CASE STUDY

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BendBroadband Breaks New Ground as Oregon's Greenest Tier III Colocation Data Center

A seed was planted in the Central Oregon town of Bend … a "POD," really. Relying on sunlight, water and even wind, this seed took root among the region's cool desert climate in early 2011 and broke new ground as the greenest of its kind in all of Oregon. This was the beginning of the BendBroadband Vault.

bendbroadband™ Vault a GREEN Data Center

In an effort to build the greenest colocation facility in Oregon, the BendBroadband Vault deployed CPI Passive Cooling® and heat isolation by installing the F-Series TeraFrame® Cabinet System with Vertical Exhaust Ducts.

Already an innovator of cable, phone and internet services, BendBroadband wanted to diversify its services even further with a colocation data center that provided more than just a local option – it would be one of the most sustainable, reliable and secure colocation facilities in the entire state. BendBroadband put together an ambitious plan for the Vault, one that relied on a "free cooling" wheel, renewable energy sources, carbon credits and a range of cooling, cabinet and security solutions from Chatsworth Products (CPI). A challenge for any company with experience in managing data centers, BendBroadband flourished in its first attempt and became the West Coast's only colocation data center to achieve Uptime Institute™ Tier III certification in Design and Facility.

BendBroadband also became LEED® Gold certified by the U.S. Green Building Council, making it only one of five data centers in the entire world to acquire two of the industry's most prestigious honors.

BendBroadband is leading the way by building a colocation center that other cable companies are only dreaming about.

The Vault's legacy will be about more than illustrating business models or laying out diversified revenue streams for other cable companies to follow. By incorporating a design with numerous redundancies in power and security, as well as the usage of renewable energy sources, CPI Passive Cooling® solutions and a power usage effectiveness (PUE) as low as 1.2, the BendBroadband Vault has redefined the term "green."

Opening the Vault

Solutions Provided by Chatsworth Products, Inc.

- CPI Passive Cooling®
- Aisle Containment products
- F-Series TeraFrame® Cabinets installed with Vertical Exhaust Ducts
- Staggered deployment to ease construction
- Cabinet security systems to ensure HIPAA compliance

Two of the largest KyotoCooling® wheels in North America were installed at the Vault. Combined with CPI cabinets, they offer free cooling and a PUE as low as 1.2.

Containing the Cost

Today's colocation facilities are designed with one underlying goal – keep energy costs down. Each data center might go down a different path to get there, but at the heart of any plan that minimizes energy consumption and cost is an effort to reduce workloads for computer room air conditioning (CRAC) units.

What sets the Vault apart is how far the designers were willing to go. Relying on the principle that isolating cold air from heated air is the most economical way to regulate server room temperatures and reduce CRAC usage, BendBroadband turned to a combination of CPI's Passive Cooling solutions and KyotoCooling®. The result? A colocation facility with a PUE of 1.2.

"First and foremost we are trying to save dollars," says Bob Mobach, Practice Director of Data Center Consulting with Logicalis and lead designer for the Vault project. "Your costs of energy and your transport costs for a data center are two things you just don't have control of. We all know energy is going up. The rising needs of data centers worldwide are so great that these energy costs are just going to become mind boggling at some point."

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To stay ahead of those projected costs, the Vault was designed to utilize its geographical position in the Pacific Northwest's cooler high-desert climate by investing in the KyotoCooling system. By deploying a Rotary Heat Exchanger wheel as its cooling solution, Kyoto would use the cooler temperatures outside to "free cool" the data center – all without the use of mechanical refrigeration.

Despite all the projected savings and hopes that KyotoCooling would be able to free cool the Vault for up to 75 percent of the year, the solution was only halfway complete. Without a separation of chilled air and heated return air happening at the cabinet level, the wheel's true effectiveness would fall short.

Vertical Exhaust Ducts direct heated return air into the plenum space, which isolates hot and cold air to create a containment solution that increases efficiency of both KyotoCooling® and traditional cooling systems.

"In order to make a Kyoto system efficient, you have to do some sort of heat recovery," says Mobach. "Cool air all comes directly from KyotoCooling and into the front. You contain the hot air, trap the hot air, and you get much more efficient cooling."

Having already seen the State of Montana's large scale installation of cabinets using CPI's Vertical Exhaust Duct, which utilizes passive cooling to

direct warm air from the back of the cabinet and send it directly into the plenum space, Mobach knew of at least one cabinet solution that used no power and worked to a PUE of 1.1.

"Various manufacturers have fan-based systems that often fight with the nature of the server," says Mobach. "So something natural was foremost in our minds when we did the design. And Chatsworth built just that. We knew that Chatsworth manufactured these cabinets that have a passive heat rejection system. We can pump as much air through these cabinets as we want– so very efficient, no moving parts, nothing to worry about and a quality manufactured product that was very easy for us to deploy."

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Piecing Together the POD

While creating an environment where heat could be captured and contained was part of the Vault's overall energy saving plan, a few more steps still needed to be made in the room's layout before those savings would trickle down to customers. As a colocation facility, the Vault would need to house varying business sizes in a wide range of cabinet configurations and sizes, which typically means higher costs to smaller businesses that have to pay for additional space to help balance out energy consumption.

"We were still kind of struggling during the design with what to do with a customer that has traditional storage, front-to-back cooling and storage arrays," says Mobach. "In order to mitigate that we worked with Chatsworth in developing what we call the POD – a performance optimized data center. We designed a POD where the configuration is flexible and they have a central passive heat rejection into the return plenum."

To create the flexibility and security needed in a colocation facility, the Vault implemented the use of performance optimized data centers, also known as PODs.

Using CPI's passive cooling system within the PODs helped balance energy usage, eliminate hot spots and allowed companies to mix and match equipment as needed.

"We can have a customer that has a 20-kilowatt cabinet and the next cabinet may have 2-kilowatts and it doesn't matter," says Mobach. "The air volume is large enough that we've proven in CFD modeling that it is completely flexible. So what it allows customers to do is to have high density and low density environments side by side. So a customer, in essence, needs less space here and that eventually drives down the cost for them to co-locate their equipment. In the colocation business, price is everything. They have to be able to sell the space."

As a company that specializes in manufacturing customized products, CPI was able to develop a POD design that satisfied both containment and security needs, complete with cabinets, vertical exhaust ducts and cable runway – all in a color scheme tailored to BendBroadband's specifications.

"We took that concept, worked with Chatsworth and they showed us that they could actually make these custom PODs in white, but we took it one step

further," says Mobach. "If we are going to spend this amount of energy in making this a showcase facility, then we wanted our overhead ladder rack infrastructure in white to match everything up. Chatsworth worked with us on that. We put it all together in the early stages of designs and it all came out flawlessly in the end."

The decision to go with white cabinets over a more traditional black design was one of both aesthetics and functionality. Planned from the start as a showcase facility for security, energy efficiency and design, the white room reflected both light and a high tech appearance.

There is a practicality as well. Technicians have found that the reflective surface makes it easier to see and work inside the cabinet, and some testing has suggested a potential for energy savings.

"White is a reflective material so it helps us reject the heat better," says Mobach. "We've done a lot of CFD modeling before deployment and it definitely shows that in the higher return temperatures white was very efficient. It is a serious reduction in our energy bills, not just because of the white infrastructure, but it does help in reducing the light costs in the data center."

The Vault's white design was one of many components that CPI would need to customize but it was a personalized logistics plan that proved to be the most critical. Having laid out the plans and attributes of a truly sustainable facility, the Vault was also under a time crunch. To bring all the pieces together, CPI coordinated with Logicalis and BendBroadband to ensure that each element was available to construction teams as the need arose, rather than too soon or too early.

"We looked at various manufacturers around the United States and they just couldn't make it happen," says Mobach. "This facility coming out of the ground within six months obviously needed the speed of deployment, including a customized POD design, cabinets, overhead infrastructure that all needed to land to the jobsite on time. At times we had 150-plus workers here in the

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CPI used custom solutions such as white CPI Cable Runway and Cable Management to ensure the Vault's aesthetics would match those of a display facility with a high tech appearance.

facility, so staggering these guys in an area that is so rich and complex with technology like a data center made it very difficult. The ability for us to work with Chatsworth to land these products here at the time we needed them and exactly when we needed them was really well done and really contributed to the success of our construction."

'LEED®ing' the Way

The pieces were coming together – CPI's customized PODs and passive cooling solutions were in place and the KyotoCooling wheel was promising free cooling for 75 percent of the year. For most new data centers this would have been enough to satisfy any overarching green initiatives or plans to reduce energy costs, but the Vault wasn't designed to be like most. Instead of contributing to a trend that shows data centers consume as much as 2.2 percent of the nation's energy, BendBroadband worked on a plan that would all but zero out its carbon footprint.

BendBroadband is part of a program called Blue Sky, where 100 percent of the energy it buys for the facility is hydro or wind based. The company also purchased carbon credits to offset the electricity it was using. BendBroadband is basically a zero carbon facility, and it prides itself on its green data center.

In addition to becoming Energy Star Certified and LEED® Gold certified, the Vault strengthened its green reputation with elements such as its own 152kW solar array, the use of recycled building materials and LED lighting.

"To do the environmentally conscious thing, to be socially responsible in this day and age is more than just being hip – it is a necessity," says Mobach.

Taking in the Vault's extensive green efforts and clean aesthetic design, it is easy to overlook many of the technological advances and redundancies that led to its Tier III certification.

The Vault's long list of green initiatives includes carbon credits, recycled building materials and the exclusive use of renewable energy from the local utility company, as well a 152 kW solar array located on the facility's roof.

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The Vault not only has the option of solar power, it can also employ multiple backup generators with 4.5 megawatts of capacity and 17,000 gallons of onsite fuel storage – enough for nearly a week and a half.

Securing the Anchor

Minimizing energy consumption was a cornerstone of the Vault's design from the beginning, however, it was one company's need for a highly-secure and heavily-monitored colocation space that got the entire project in motion.

The Saint Charles Medical System, which operates several hospitals in Oregon, was faced with either making the large investment of building its own data center or finding a colocation facility with an advanced security system that would satisfy HIPAA requirements.

"With the hospital's need and us having the inclination – that catalyzed it," says Weitman. "We knew then that we had a significant anchor tenant to move forward."

Having supplied security solutions for health systems in the past, most recently for one of Orlando Health's data centers in Orlando, Fla., CPI was poised to deliver peace of mind early into the process with its line of digital security products and locking cabinet systems.

"The uniqueness of the cabinets is that they are ultra secure," says Mobach. "Working with Chatsworth on having the cabinets equipped with electronic access (Electronic Locking System) on the front and back, we have our customers use a badge not only into the facility but into the data hall and into the cabinet. Everything is set up through a central badge system. When a customer does their audits for HIPAA, we have an automated trail allowing us to give each of our customers an audit trail driven by picture, video and a complete printout of who was at what cabinet, at what time and how long the doors were open. It just takes the complete ambiguity out of a security audit."

Open for Business

Teaming up to make this dream a reality took three primary elements: BendBroadband's idea for a showcase facility, a well-thought out design from Logicalis and CPI's ability to deliver customized products exactly when they were needed.

"From a professional perspective, I have worked with Chatsworth Products for over 15 years now," says Mobach. "I've seen the company evolve. I've seen the products evolve. The ability to work with your organization and to have the local support and guidance to help us throughout the design phase with solutions that could be directly relayed back to engineering – having that interface and support was critical, especially with the timelines we were under."

From start to finish, the 30,000-square-foot BendBroadband vault was completed in just six months and opened for business in April.

About Chatsworth Products

Chatsworth Products (CPI) is a global manufacturer providing voice, data and security products and service solutions that optimize, store and secure technology equipment. CPI Products offer innovation, configurability, quality and value with a breadth of integrated system components, covering virtually all physical layer needs. Unequalled customer service and technical support, as well as a global network of industry-leading distributors, assures customers that CPI is dedicated to delivering products and services designed to meet their needs. Headquartered in the US, CPI operates global offices within the US, Mexico, Canada, China, the Middle East and the United Kingdom. (www.chatsworth.com)

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