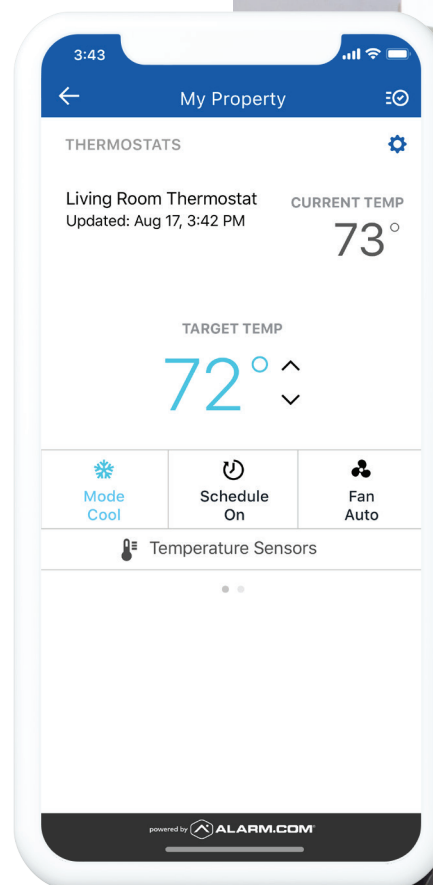


POINTCENTRAL HVAC System Monitoring

HVAC System Monitoring transforms how heating and cooling malfunctions are recognized and dealt with before they become costly repairs or replacements. PointCentral and Building36, both subsidiaries of Alarm.com, are pushing this technology to the forefront of property automation, recognizing its potential to protect vital assets, increase operational efficiency, and reduce financial expenditures. Indeed, this technology will soon become another essential component to the modern smart home; here is everything there is to know about HVAC System Monitoring.



Alert System

HVAC System Monitoring was developed by Building36 to collect and analyze data on household heating, ventilation, and air conditioning.

At its most fundamental principle, these analytics compare the current temperature in the home to the desired or set temperature demanded by the property manager. If there is a large enough discrepancy between the two over a significant period of time, managers receive an alert through the PointCentral app associated with their smart property. PointCentral's alerts may also be sent by email or mobile text message, providing instant notification to users to promptly address their HVAC issues. Some common notifications include:

Small differences between set and actual home temperature

Irregular delays in arriving at a given temperature

Unusual HVAC usage patterns, suggesting user thermostat malpractice

Recurring or seasonal reminders to replace filters and other vital components

Serious temperature differences that suggest system failure and require immediate response

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now

Rental Home: The thermostat reported a potential heating & cooling system failure. Contact XYZ HVAC for service



Property Manager Value Proposition

HVAC System Monitoring is done through Alarm.com's Smart Thermostat. Unlike other thermostats, the Smart Thermostat performs HVAC analysis in addition to the basic temperature setting functionality. Property managers can remotely control the temperature, set temperature schedules, and receive alerts and reports about their HVAC systems through the PointCentral app. In receiving such warnings, property managers increase operational efficiency, protect vital assets, and reconfigure their approach to HVAC repair and customer relations from reactive to proactive.

HVAC System Monitoring reduces operational costs.

HVAC alerts flag minor issues, which can be solved promptly. HVAC analysis also informs property managers of inefficient units in order to prevent accelerated wear-and-tear and "hidden" HVAC failures otherwise unreported by residents. Together, these alerts reduce the frequency of critical HVAC system failures, which often require costly replacements. Additionally, constant monitoring and care increases the lifespan of an HVAC system, meaning less overhead will be spent on new systems over longer periods of time.



HVAC Systems Monitoring facilitates efficient maintenance.

Upon receiving an alert, property managers may schedule repairs themselves or have automatic alerts sent to HVAC specialists who then notify the manager and schedule a repair. HVAC technicians can make repairs quickly with the data collected by the monitoring system, such as when the error began and how severe the temperature discrepancy is.

HVAC Systems Monitoring improves resident satisfaction.

Property managers can detect and fix issues within hours of the alert, often before residents know the system is broken. This allows managers to proactively serve residents and ease the influx of demand for HVAC repairs on the first hot/cold days of the year, when HVAC systems are most likely to fail. Managers can also prevent high energy bills caused by inefficient units, in addition to the energy-saving runtime schedules that can be configured with the Smart Thermostat. Basic HVAC monitoring maintains the standard experience that residents and renters expect. The bottom line is that HVAC Analytics benefits property managers.

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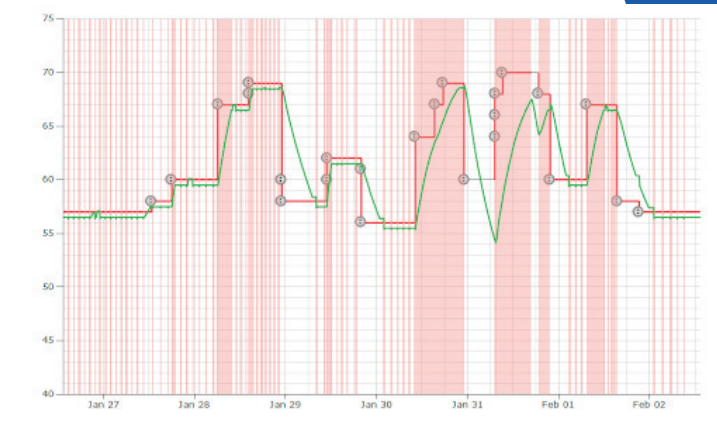
My Property: Humidity reached 65% at 3:42 pm
on Thursday, Aug 17.



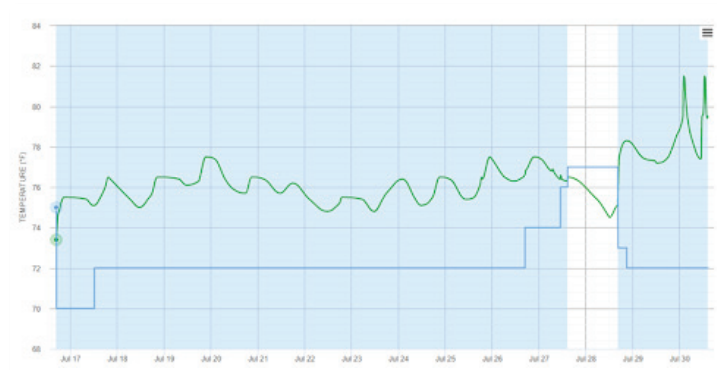
Dealer Features

Graphical Examples From Dealer UI

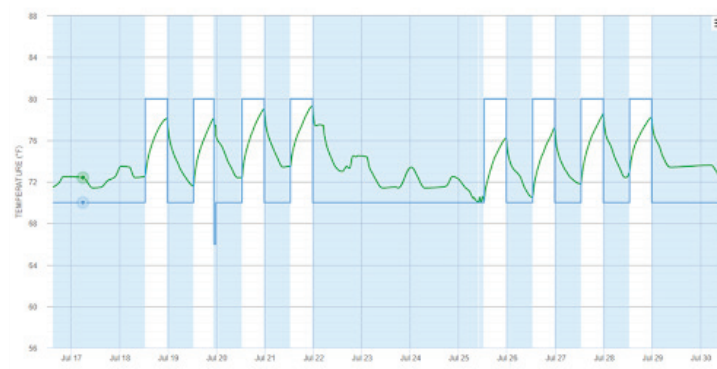
This is what a healthy heating system looks like with HVAC System Monitoring. Note the gradual changes in the temperature in green corresponding with the desired temperature set by the manager in red. The red shading represents the time periods in which the heating programs were run.



This is an HVAC system failure with the desired temperature in blue and system temperature in green. Note how the indoor temperature rises and falls in accordance with daily outdoor temperature fluctuations. The blue shading again represents the time periods in which the cooling programs were run.



This unhealthy system loosely follows the set temperature over lengthy periods of time. Note how the shaded regions take at least half of a day to approach the desired temperatures and at worst over three days. Additionally, the HVAC system in most cases did not achieve the desired temperature, indicating an issue albeit not a total failure with the HVAC system.



Resident Features

HVAC System Health Reports

Monthly system health reports by Building36 present easily digestible, visual information to users. These reports track HVAC consumption from the past month and year-over-year HVAC usage from the same months to notify users of any unusual consumption change.

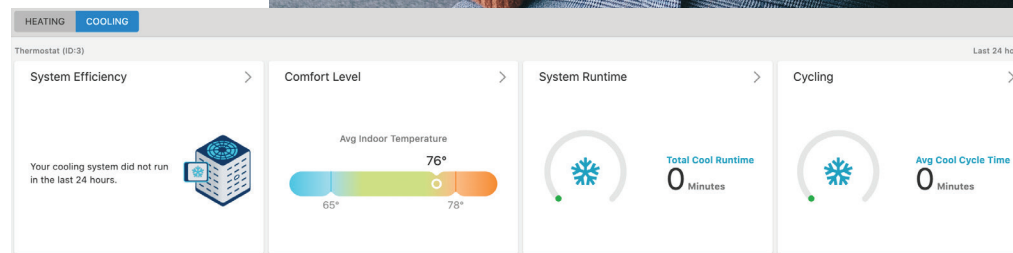
The reports also include average outdoor temperatures for the month, a "report card" of devices that could need battery replacement, and recommendations on heating/cooling schedules based on how long the HVAC takes to complete a cycle. If PointCentral were to implement this monthly reporting system, there would have to be an overarching system to view many pages simultaneously.

Maintenance Reminders

Building36's System Monitoring also includes seasonal HVAC preventative maintenance reminders in the spring and the fall. In scheduling proactive repairs, HVAC systems are less likely to fail on the first hot/cold day of the summer or winter. Building36 partners send these reminders to user's phones as push notifications through the Alarm.com app, which engage users more effectively than email or phone calls. This would work well with the property manager channel as proactive maintenance reduces operational costs.

Customer UI

The HVAC Customer UI presents customers with insight into their HVAC system's performance if they have an Alarm.com Smart Thermostat, a central home thermostat again developed by Building36, installed in their home and linked to their account. The HVAC Customer UI consists of 4 cards that indicate the performance of the HVAC System: System Efficiency, Cycling, System Runtime, and Comfort Level for the Heating & Cooling modes.



Case Studies

Below are case studies detailing how HVAC System Monitoring has improved the experiences of property managers, rental managers, and HVAC contractors.

BH Multi-Family Data

BH Management is a large multi-family housing provider based in the United States. They own thousands of apartment complexes across the country. As a longtime PointCentral customer, BH Management was given a test run of an early HVAC analytics engine. Approximately 3700 of BH Management's HVAC systems were reviewed. 42 systems were identified as potentially broken or not working properly, which is roughly 1% of the surveyed systems.

Most of these malfunctioning systems had gone unnoticed either because residents had not yet complained or failed to understand that their systems were underperforming. In both cases, the HVAC issues significantly increased energy costs and would have posed greater risks for long term damage, requiring replacement. Based on the discrepancies, PointCentral staff suggested steps for the future, such as training for BH's facilities director and managers and integrating with BH's task management system to include HVAC data into relevant maintenance workflows.



Vacation Homes

In January of 2020, a couple who use HVAC System Monitoring were vacationing in Mexico when they received a severe heating alert for their lake house in Speculator, New York. The alert reported that indoor temperatures had dropped below 50 degrees Fahrenheit. The couple immediately requested that an HVAC company inspect the house and a faulty valve was discovered, which had caused the furnace to shut down. Ultimately, the HVAC company replaced the valve and recommended replacing the oil heating system with a propane-based system instead. A week later, the same couple received an HVAC severe heating alert from their beach house in Ocean City, New Jersey. Again, they requested that an HVAC company visit the house and a broken hot surface igniter was discovered and replaced.

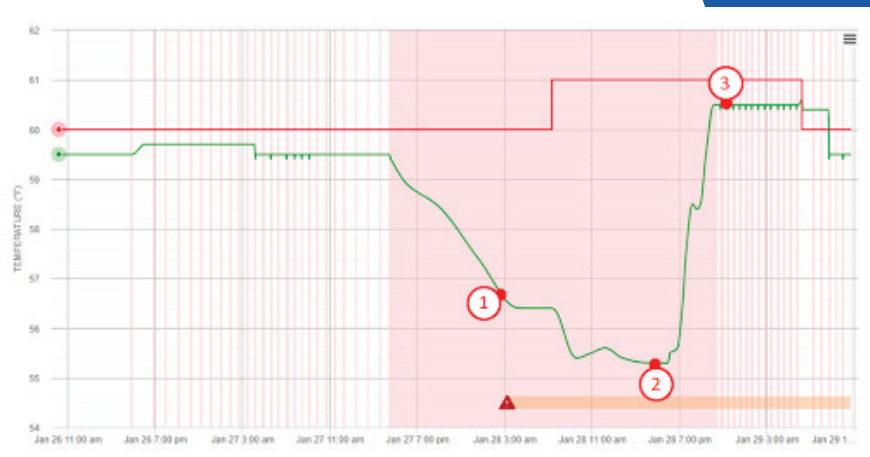
HVAC System Monitoring allowed the couple to resolve critical system malfunctions at their rental properties within a matter of hours, even while traveling internationally. Had these HVAC analytics not been installed in either home, the broken heating systems would have gone unnoticed for months in the vacation offseason. This could have resulted in frozen or leaking pipes which cause significantly expensive water damage and would have ensured negative experiences for future renters. The graphs taken from both vacation homes on the next page highlight HVAC System Monitoring's usefulness in diagnosing and resolving HVAC related issues.



Vacation Homes (cont'd)

BEACH HOUSE

1. HVAC alert sent Tuesday (1/28) morning: "Indoor temperatures dropped to the low 50s - the risk of frozen pipes"
2. HVAC company discovers and replaces faulty hot surface igniter
3. The indoor temperature returns to normal



LAKE HOUSE

1. Initial HVAC alert sent Tuesday (1/21) morning: "Indoor temperatures dropped into the 40s - high risk of frozen pipes"
2. The maintenance team arrives and finds the furnace disabled. They reset the furnace
3. HVAC company arrives to service the furnace
4. Indoor temperature stabilizes and the heating system seemingly returns to normal
5. Another HVAC alert sent early Wednesday morning
6. HVAC company returns to find the furnace disabled again. They discover the faulty valve
7. HVAC company returns to complete replacement of the faulty valve
8. Indoor temperature restabilizes and the heating system returns to normal



Partnering with HVAC Contractors

The Canadian HVAC dealer Enercare has had success leveraging HVAC System Monitoring to enhance their business. The effect HVAC System Monitoring has on Enercare is outlined by Tim M., who is the Director of Smarter Home Solutions at the company:

“Transforming our reactive service model business to a proactive service model was critical to our strategy in enhancing the Enercare customer experience. HVAC analytics has enabled us to deliver a customer experience where customers are notified of a failure before it occurs, ensuring the customer doesn’t go a night without heat or cool.”

