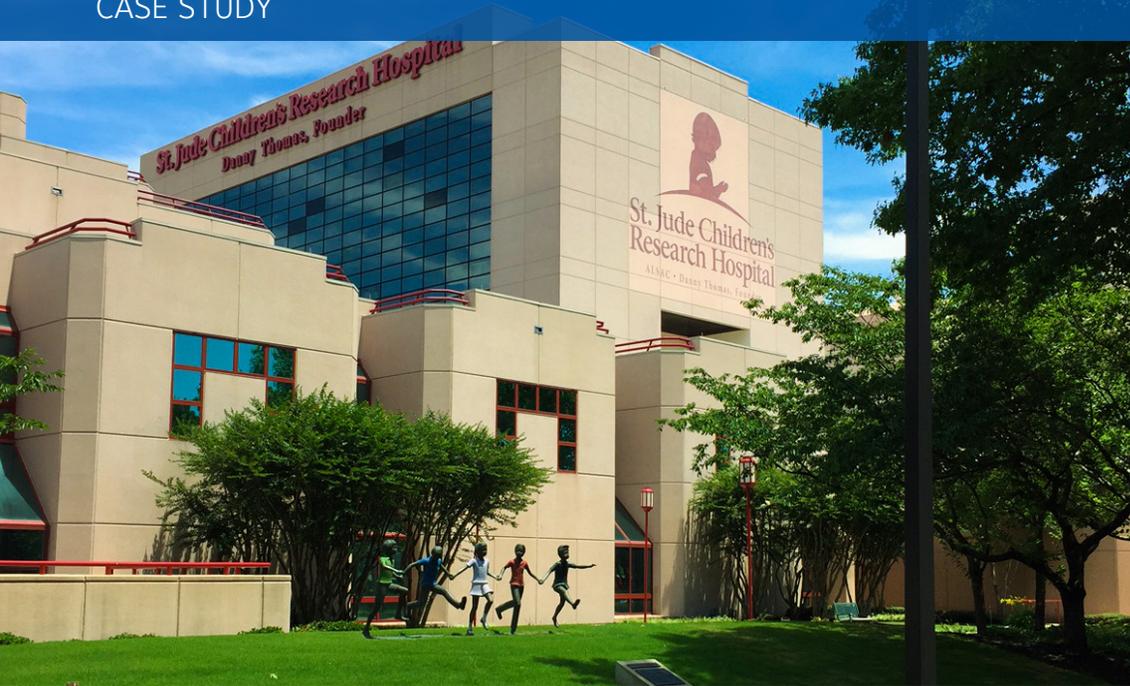


St. Jude Children's Research Hospital

CASE STUDY



AT-A-GLANCE :
St. Jude Children's Research Hospital
Memphis, TN

PROJECT HIGHLIGHTS:

- Web-based access to data & reporting
- Lifetime HVAC system commissioning, fault detection, and diagnostics
- System-wide evaluation VS individual alarms
- Real-time commissioning
- Energy efficiency analysis based on operation sequence
- Tailored – daily, weekly, monthly energy usage reports
- Historical repository for all needed data
- Compliance Reports – quickly identify, prioritize problems
- Custom data queries with FPi Rules
- Root-Cause Analysis to find problem source

Providing a Better View of Facility Performance

St. Jude Children's Research Hospital is leading the way the world understands, treats and defeats childhood cancer and other life-threatening diseases. The hospital's mission is to advance cures, and means of prevention, for pediatric catastrophic diseases through research and treatment. Approximately 7,800 patients from all 50 states and around the world are treated at St. Jude each year.

The St. Jude campus comprises 66 acres with more than 5-million-square-feet of building space, over half of which is dedicated to research. Operating and maintaining these facilities is a daunting challenge. Not to mention the challenges associated with monitoring and optimizing the performance of the countless pieces of HVAC equipment within them. And at a cost of \$2.2 million per day to operate the hospital, managing and potentially reducing those costs is critical.

Even more critical is providing a proper environment for healthcare and research, which can be negatively impacted by poor equipment performance. With this in mind, St. Jude challenged Johnson Controls to provide a technology solution that would give its operations team a better view of the performance of HVAC equipment throughout its facilities.

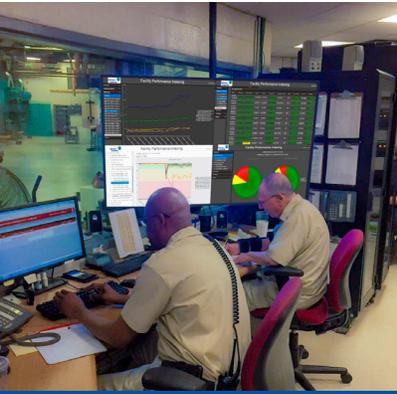
Facility Performance Indexing improves understanding of equipment performance

The solution was the implementation of Facility Performance Indexing (FPi). Johnson Controls designed and developed FPi to detect faults, analyze, and simplify data. FPi adds significant value to facility organizations, in particular the fault detection and diagnostics associated with major systems such as chillers, boilers, air handling units, terminal devices, and all other controlled equipment. FPi provides a practical methodology that facility owners and maintenance personnel can use to gain improved understanding on how their equipment is performing and operating using an intuitive dashboard display.

Detect

FPi uses patented algorithms to continuously detect faults and measures system performance in equipment such as air handlers and chillers, culminating with a measurement of a facility's performance. This continuous condition assessment provides St. Jude's operations team with knowledge to manage the lifecycle and maintenance costs of the equipment more effectively.

And provides the data they need to achieve peak performance, increase reliability, reduce unnecessary maintenance, sustain asset life, and improve lifecycle cost.



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BENEFITS HIGHLIGHTS:

- Simple to use analytics
- Evaluates large quantities of equipment
- Creates proactive, conditioned-based maintenance VS reactive
- Measures repair effectiveness
- Identifies poor-performing systems and the reason for it
- Reduces customer complaints
- Reestablishes equipment baseline performance
- Allows fine-tuning of BAS for energy savings
- Shifts from calendar-based to conditioned-based maintenance
- Simplifies complex data for user, regardless of experience
- Does not have to reside in the "cloud"
- Uses FPI Rules to mine data based on custom queries

Analyze

From the moment a piece of HVAC equipment comes online, FPI creates actionable analytics throughout the equipment's expected life and beyond. It continuously measures and scores the operating characteristics of the equipment connected to the building automation system. The data is stored in a database where performance indices are calculated. Consistent performance parameters are used to provide the operations team with an apples-to-apples comparison of system performance over days, weeks and even months.

Simplify

FPI simplifies the vast amount of data produced by the building automation system, which helps the operations team focus on what's really important. The data is accessed through an easy-to-use web page. An intuitive red (failure), yellow (acceptable), green (optimal) color format is used on the performance web page along with a 0 through 100-based performance index. FPI considers each piece of HVAC equipment to be a system. And instead of the traditional single-point failure alarm, it evaluates the entire control strategy of each individual piece of equipment using benchmarks established over the 17 years of FPI development.

Buildings that work the way they're designed to work

By providing St. Jude's operations staff with a better view of how HVAC equipment is operating, FPI eliminates time-consuming daily data collection while at the same time helping them identify under-performing equipment before failures occur. And because FPI continuously measures performance, it provides immediate feedback to verify the success of any adjustments or repairs they have made.

A host of flexible reporting tools, which can be modified to fit St. Jude's unique needs instead of using canned criteria, mean an even sharper view of overall system performance. Measurement and Verification reporting provides trended information, system runtimes and energy utilization which can be used to support continuous measurement requirements. Fault reporting identifies equipment that consistently performs poorly and Root-Cause reporting identifies those that negatively impact other systems, helping staff to quickly find and fix the real problem. All reports can be customized for the intended user and are emailed daily to promote a proactive versus reactive maintenance strategy.

The result is actionable data that St. Jude's operations staff and Johnson Controls Service personnel can use to drive and focus a condition-based facility maintenance strategy, that ensures all connected equipment is working as it should throughout its lifetime

Facilitating growth and change while leveraging existing assets

For more than 30 years, Johnson Controls has partnered with St. Jude to implement technologies that help create a quality environment and facilitate the hospital's objective to expand its research capabilities. The partnership has resulted in the installation of the Metasys® building automation system, making facilities more cost-effective. In addition to ground-level involvement in campus expansion and building construction, providing technical expertise to help avoid facility and equipment downtime. Not to mention the related expansion of the Metasys® system and integration of numerous HVAC systems and equipment. Plus, an extensive service relationship with St. Jude's Planning, Operations and Construction departments.

The addition of the FPI fault detection, diagnostics, and data analytics tool helps ensure that as St. Jude continues to grow and change, the hospital can get the full benefit of the HVAC equipment that is already in place and minimize the need for new equipment. And armed with better information, the reach and capability of the maintenance staff is extended, enabling them to better achieve peak facility performance.

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