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Temperature Measurement of Server Room

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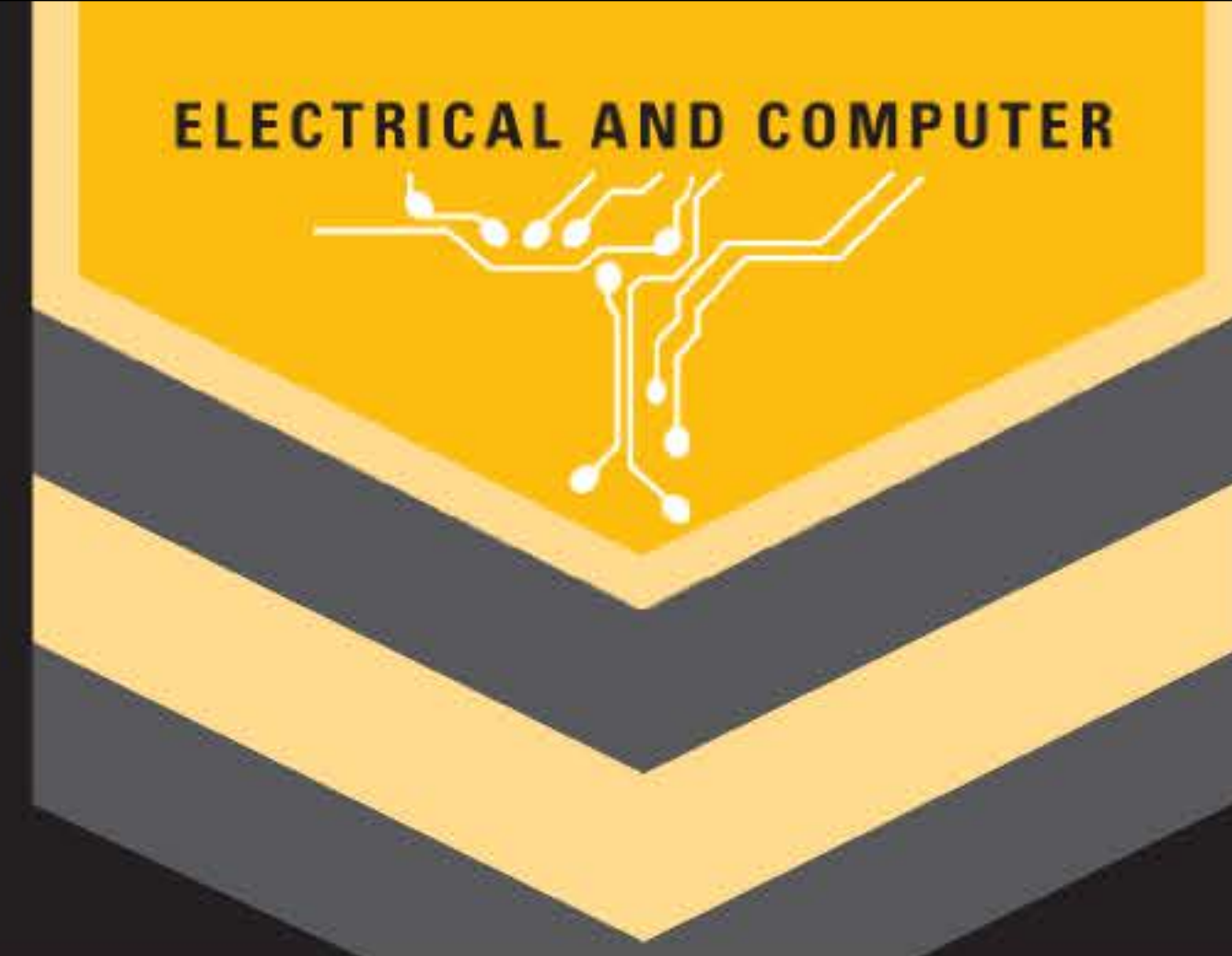
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Temperature Measurement of Server Room



Background

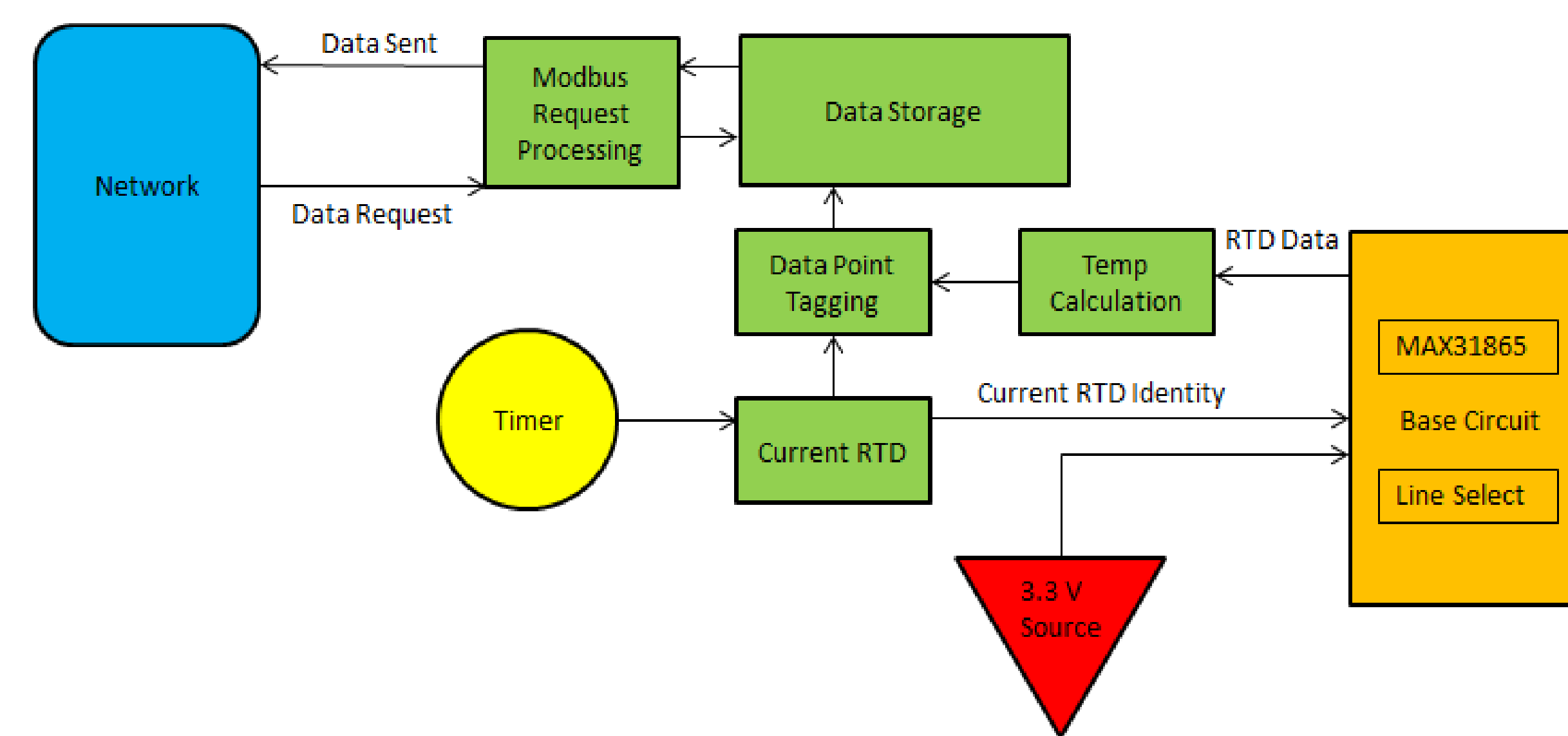
- Data center managers need to carefully monitor the temperature in them. If a server overheats, then the equipment could be damaged and data lost.
- Currently a MAX31865 chip can be used to run up to 8 temperature measurement devices.
- Using more devices would allow more detailed monitoring for isolated hot areas.

Overview

Temperature Monitoring System

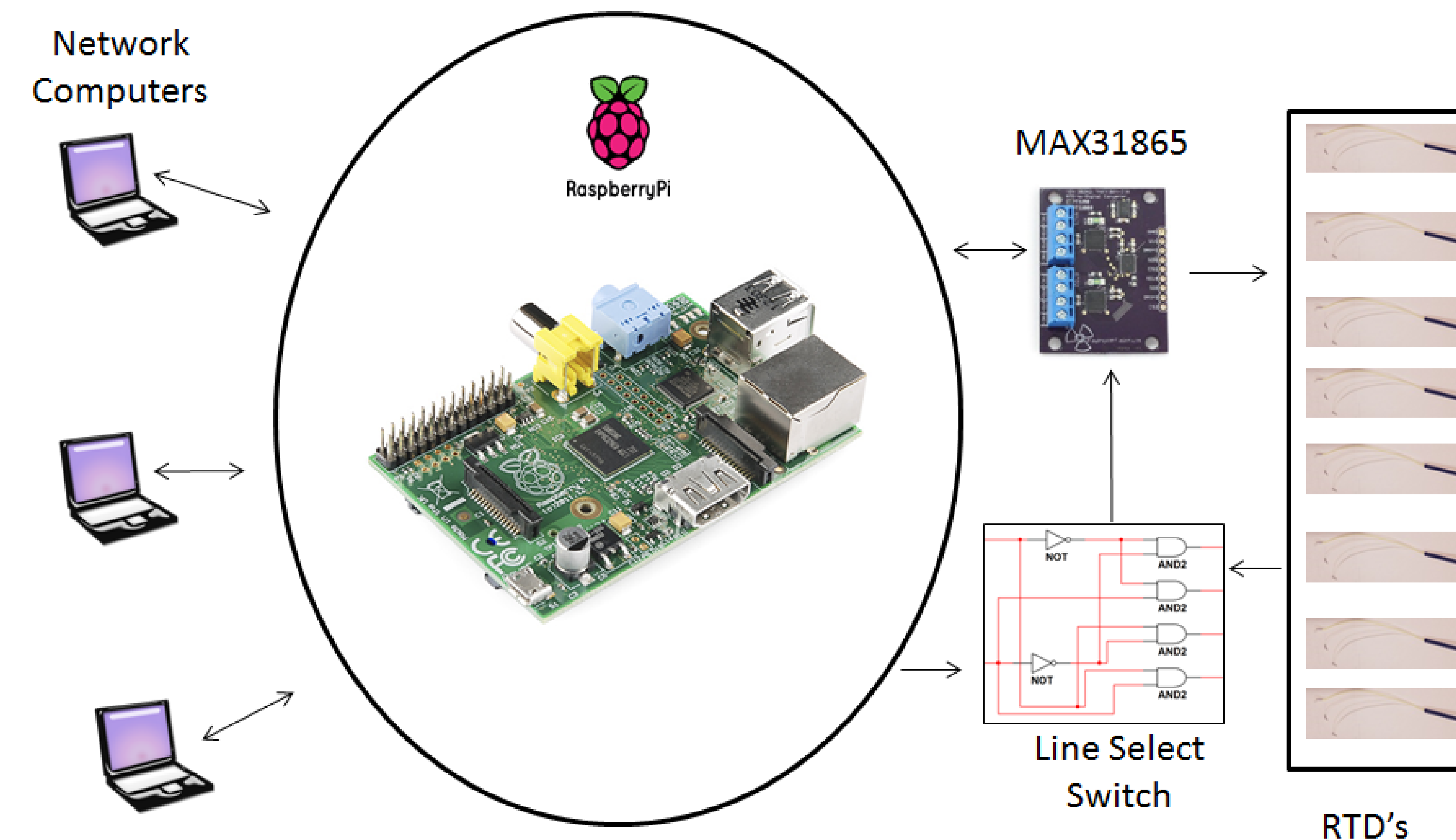
- Connect with up to 64 resistive temperature devices (RTD's).
- Read and store the temperature measurement.
- Allow the measurements to be accessed remotely through a network.

Software



- Changes current RTD number based on the system clock time.
- Sends RTD number to line select circuit
- Activates and reads MAX31865 chip
- Converts RTD readings to temperature
- Tags temperature calculations with RTD number and time
- Establishes Raspberry Pi as server so that the data can be accessed over a network

System Structure



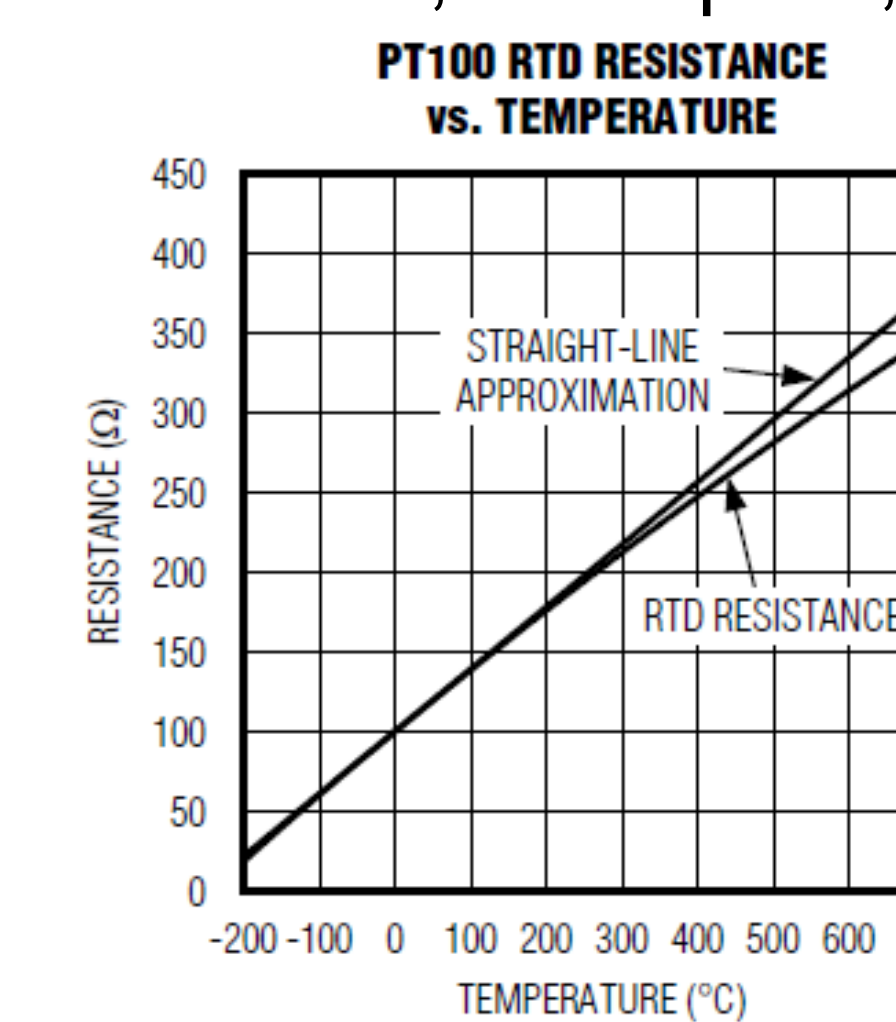
- Control System: Raspberry Pi
 - Current RTD Code
 - Receive Data from MAX31865
 - Data Processing: convert reading to temperature
 - Data Storage
 - Network Server
- Temperature reading: RTDs and MAX31865
- RTD selection circuit
- User Network

Line Select Circuit

- Receives current RTD code from Raspberry Pi
- Circuit logic turns on the relay for the current RTD line

Temperature Reading

- Temperature changes the resistance of the RTD's
- The MAX31865 integrated circuit (IC) reads the resistance of the connected RTD.
- The IC converts the resistance, as a percentage of the reference resistance, to a binary code.
- It then sends this data, on request, to the Raspberry Pi.



Control System

System controlled by a Raspberry Pi computer

- Selects the current RTD being read.
- Receives RTD data from the reader (MAX31865) through SPI communication.
- Calculates temperature from the resistance data.
- Acts as network server to provide access to the data.

Conclusion

- System allows data center temperatures to be monitored more closely.
- Better coverage with more temperature devices.
- Access to data over a network.

