

## AI is on Duty for Natera DevOps

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*NMLStream's AI technology helps Natera DevOps quickly localize problems and automate actions.*

Natera is a publicly traded genetic testing and diagnostic company. It develops and commercializes non-invasive methods for analyzing DNA. Its mission is to transform the diagnosis and management of genetic diseases. Natera processes patient samples in their own CLIA certified laboratory as well as provides cloud-based software to be used by partners to perform analysis of their next generation sequencing data.

### Challenges

A typical genetic test at Natera starts with a patient sample. The sample is sent to the laboratory to perform multiple steps workflow, then the sample is sequenced on an instrument and the data is analyzed by compute-intensive algorithms.

Natera's infrastructure is a complex distributed system running over 50 services across hundreds of hosts. Additionally, tens of thousands of nodes have to be launched and managed in the cloud to process terabytes of sequencing data every day. Given the nature of gene sequencing algorithms, the infrastructure workload varies substantially. Meanwhile, the laboratory and customer facing infrastructure needs to operate in real-time to provide minimal turnaround time. The heterogeneous nature of workloads along with large datasets and complex intensive algorithms create a unique set of challenges for IT/DevOps teams. As samples are being processed 24/7 in batches any disruption in service of any of the services can cause a significant delay in results delivery to many customers. To handle these challenges, Natera's DevOps team uses NMLStream's AI technology to meet their IT operation's needs.

### Solution

Natera uses NMLStream's AI solution to manage its IT cloud infrastructure. NMLStream ingests streaming metrics from multiple services and uses this data to continuously build relationships between key performance indicators (KPIs) and potential causal metrics. These relationships are aggregated to form a dynamic causal graph of Natera's infrastructure. The causal graph allows Natera's DevOps to get a deep view of their entire infrastructure down to individual metrics.

### Challenge

Quickly discover and localize problems.

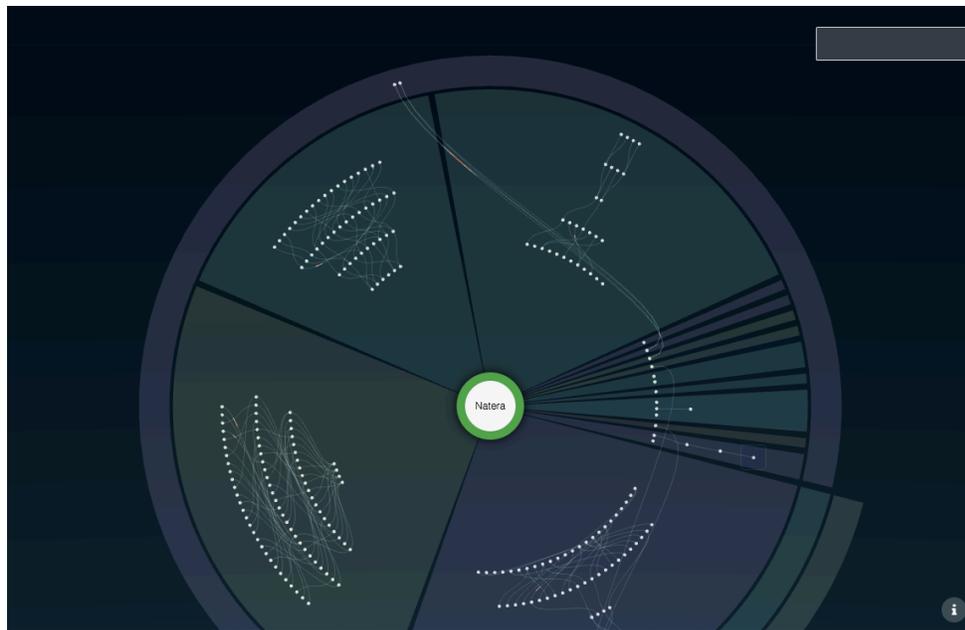
### Solution

NMLStream's AI solution for real time system management and Backward Chaining technology.

### Benefits

- Instantaneous issue localization
- Zero downtime
- Understand system bottlenecks

The figure below shows the causal graph of Natera's infrastructure. Each node represents a metric from a particular service, and two metrics are linked if one impacts the other. As is evident from this causal graph, there are many complex relationships between services.



*“NMLStream helps us identify and fix problems before they impact our patients”*

**Dmitry Grudzinskiy**, Senior Director, Software Engineering

When a KPI associated with any service goes red, NMLStream's notification mechanism alerts Natera DevOps of the problem. It then uses *backward chaining*<sup>™</sup> technology to identify the most causal metric for the bad KPI. This process is iteratively applied to identify the most causal path from the KPI to the offending metric over the entire topology of services and metrics. The DevOps responsible for the infrastructure can use this path to quickly identify the offending service and metric.

DevOps can also assign automated actions and playbooks to the offending services and metrics. This allows them to rapidly resolve problems and restore service. NMLStream's technology bridges the gap between monitoring solutions and automated actions.

## Benefits

For Natera's large distributed IT infrastructure, NMLStream's AI solution provides following benefits:

- **Causal graph:** NMLStream's deep causal graph provides DevOps with a detailed view of their infrastructure along with interdependencies between services and metrics.

- **Instantaneous issue localization:** NMLStream's backward chaining technology rapidly identifies the causal service and metric that is responsible for poor KPI performance.
- **Zero downtime:** By pointing DevOps to the cause of the problem, our AI solution reduces the time required to identify and remediate the problem from hours to seconds. This reduces the time and cost in troubleshooting and allows businesses to meet their SLAs.
- **Historical deep dive:** By identifying the most causal services and metrics for historical alarms, NMLStream's AI technology allows system managers to understand system bottlenecks and take preventive measures before issues happen.