Advanced Thermostats:
What They Offer the Nonresidential Sector

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(In collaboration with NYSERDA)

Components and Features

Advanced Thermostat =

Programmable, Communicable Thermostat

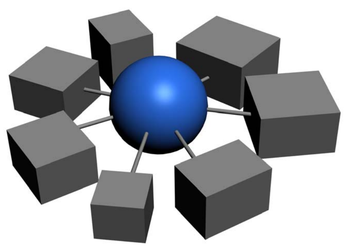
Also known as: web-enabled thermostat, connected thermostat, smart thermostat

Hardware

- At the core, it is a standard programmable thermostat (SPT).
  - –One-to-one replacement of SPT
  - –Not for multi-zone or VAV systems
- More input and output channels
  - –Option to expand system
- Increased power needs
  - –Usually not a problem

Communications

- Thermostat to the world
  - –NOT thermostat to HVAC unit
- Methods: Wi-Fi, Ethernet, mesh networks
- No “best” method



Software

- Mostly cloud based
  - –On the web
  - –Mobile platforms
- Easier to use
- Remote access
  - –“App” interface
- Collect data
  - –Presentation of trends
  - –Alerts

Market Transformation Potential

Fulfill Original Promise of SPTs

- SPTs have been a disappointment.
- ENERGY STAR has suspended labeling.
  - –Lack of usability
  - –Difficulty substantiating savings
- Advanced thermostats are more usable!
  - –Will (hopefully) save the energy that SPTs were supposed to

Massively Increase Data

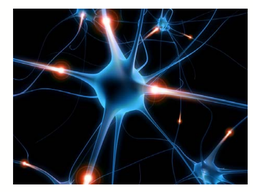
- Collecting, transmitting, recording 24/7
  - –Indoor/outdoor air, binary output controls, etc.
  - –Highly frequent intervals
  - –Never captured systematically before
- Which should lead to . . .
  - –At building: better understanding of your equipment
  - –Industry: better understanding of use patterns/equipment

Change Maintenance Staff Role

- Reduce burden on maintenance staff
  - –Remote investigation/triage/remedies
    - = Less wasted time
    - = Lower cost + more time for other projects
- New business models for HVAC contractor
  - – Greater transparency to unit means cost savings and better, more proactive service

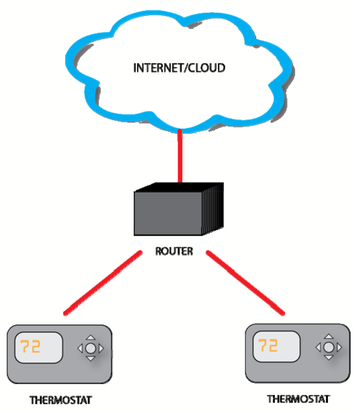
Modular, “Lite” Building Management System

- Thermostat is not just a thermostat
  - –Becomes hub of software-based controls system
- Can control HVAC, lighting, plug load, etc.
- Expansion is modular and piecemeal
- Will not replace full building management system (BMS), but can act as cheaper “down market” substitute
  - –Cost: $750–$1,250/thermostat (including labor)



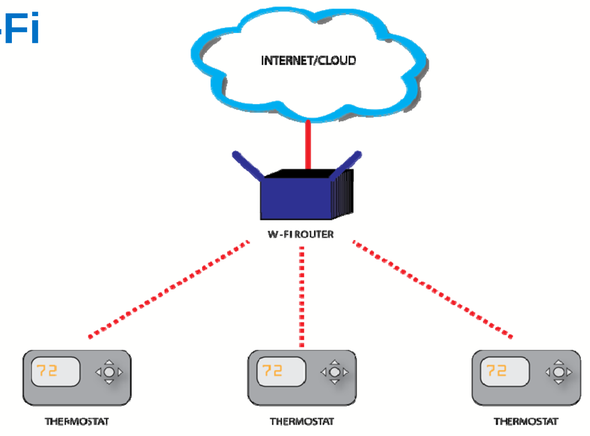
How They Work

Wired



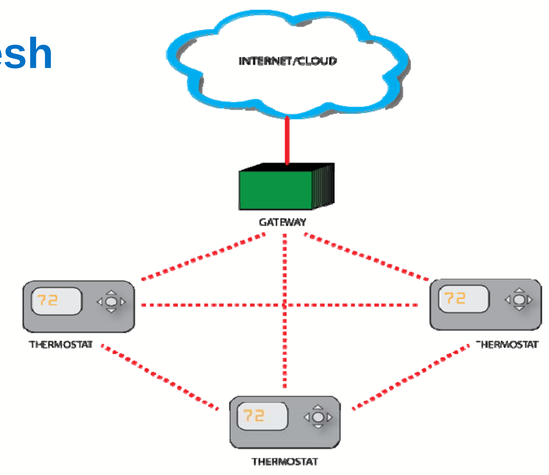
Pros	Cons
No wireless/range/interference issues	Must pull wire (disruptive)
Can be used for power	High first cost
No “maintenance”	

Wi-Fi



Pros	Cons
Easy startup; familiar to end user	2.4 GHz; limited range; traffic issues
Network exists; no “gateway” needed	Security concerns; tenant issues
Bandwidth and data freedom	Must be “maintained”

Mesh



Pros	Cons
Better range than Wi-Fi	Extra hardware: gateway needed
Range is extendable (thermostats/ repeaters)	Minimum and maximum node require-ments
Redundant and reliable	Restricted bandwidth and data freedom

Read more at www.zondits.com