Empowering National Grid

How National Grid is leveraging the Anaconda Enterprise data science platform to reduce costs and increase reliability of energy delivery

Executive Summary

National Grid is a British electricity and gas utility company responsible for the utilities consumed by millions of users in the UK and US. Historically, National Grid's Electricity Transmission Owner (ETO) in the UK has managed the maintenance of their electricity transmission assets based upon manufacturer guidelines and engineering judgment.

National Grid's ETO business sought to apply a more sophisticated, risk-based methodology, and the ETO analytics team began looking for a new enterprise-ready data science platform. The team wanted to use open source tools in Python, as they had many team members with Python skills and knew the power of the PyData ecosystem. However, to comply with strict internal IT policies and to allow for greater control over various software licenses, they needed a solution that let the IT team verify and govern the packages used by the data science team. They ultimately turned to Anaconda Enterprise as National Grid's data science solution because it could meet their Python governance needs. Paid Anaconda subscriptions also provided 24/7 support, which was deemed essential by the team.

Through the power of Anaconda Enterprise, National Grid has been able to streamline their data science workflows, build reproducible maintenance models, and set goals for future data science analyses. National Grid is implementing a more informed, cost-effective maintenance framework that allows for greater accuracy in modeling and predicting the maintenance needs of their electricity transmission assets.

The Challenge

National Grid's team wanted to use data science to improve their asset maintenance program. They were following the manufacturer's recommended schedules and historical engineering experience to determine the frequency of asset replacement and maintenance. The analytics team knew that, by moving to a risk-based maintenance methodology, it was possible to quantify the level of risk on the system at any given time using the existing maintenance schedule. This would allow the company to optimize maintenance, delivering substantial cost savings while maintaining the required level of safety across the network.

nationalgrid

Company Profile
National Grid
Electricity & Gas Utility Company

Anaconda Solutions
Anaconda Enterprise

About the Customer
National Grid is one of the world's largest investor-owned utilities focused on transmission activities in electricity and gas in the UK and parts of the US. The company is responsible for maintaining electricity transmission lines, transformers, circuit breakers, and other transmission assets. National Grid seeks to ensure that supply and demand are balanced in real-time, and plays a vital role in safely and reliably connecting millions of people to the energy they consume.

Solution at a Glance

Challenge
How to use data science to develop a risk-based monitoring and maintenance system for electricity transmission assets

Solution
Anaconda Enterprise provided the open source tools the data science team needed while meeting IT and security requirements

Benefit
National Grid was able to build machine learning models that resulted in a more cost-effective approach to asset management

Following the decision to move towards a risk-based maintenance methodology rather than time-based, the existing system needed to be heavily modified. When considering alternative tools to implement the new policy, it became apparent that existing tools would not be capable of delivering the required levels of performance and flexibility. The growth and development of the in-house analytics team demanded another platform capable of processing a wider variety of data—including audio and video—as well as libraries for machine learning and probabilistic modeling.

Furthermore, using a proprietary platform made finding and recruiting talented candidates extremely difficult. Their proprietary platform also lacked the community support (e.g., blog posts, tutorials, and Q&A sites like StackOverflow) widely available with open source tools, making finding help "a real issue," according to Will Collins, Analytics Development Leader for National Grid.

With these challenges in mind, the analytics team began evaluating platforms powered by open source libraries. Due to existing Python experience within the team and the vast array of high-quality open source libraries available for use, the analytics team decided an enterprise Python distribution would best meet their needs. They narrowed their choice to a platform that could provide the Python libraries they wanted while also providing enterprise-level support and the secure package management required by National Grid's IT team.

The Solution

National Grid turned to Anaconda Enterprise, which gave them the governance, control, and support they needed to be able to use open source Python inside the utility.

Due to the immense popularity of the Python language, National Grid is better able to attract and hire qualified candidates. Now they can review a candidate's existing Python code and ask Python-specific interview questions rather than "take a leap of faith," said Mr. Collins. Because of the popularity of Python, the analytics team has been able to take advantage of the vast amount of online community support in addition to the enterprise-level support offered by the experts at Anaconda, Inc.

The new platform gives them access to libraries for data analysis and machine learning not available with their proprietary solution, such as OpenCV for video processing and scikit-learn for machine learning. Because the platform enables secure package management and offers governance of a secure repository of packages tested and verified by the experts at Anaconda, Inc., Anaconda Enterprise meets the security requirements of National Grid's IT team. The platform's on-premises mirror gives the team immediate access to all the latest packages, enabling greater flexibility and much faster development.

With Anaconda Enterprise and a suite of other open source tools, the team can now rapidly develop Proof of Concept type work using a wide variety of data sources, publishing results with ease. They are able to share their conda environments internally, enabling multiple users to rapidly replicate the required packages allowing for testing code across different machines. "Anaconda Enterprise gave us everything we needed in a nice, neat package," said Mr. Collins.

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Will Collins
Analytics Development
Leader | *National Grid*

ETO's analytics team is now able to use Anaconda Enterprise to build their own APIs to integrate with other line of business applications, quickly getting insights into the hands of executives and decision-makers. "We've leveraged some amazing visualization tools and web APIs," said Mr. Collins. "Anaconda Enterprise offers us a lot of flexibility in the way we want to deliver results to customers, which is something we were really after." As part of their workflow, they are now able to deploy models and visualizations with the Python web framework Flask.

Thanks to Anaconda Enterprise, National Grid is now implementing a data-driven, risk-based methodology to deliver a more sophisticated maintenance and monitoring system for their electricity transmission assets. "We use Anaconda Enterprise on a daily basis. It certainly ticks a lot of boxes for us as a team and as a business," said Mr. Collins. "We're now using several cutting edge libraries to answer questions posed to us by the Business."

The Results

According to Mr. Collins, ETO's "data scientists are happy they can concentrate on using the tools rather than maintaining them." One way they're using these tools is to optimize the visual inspections of their aerial transmission lines. National Grid flies two helicopters to take video of the lines in order to determine their condition, paying particular attention to line spacers regularly located along the line. Historically, the engineering team had to review this video and manually sift through hours of footage to locate the few seconds each spacer was visible.

While not part of their original project plan, ETO's data scientists knew that the computer vision libraries in Python might be useful for processing the video to highlight the instances when the transformer was in view. Using Anaconda Enterprise, the analytics team was able to securely install a Python open source computer vision library, OpenCV. Given National Grid's governance policy, this package would have been unavailable to the data science team had they used only an open source distribution of Python, but with Anaconda Enterprise, they could ensure proper access to securely manage the package. This enabled the team to use OpenCV to train an algorithm to recognize and highlight component shapes, isolating just the important segments of video and saving the engineering team hours of valuable time.

Schedule a demo today!

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