Technology for Snowflakes

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One of the universal truths of the property industry is that every building is unique. They like snowflakes take their own shape, occupy their own space, and react to the world in their own way. Also, like the delicate snowflake, they are constantly in a state of changing, decaying, adapting, or building upon themselves. Unlike snowflakes, buildings are much more than what meets the eye, so they require a lot of work by experts to fully understand their condition. Until now, this has been done through commissioning or retro-commissioning.

The idea of building commissioning has been around for a while and is basically a process of hiring outside engineers to go through and test every part of a building. It comes from the AEC community as a way for new construction to be analyzed, which "ensures that the new building operates initially as the owner intended and that building staff are prepared to operate and maintain its systems and equipment." This idea was quickly adopted by the building management community because, as every building manager knows, after even a short amount of time building systems start to deteriorate and systems change as they are upgraded.

So, the idea of retro-commissioning was born. It has always been considered the realm of building engineers and architects, and is usually sold as a regular report done by a certified third party.

The idea of retro-commissioning is a very useful one but the process by which it is often conducted - as an expensive report done every five to ten years - is antiquated. Buildings do not adhere to any proposed depreciation schedule (as much as accountants would like it to). Buildings are always in a state of flux, like a falling snowflake. Things are breaking, or getting closer to breaking, and systems are constantly being upgraded. In order to do a better job of knowing the state of our buildings, we need to rethink building retro-commissioning. That means making it part of a continuous improvement process and not just a stand-alone event.

BOMA, the Building Owners and Managers Association, seems to have the same idea. They partnered with manufacturing giant Siemens to produce a guide that introduced the idea of monitoring based commissioning. They lay out important techniques for using intelligent infrastructure by stressing "a sophisticated package of software applications that combines building data from a wide variety of sources to better manage a building's performance and efficiency."

I highly recommend this report. One of my favorite parts is the point they make about how every building is unique and therefore needs to have its own, specific diagnosis. Too often an "off-the-shelf" tool is sold to facilities teams and ends up being worthless in practical applications. As the report so succinctly puts it, "the many diagnostic algorithms must be continually tested and improved upon, rather than developed and tested in sterile lab environments."

This is more achievable than ever since the increase of data collected by buildings and the advances in computing have made it easier (and cheaper) than ever to customize algorithms that optimize a building's performance.

Since they are snowflakes, learning what a building needs to perform at its peak requires a couple of things.

- First, you must have a definitive understanding of peak performance. For some managers, this might mean maximum comfort for the occupants. For others, it might have more to do with energy efficiency or longevity of the systems. We think that all three of these things should factor into the equation, each of which has its own trade offs.
- Second, the important data needs to be analyzed by a customized software system to figure out what is keeping the building from its full potential and why.
- Lastly, this analysis should create some real-world suggestions on where to actually turn a wrench. Giving generic suggestions like "upgrade the heating system" is a easy as it is useless. Suggestions need to be prioritized and must help operators make what are often hard decisions about what upgrades are needed.

Hiring a team of experts to retro-commission a building is a useful tool and one that will likely be around for a long time. But we need to start using all of the data at our disposal to be able to continuously examine our buildings in their infinite variety.

Sporadic, one-off reports are not enough to track the constant change going on in something as complicated as a building. Not only can analytics software be much more than a commissioning report, it can also be as little as half of the cost. No longer should building managers need to hire engineers and consultants to understand their building. They should need to look no farther than their computer or their phone to understand the condition of their snowflake.