

# Real Time Localization using NMLStream AI Technology

*How Beeswax – a real time ad-bidding service used AI to rapidly localize infrastructure problems.*

Beeswax is a pioneer in the programmatic digital advertising space. Using its proprietary Bidder-as-a-Service (“BaaS”) product, Beeswax allows brand marketers, agencies, and ad networks to build and run their own cloud-based bidding technology. With a real time bidding infrastructure at its core, Beeswax allows customers to combine and customize bidding solutions to achieve the flexibility and control they need for their business. Business Insider has named Beeswax as one of the top 25 hot startups in 2015.

## Challenges

Beeswax has over couple of hundred services running across 4 different data centers globally. On average, it handles over 2M requests per second originating from 50 different ad exchanges around the world. These ad requests are parsed, filtered, and augmented with additional data that allows customers to better manage their ad-campaigns. These enhanced ad-requests are then sent to customer-defined bidding logic to determine whether a bid should be placed. In order to serve their customers, Beeswax needs to ensure that the end-to-end latency is within their SLA.

On January 30, 2018 at around 4:15 PM Eastern Time, a key performance indicator that measures the end-to-end latency for Beeswax’ real time bidder platform experienced severe problem. Within a matter of minutes, there was a 7-fold increase in the value of this KPI. All of their customers experienced this issue, were unable to place bids, and had to suspend their marketing campaigns.

## Solution

Beeswax uses NMLStream’s AI solution for real time system management to quickly diagnose problems and take remediation

### Challenge:

Quickly identify the cause of outages within hundreds of services and thousands of metrics spread across multiple data centers.

### Solution:

NMLStream’s AI solution for real time system management and Backward Chaining Technology.

### Benefits:

- Instantaneous issue localization
- Zero downtime
- Understand system bottlenecks

action. NMLStream ingests streaming metrics from Beeswax's infrastructure across multiple data centers to power its AI.

During the outage that happened on January 30, NMLStream's AI technology identified the problem as a sudden deterioration of the cache performance on the high performance in-memory No-SQL database. The database is used to store information that augments incoming requests. Because of misconfigured update on this database, the entire cache was wiped out. This caused tremendous increase in the response time of the database which in turn caused the KPI to go bad. The DevOps responsible for the infrastructure was able to resolve the problem quickly by rebuilding the cache on the No-SQL database.

NMLStream uses patented technology to continuously build relationships between KPIs and potential causal metrics. When a KPI goes bad, NMLStream's notification mechanism alerts 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 iterated 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 receives this most causal path in an email or PagerDuty alert.

## Benefits

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

- **Instantaneous issue localization:** NMLStream's backward chaining technology rapidly identifies the causal service and metric that is responsible for the 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.
- **Understand system bottlenecks:** By identifying the most causal services and metrics for KPI behavior, NMLStream's AI technology allows system managers to understand system bottlenecks and take preventive measures before the issues happen.

*"NMLStream was able to detect the outage that occurred on January 30 and also precisely localize the problem to the right component in our serving system."*

- Ram Kumar, Chief Technology Officer, Beeswax Inc.