



At a glance...

What they do...

- The company manufacture intelligent glass that moves through 4 different degree of tints and provide continuous and unobstructed view.
- The company installs electro chromic glass window as part of building facades that tints in response to external conditions or can be controlled by users to meet specific needs.
- Their installation at 150+ sites worldwide provides occupants comfort and natural lightning, simultaneously reducing energy consumption of the building.

What bothered them...

- Controllers which tint the windows generate a large number of variable data every 15 seconds throughout the day. The management of such data which is indexed by timestamp (or time series data) is very challenging.
- Over the period of time due to prolong exposure to UV light, the controllers began to degrade. Mining historical data of 150+ sites worldwide to identify faulty controller was the other major challenge.
- Consistent performance of windows was important as that it not only impact occupant comfort but also building energy consumption. Thus regular analyses and identification of performance degrading anomalies was of paramount importance.

What we did...

- Altix built a cloud based distributed infrastructure to manage large volumes of time series data.
- Altix also devised a rich analytic model to mine the large volume of historical and new data on regular basis to identify anomalies.

Value we offered...

- Most effective, secure and scalable data management infrastructure to efficiently manage time series data.
- Cost-savings by avoiding unplanned maintenance.
- Enhanced end customer experience by enabling predictive maintenance and lower downtime.
- Additional revenue opportunity as new infrastructure that can be scaled and integrated with existing and/or new Smart Office or Home infrastructure management system.



About the Client

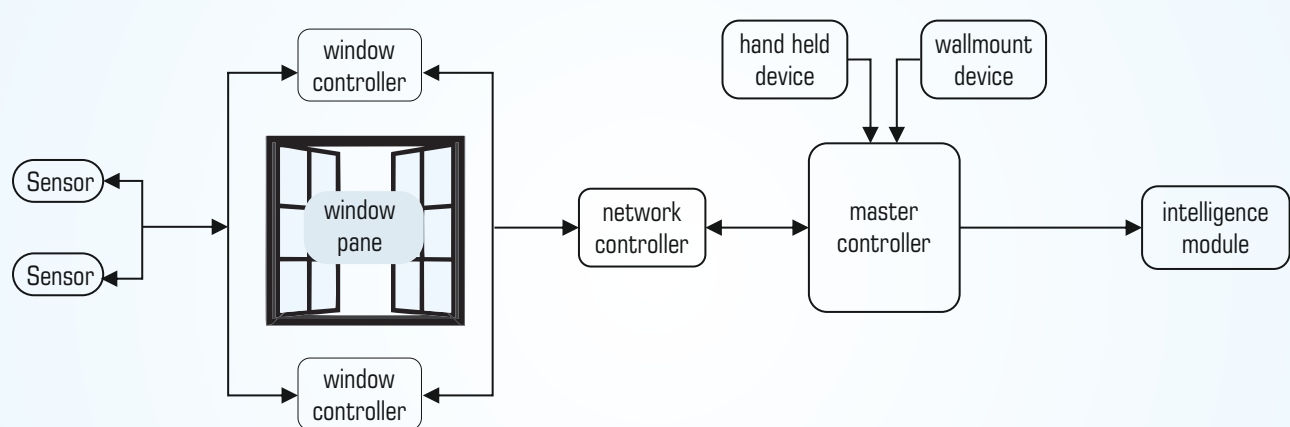
A Smart Glass Company which manufactures dynamic glass that intelligently adjusts its tint in response to external conditions and/or user preferences. This enables control over the amount of light and heat that enters a building thereby reducing energy consumption while providing comfort and natural light.

- The dynamic glass tints electronically to control the sunlight and provide smart control of the window.
- Thousands of such glass windows are installed at more than 150+ sites worldwide.
- The tinting of the glass is managed by complex infrastructure of controllers which continuously monitor change in external factors, e.g. sunlight, or user preference.



How it works

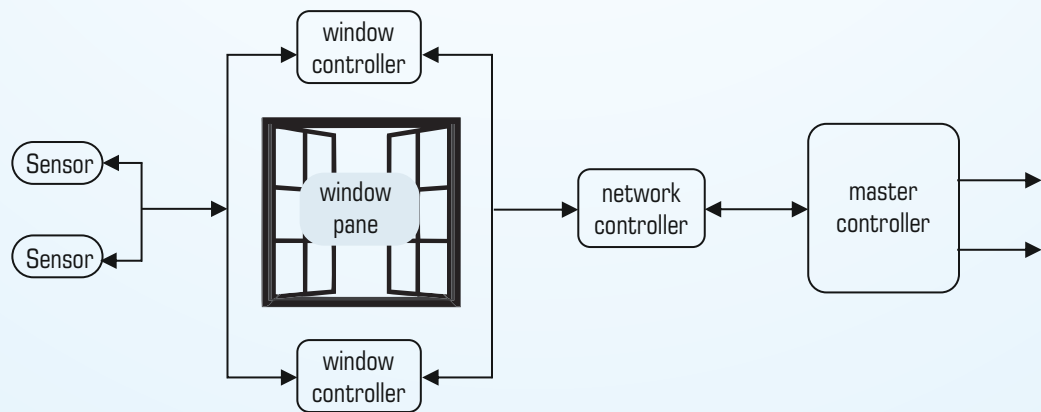
- The window panes are controlled by window controllers (WC) which in turn are controlled by Master controllers (MC) through Network Controller (NC) in between them.
- MC records data sets (external factors or user preference) every 15 seconds.
- Based on these data, MC interfaces with Intelligence module to set appropriate current and voltage which tints the glass..



Challenges

1. Large volume of data is generated by real-time decision support system comprising of Window controller, Network Controller, Master controller. This data is recorded every 15 seconds.

The challenge was to manage such large volume of data.

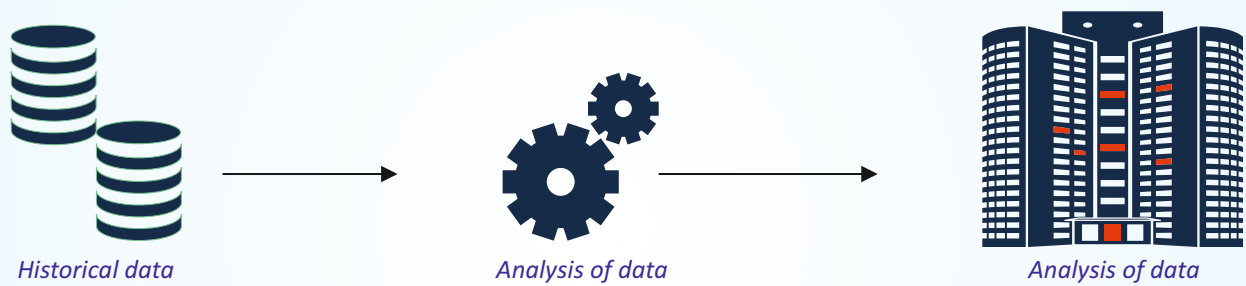


**Indicative data flow . At each stage there is addition in the number of attributes*



2. The electro chromic layer enable tinting of glass in response to variable electricity supply. This layer and the controllers began to degrade due to prolong exposure to UV light leading to failure.

The challenge was to mine the historical data to locate malfunctioning window(s) i.e. to identify faulty controller(s).



 **Indicates anomaly. Implies malfunctioning window*

3. The performance of the windows is very important as it is not only responsible for occupant comfort and also reduce the energy consumption of the building. Hence the client needed a robust analytic algorithm to regularly detect malfunctioning window(s).

The challenge was to devise an algorithm which monitors the data of 150+ existing sites and new upcoming sites worldwide to accurately detect anomaly(ies).



**Huge volume of data to be analysed regularly for any possible anomaly detection*

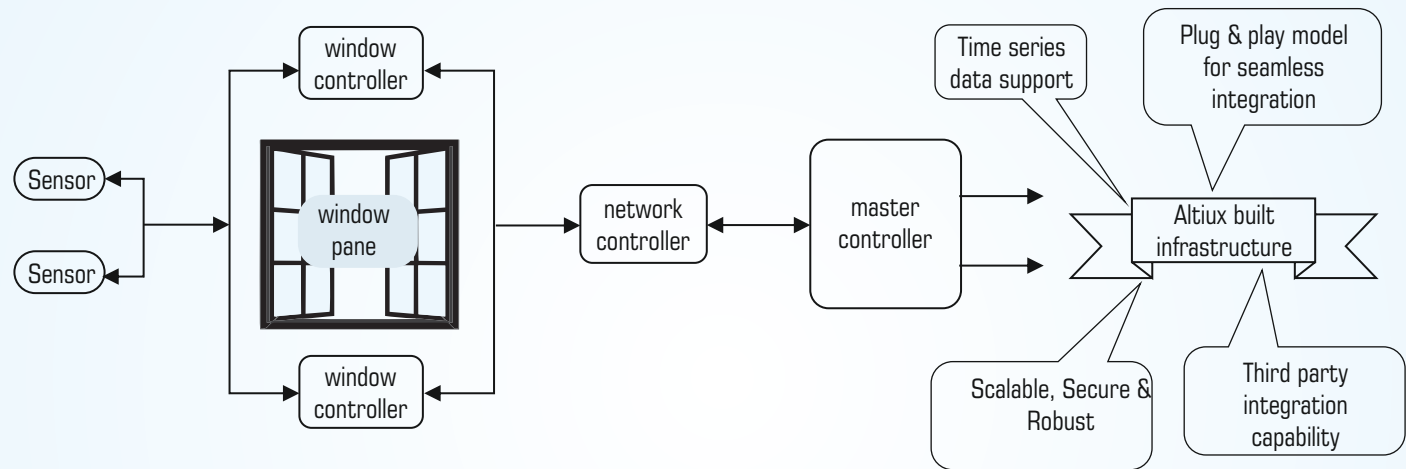


Solution

Altix, with its advance analytics expertise, built infrastructure for data management and devised algorithms for analysis and anomaly detection of large volumes of data for the client.

Infrastructure

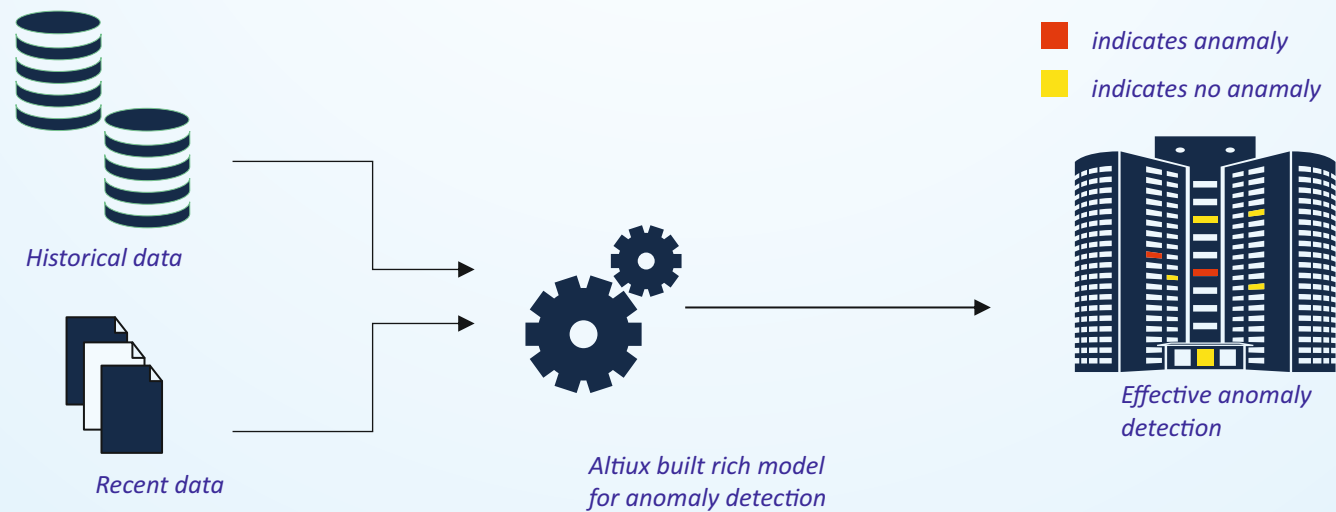
Cloud infrastructure: A clustered infrastructure using Cassandra database for management of large volumes time series data.
Plug-and-Play architecture: Ease of integration with existing infrastructure due to service oriented architecture based cloud infrastructure design.



** Altix built Cassandra based cloud infrastructure*

Advance Analytics

Anomalies Detection Model: SpringXD based advance analytic algorithms for effective and timely anomalies detection.



Benefits

Altix's advance analytics expertise helped client garner following benefits:

1. Efficient data management: The sophisticated clustered cloud infrastructure enable ease of management of time series data in effective, secure and scalable fashion.
2. Cost Saving: Unplanned maintenance visits were avoided with upfront anomaly detection, which also lead to efficient workforce management and cost saving.
3. Enhanced End Customer Experience: Anomaly detection enabled not only predictive maintenance but also reduction in maintenance downtime.
4. Additional revenue opportunity: The cloud infrastructure can be scaled up to integrate with existing or/and new smart home or office ecosystem. This opens up additional revenue opportunities to become end to end smart ecosystem provider and/or collaborate with other smart ecosystem provider.

Altix provide specialized Product Engineering services across the entire product development cycle, from Product Ideation to Embedded & Hardware design, User Interface design, Cloud and Mobility application development and Machine data analytics.



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