Case Study

Comcast

Graph Technology Helps Xfinity Create Personalized, Smart Homes

INDUSTRY
Telecommunications

USE CASE
Knowledge Graph / Identity and Access Management

GOAL
- Develop a customizable, automated and personalized smart home.

CHALLENGE
- Home devices were connected but performed only minimal additional functions.

SOLUTION
- Developed the Xfinity profile graph to map rich relationships across products.

RESULTS
- Rich definitions provide a more personalized experience for users
- Profile graph provides a scalable, flexible, multi-tenant user-profile for extending relationships across products

From voice-automated lights to porch cams, there are a variety of connected devices in our homes – but they don't yet have the insights necessary to make them personalized. With graph technology, Comcast maps the connections between users, their homes and their devices to develop personalized technology that helps transform homes from connected to smart.

The Company

Xfinity from Comcast provides TV, high-speed internet, phone and home security services to more than 30 million people across the United States. With more than $22 billion in profits reported in 2018, it's ranked 33rd on the Fortune 500 list.

The Challenge

Companies around the world have come a long way towards making homes smarter.

Smart devices send alerts when the front door is unlocked, the house alarm is disengaged or someone is at the front door. These connected devices naturally interact with one another. But because many of these tools don't have capabilities like natural language processing, the result is really a large collection of connected devices that can't be automated.

"A person is not just an ID. A person is a set of relationships to personal information, locations, people and devices," said Jessica Lowing, Director of Project Management at Comcast.

Homes aren't able to perform tasks like "turn off the lights in Lily's room" because these requests require insight into complex semantic and social relationships. The ability to personalize these tools is also incredibly limited. To address both of these challenges, Comcast put together a team dedicated to creating and perfecting an xFi smart home prototype.

The Strategy

The xFi team started with a detailed analysis of university research, market trends and product offerings to select core themes: connected devices, connected people, rich interfaces and automation.

The team then developed prototypes that could do things like send an alert when someone's child got home from school.

"We needed to model a set of relationships as a graph structure because our data is richly connected," said Lowing. "And the real value provided is the set of relationships between our data points."

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– Jessica Lowing,
Director of Product Management,
Comcast

The Solution

The first step was to develop rich definitions for all the terms in the Comcast profile graph.

For example, a "person" definition needed much more than a unique ID. It had to include a unique set of relationships to personal information, locations, people, and devices.

"Since people are at the center of these smart homes, they also need to be at the center of our automation," Lowing said, "which brings us back to modeling social and semantic relationships."

The team recognized that the real value of this rich data was the relationships between them, which would require a native graph database structure. Ultimately, the team would also need to build a shared platform at the household level that could be used by any Xfinity application so that user(s) would be provided with the same set of information.

This resulted in the Xfinity profile graph, a scalable, flexible, multi-tenant user-profile service for extending personal information and relationships across Xfinity products. It models customers' real-life relationships, and provides context so that Xfinity applications provide a more personalized experience for users.

The Results

"The Xfinity profile graph is built with GraphQL APIs on Neo4j, a natural fit," Lowing said. "This allows platform developers to build generic, expressive APIs for our clients, and provides client developers with the benefit of being intuitive and flexible."

With the Xfinity profile graph, users control devices at the household, person and device level, and ultimately ask much more from their home devices.

For the end customer, it provides applications that support unique experiences based off that same data service, but with information tailored for each household.

"One of the most surprising things I've seen with Neo4j is the speed at which we're able to innovate and deliver features to our customers," said Mark Hashimoto, Senior Director of Engineering, Digital Home at Comcast.

For example, now the Xfinity xFi personalized WiFi experience allows users to create and manage profiles for everyone in their home. This allows them to perform tasks from providing internet access for guests to pausing devices when it's time for dinner.

"Since graph databases are inherently schemaless, the graph model allows us to add new data types and new paradigms and just attach them to an existing profile or device or person," said Hashimoto. "That was surprisingly powerful – more powerful than I ever thought it would be."

Questions about Neo4j?

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