of the infrastructure systems were at the end of their useful lives before the remodel.

Solid walls blocking natural light were removed. Taking down those walls improved the ventilation around floors for better heating and air conditioning. Updated floor layouts brought in multiple types of workstations and workspaces for

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greater collaboration and teamwork, while still providing space for quiet, confidential work and conversations (Figure 1). By reconfiguring the existing GP space, leadership could also consolidate its teams on fewer floors and free up additional space.

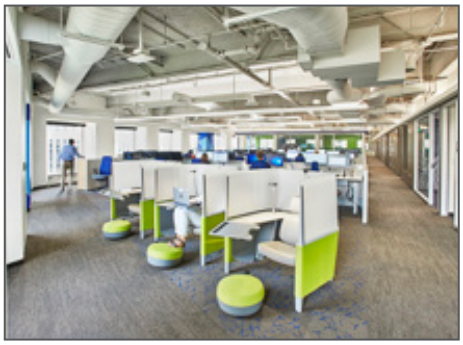

FIGURE 1: Redesigned main office space.

New bathrooms and break rooms are now equipped with innovative new IoT-enabled products, improving hygiene, wellness, and operational costs. They are cleaner, fresher and equipped with hands-free dispensing systems to prevent germs and cross-contamination. Overall consumption of energy, water, consumables, and janitorial labor is expected to decline with these improvements, thus reducing operating costs and freeing up those resources for other uses.

NEW TECHNOLOGIES: BACKBONE, IOT NETWORK, POE, AND MORE

New technology was added and current technology was evaluated —everything from equipping employees to work from various environments to creating consistent technology inside conference spaces.

The wireless network, which employees reported did not always work, was also re-engineered. Wi-Fi coverage was enhanced with three times the number of wireless access points (WAPs) to eliminate areas without coverage. The speed of the wireless network was dramatically increased, support for the latest mobile devices was added and a cellular DAS system was installed to ensure coverage for cellular phone calls. ANSI/BICSI 006, *Distributed Antenna System (DAS) Design and Implementation Best Practices* provides valuable information for the design and installation of a DAS system.

A major emphasis of the project was upgrading the company's technology infrastructure to enable mobile computing and wireless operation of many work tools. The core network backbone running up the building was replaced with blown cable (also referred to as blown fiber or air-jetted fiber) technology, and key networking equipment was replaced to support the faster speeds required for a business now heavily focused on advanced analytics.

GP's old riser backbone, a mixture of singlemode and multimode optical fiber deployed with armored jacketed cables in innerduct, filled most of the available core space.

The new air-jetted backbone consisted of laying 2, 4, 7, 19, and 24-way riser and plenum microducts to form the fiber pathways (Figures 2 and 3).

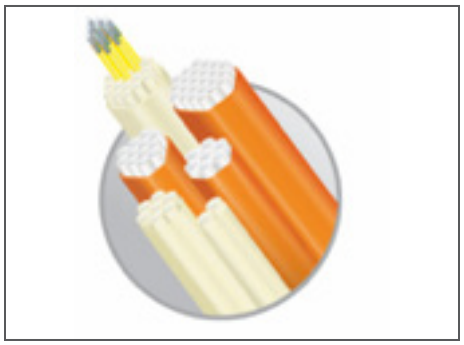

FIGURE 2: Providing flexibility in network infrastructure design, the microducts come in various bundled configurations containing 1 to 24 empty 8.5mm x 6mm inner microducts and include high density polyethylene (HDPE) OSP, riser, plenum, and low-smoke zero halogen options as dictated by the location in the network. [1]

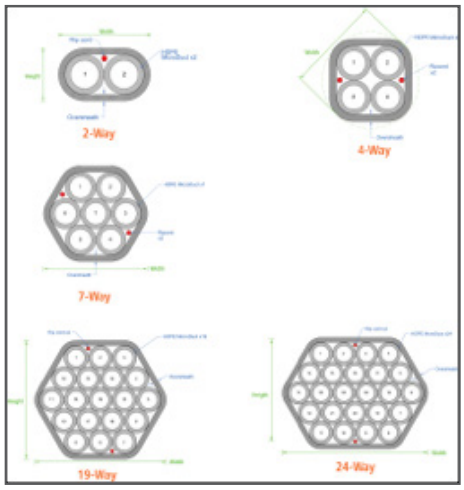

FIGURE 3: Microducts form permanent fiber pathways through which any type microcable (e.g., OS2, OM3, OM4, OM5, bend-insensitive) can be jetted or blown in a continuous splice-free (zero point of network failure) fiber run in and out of the network at typical speeds of up to 250 feet per minute using only two installers, thereby eliminating the high cost and time of large installation crews that would "pull fiber." [2]

The installation of the microduct permanent fiber pathway is the only time that GP incurred and will incur physical disruption to its building for fiber-related projects. Once the microduct fiber pathway was installed, GP chose to blow or jet singlemode riser and plenum jetted microcables primarily in 6 to 24 fiber counts.

Now that GP's continually reusable jetted fiber pathway is in place, upgrades, MACs, and fiber path rerouting (via microduct distribution boxes) are done quickly and easily anywhere and at any time. Fiber termination is typically done in the same way as a conventional backbone. Because air-jetting microcables in and out of the network can be done quickly (250 feet per minute) in near real-time, there is no end to the fiber and bandwidth life cycles. Some of the many benefits that most attracted GP to install the jetted fiber backbone include:

- Since fiber jetting is done behind the scenes in a closet or telecom room (TR), there is no physical disruption to the GP building
- No large construction work with a crew of installers accessing floors and ceilings
- Elimination of vetting large crews for physical and cyber security
- No odd over-time 5:00 p.m. to 4:00 a.m. fiber installations, upgrades, or MACs
- Elimination of any and all over-time labor hours
- Optical fiber installations, upgrades, and MACs accomplished in a fraction of the time and cost when compared to conventional cable pulling
- Complete, continuous, and near real-time control of optical fiber and bandwidth

With jetted fiber technology, fiber installations, MACs, and pathway rerouting can be done during normal business hours discreetly out of view of employees and visitors to GP headquarters, while preserving the aesthetic beauty of its renovations.

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An internet of things (IoT) network platform solution was selected as the cornerstone of the building's IoT foundation. Because it is easy to install, the solution also significantly reduced cost and workplace disruption. The solution allows wide scale sensors and deployment that is capturing data across the floorspace and using it for a variety of integrated applications with lighting, HVAC, Audio/ Visual, room scheduling and motorized shading systems (Figure 4).

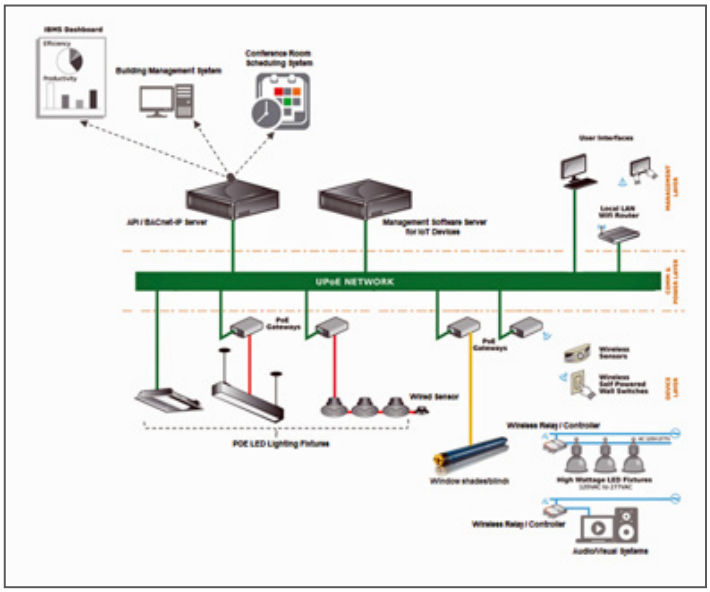

FIGURE 4:Network topology of GP's IoT and PoE-enabled integrated platform.

Power over Ethernet (PoE) is an integral part of GP's network platform. ANSI/BICSI 007-2017, *Information Communication Technology Design and Implementation Practices for Intelligent Buildings and Premises* covers PoE in detail with applicable IEEE 802.3 PoE specifications and should be followed.

Together with GP's information technology teams, work was done to ensure technology was applied to make working in the new environment highly productive. From individual work tools to the equipment used in collaborative spaces, technology greatly improved to accommodate streamlined connectivity and ease of use.

The conference room AV was significantly upgraded to share content in the room, allow remote employees to participate as if they were in the room and support video conferencing in all meeting spaces. This was done using a common AV interface for all room sizes (Huddle to Training Room), so employees only had one thing to learn in order to operate the AV. The AV equipment interfaces with the integrated network system using a relay. This relay is installed on the electrical circuit and communicates with the integrated system over a sub-GHz wireless protocol. This same relay is also used for controlling LED lighting fixtures that are powered over line voltage (Figure 5).

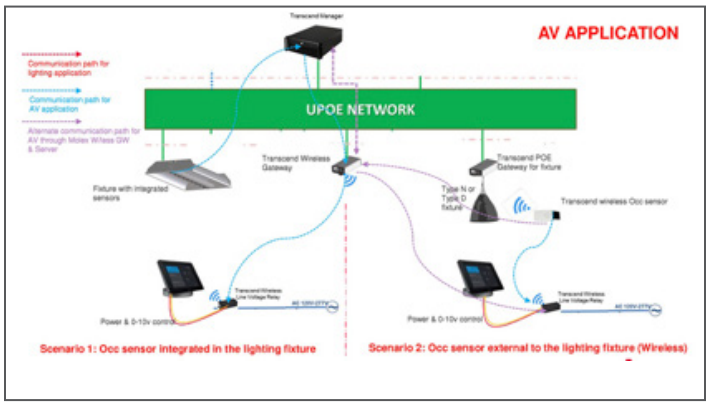

FIGURE 5: Diagram showing the connectivity and communication path for GP's AV application.

The AV and WAPs are connected with Cat 6A, while the PoE lighting is connected with Cat 5e UTP that is designed specifically for high power network applications.

Some of the features of the AV system include meeting software for business teams and state-of-the-art wireless presentation capability. The scale changes with room size (Figure 6).

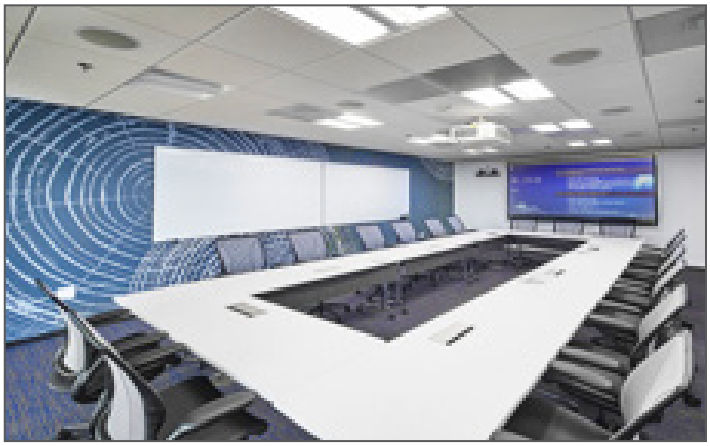

FIGURE 6: Updated conference room space.

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BIOLOGY BEHIND DIGITIZATION

BlueSky features a state-of-the-art network connected lighting system that addressed the typical lighting needs of the project. The lighting system is managed by centrally located software that is continuously fed data from the array of sensors in the building (Figure 7).

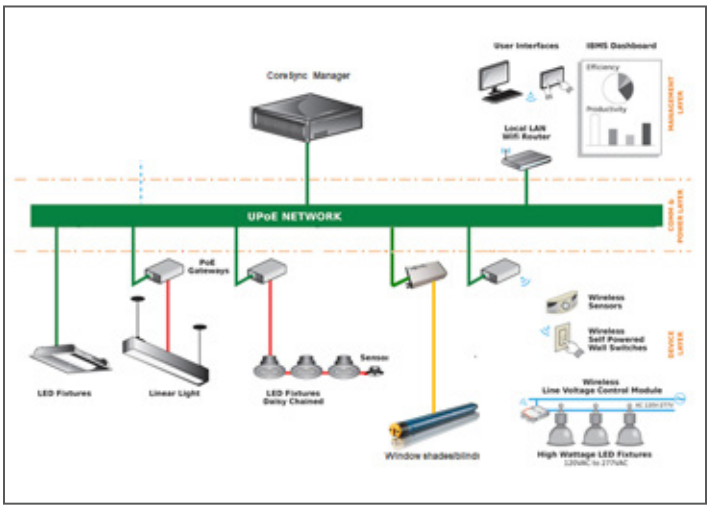

FIGURE 7: Network topology of GP's lighting platform.

The system utilizes PoE gateways connected to a PoE network switch to transmit IP-PoE power and communication to a variety of operational technology (OT) devices, such as LED lighting fixtures, sensors, motorized shades, and relay/actuators.

FIGURE 8: PoE LED lighting fixture with integrated sensors.

Lighting over IP, being ubiquitous in the building, automatically means the supporting network infrastructure is already available throughout the floorspace. This allowed GP to deploy a variety of sensors on this IoT network. The project utilizes sensors that detect occupancy, vacancy, ambient light levels, lighting fixture power readouts, temperature and humidity from the different types of spaces (e.g., open office, conference rooms, breakouts, hallways). The sensors are in some cases embedded into the fixtures utilizing the Category cabling already used for the light fixtures and do not need to be wired or installed individually (Figure 8). Standalone sensors (outside of the lighting fixture) utilize wireless communication and energy harvesting and does not require any point-to-point power and communications cabling for these units.

This additional network infrastructure was blended-in beautifully into the environment to appear non-intrusive yet providing wide scale coverage of different areas in the building.

Enhancing employee productivity was one of the central motives of the extensive renovations; therefore a lot of different aspects of a productive workspace were considered. Lighting is one of the important factors in defining the ambience (Figure 9). Existing research documents good evidence of an association between lighting and work performance, mediated by employee well-being.

Studies also suggest that while lighting independently is unlikely to have a strong effect on performance, it is one of several major factors that combine to create healthy work environments that in turn help promote employee engagement, well-being and productivity.

Areas where employees are expected to spend most of their working hours, for example, are in open office desk spaces that get bio-dynamic and circadian lighting. Incorporating circadian lighting not only offers a viable alternative to natural light, but it also positively impacts the overall health and happiness in an office.

The system pushes lighting scenes appropriated for the demand and application based either on schedule, sensor input, local control or a combination of these. The idea is to have a lighting system that is non-intrusive, intuitive and simple to use, which has been successfully deployed and enhances the wellness aspect of the space. Beyond lighting applications, sensor data is shared with other building and office automation systems. Using the same sensor for multiple applications has reduced the overall hardware device footprint in the building.

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For example, an occupancy sensor integrated into the light fixture acts on the light as expected, while sharing this status change with:

1. AV systems through a wireless relay to turn on systems based on presence
2. HVAC systems to indicate presence in a certain zone and adjust airflow
3. Room conference scheduling systems to validate scheduled meeting bookings with the occupancy indication

The above application in BlueSky reduces four physical sensors to one.

FIGURE 9: Architectural PoE LED luminaires.

ENJOYING THE SHADE

The integrated IoT system, a digital infrastructure, was designed to support scalability and simplified integration of smart, automated, and connected systems now and in the future. This IoT solution helped to address any challenges of designing for cost-effectiveness and energy efficiency.

With this infrastructure already in place, it is easy and cost-efficient for GP to add low-voltage Category cables to power low-voltage motorized shades. These shades come with multiple positives. Located in premier meeting room locations, integrated systems can automatically start the AV, dim the lights, lower the shades, and then reverse them when AV is not being used. Additional benefits include the ability to provide DC power via the same Category cables and to control the shades using the same system in place for managing the building's dynamic lighting. Scheduling, occupancy, and daylight sensors now provide fully automated shade control that minimizes heat build-up and eliminates glare, reinforcing the smart, adaptive nature of the building.

This solution, which was easy to install, also dramatically reduced cost and workplace disruption. The only costs are the additional components necessary for expanding this application. Leading window and shade manufacturers covering the market have already adopted PoE technology for their motorized shades, offering a wide array of options.

The PoE powered and controlled shades maximize energy savings and employee comfort. These allow natural light to enter the room while controlling unwanted, uncomfortable glare. Heating and cooling cost savings can be substantial, and employee productivity improved with the right daylighting control strategy.

GP'S SUCCESS FACTORS

To highlight some non-core infrastructure technology related success factors, GP implemented a suite of integrated cloud-based software solutions to enhance employee productivity and collaboration in the new work space. Key capabilities include Office 365, digital signage, room scheduling, and mobile printing. These capabilities have been a key enabler to support the new way of working.

In addition to new technology infrastructure and software, a key success factor was increasing technology awareness, training and support services. GP's Working Smarter Program was rolled out to provide on-going training and awareness of the company's collaboration and productivity tools. To enhance day-to-day technology support, a new walk-up Tech Bar was launched where employees can quickly get support with basic technology questions and concerns.

Additionally, the office itself now has a "free address" approach, which means the majority of employees are not limited to an assigned workspace but instead has an assigned neighborhood to work in on their team's floor. This allows them to choose the type of environment they use during the day based on the type of work they are doing (Figure 10). Unassigned versus assigned seating varies depending on business needs and functions. Overall, there are fewer private offices, more spaces for private conversation and collaboration, and conference spaces equipped with consistent technology.

FIGURE 10: Mobile work space example.

Thanks to the new floor plan, employees will be more productive, creative and innovative. The spaces allow for multiple types of collaboration (Figure 11) and make knowledge sharing much easier and more natural. Moreover, free address allows for more efficient use of working spaces—no more empty offices or workspaces assigned to a single person who may be out of the office. There is more usable space per person than before, while consuming fewer floors of the GP Center and freeing up those spaces for growth or future outside tenants.

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FIGURE 11: Café/Open workspace for collaboration.

And grow it intends to do. Leadership at GP notes that this updated workspace will directly impact the company's continued growth. The design and furnishings will allow them to add people to the team—whether it is through natural expansion or through potential future acquisitions—and easily engross them into workspaces. Current employees can be proud of the modern space, encouraging them to help recruit people and engage new hires in the office culture. This strengthens the company's ability to attract and retain talent, and it improves productivity through better collaboration, teamwork, and knowledge sharing.

MOVING—AND WORKING—FORWARD

Though only time will tell how well the renovation solution for BlueSky met the goals set out by the project team, all of the pieces are in place to have a forward business trajectory. Engaged and energized employees are the single most important driver of long-term success and value creation for GP. Leadership believes the company will be more productive, creative and innovative in the open environment by giving employees multiple workspace options every day. The improvements should also strengthen the company's ability to attract and retain talented people now and in the future.

Furthermore, GP now has the bandwidth, tools, and technology to grow without disruption in the future and to eliminate waste through the replacements of outdated heating, air conditioning and lighting. The consumption of energy, water and space is expected to continue to decline, thereby reducing operating costs and freeing up those resources for other uses.

REFERENCES

1. Figure 2 is used with permission from Dura-Line. ©2019 Dura-Line. All rights reserved.
2. Figure 3, ibid.

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