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# Growing to full-suite observability with Elasticsearch and the ELK Stack

John Haskell

Head of Engineering
Dish Media

David Hope

Director, Observability Product Marketing
Elastic










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"I'm the engineering leader for Dish Media, where I guide a team of engineers to innovate the marketing world."

John Haskell

Head of Engineering at Dish Media



"I love jumping in at the deep end and getting involved in anything and everything. Why? Because getting uncomfortable is where the growth is."

David Hope

Director, Observability Product Marketing at Elastic

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## Dish Media

- Newer division at Dish Network
- 11 years of linear advertising
- 7 years of full addressable advertising



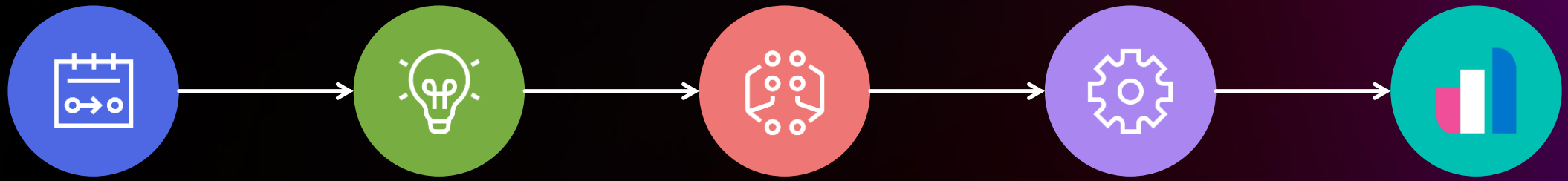
## Team responsibilities

- Develop, test, implement, and monitor systems
- $1 billion of revenue annually – $115,000/hour
- Process over 120,000 playouts daily

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# The journey to full-suite observability



Step 1

Ingest and centralize all the data

Step 2

Actionable insights

Step 3

Leverage machine learning

Step 4

Automate and secure

Step 5

Welcome to observability!

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# The challenge

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# We live in a world of exponential data growth and increasing complexity




Digital transformation

Increasing user expectations

Cloud migration

**Unstructured data**

**Semi-structured data**

Structured data

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# Advertising data lifecycle

## Targeted advertising means lots of data

1. Collect the data
2. Scrub the data
3. Categorize the data
4. Sell inventory space
5. Analyze and bill

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# Drives exponentially increasing data

**~10 billion records a DAY!**
**With 25 million device endpoints**

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# The everyday story before observability

- Reactive
- 15,000+ data points onsite
- Legacy tools and alert storms
- Limited bandwidth
- No insights
- No automation for reporting



**Negative business impact**

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# Taking a holistic approach

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# A solution that . . .



Reduces toil and load



Consolidates all data in one platform



Transforms data and processes in near real time



Provides flexible reporting and analytics



Automates forecasting and tracking business growth



Offers outlier detection for anomalies

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# Understanding operational and business KPIs



## Operational

- Overall system and application health
- End user devices
  - Interoperability
  - Health



## Business

- DVR and viewership information
- Persona based insights

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# Requiring monitoring across hybrid cloud

- Cloud services
  - System and application uptime
  - Application performance
  - Performance health
  - Security reporting
- On premises
  - Server health
  - Performance metrics
  - Network
  - Infrastructure




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# With Elastic Full-Suite Observability

Not only logs . . .



Elastic Observability

| Logging | APM | Infrastructure monitoring | Synthetics | RUM + mobile monitoring | Universal profiling |
|---|---|---|---|---|---|

**Visualize and explore**

**Search and analyze**

**Ingest everything**

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# Step 1
# Ingest and centralize all the data

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# Centralizing all data

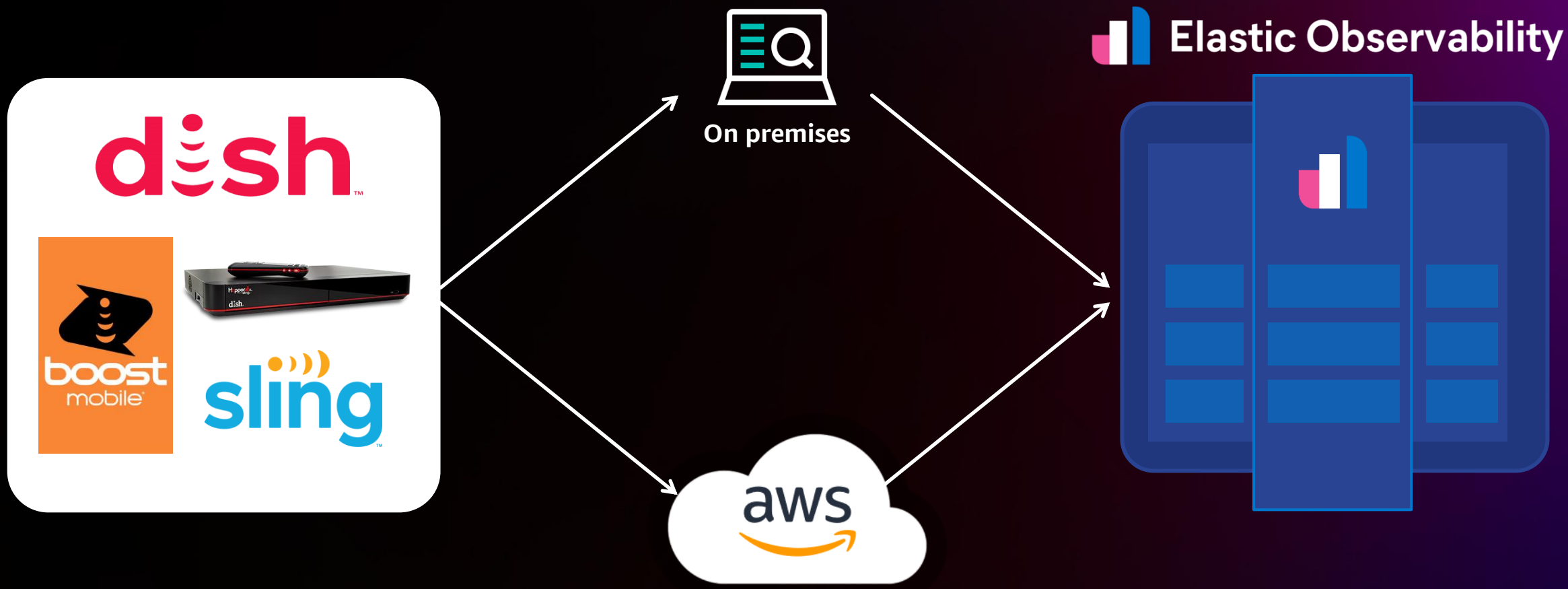
- Operational
  - Hardware monitoring
  - Operating system monitoring
  - Application logging
  - Security monitoring
  - Performance monitoring
  - On premises
  - Cloud services
  - Virtual appliances
  - Inventory management
- Business
  - Process monitoring
  - Business flow data (API and logs)




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# Ingest pipeline




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# Elastic Agent: The single unified agent for logs, metrics, security, and more

**BEFORE**

ON EVERY HOST

- Filebeat for logs
- Metricbeat for metrics
- APM agents for app traces
- Heartbeat for uptime
- Endpoint for security
- Winlogbeat – Windows data



**NOW**

ON EVERY HOST

- Elastic Agent for logs, metrics, and security – *traces coming soon*



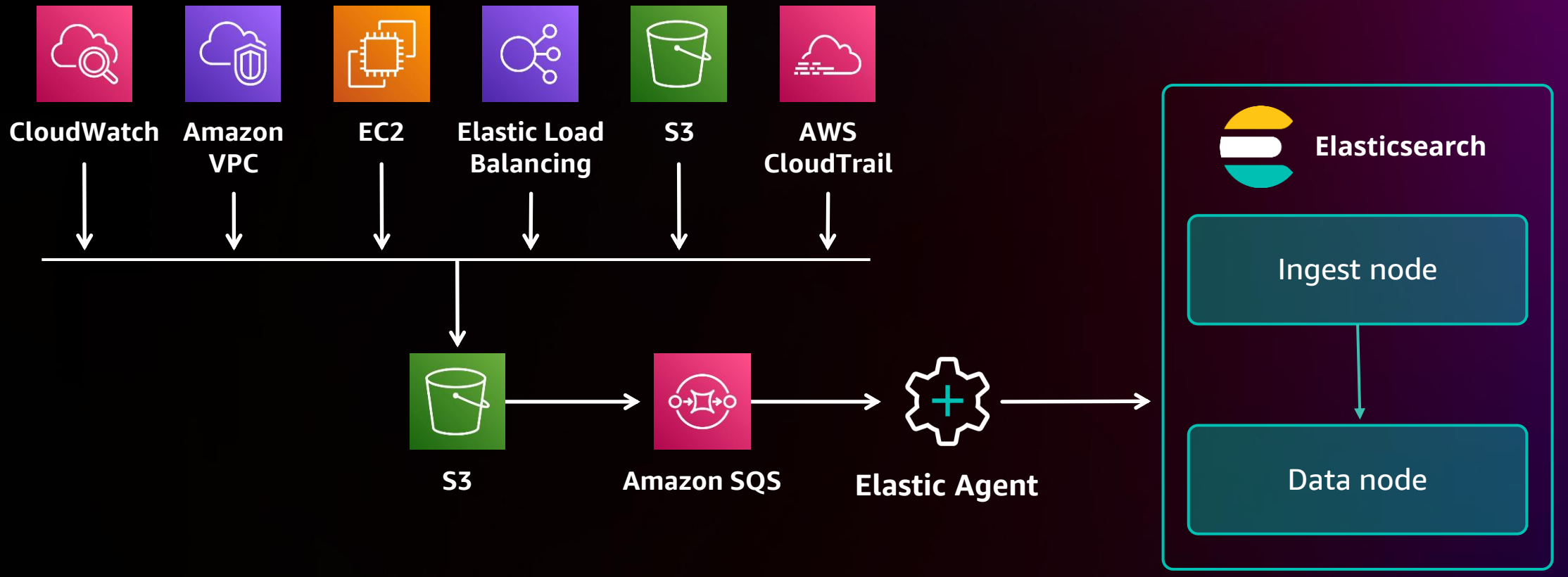
One thing to **install, configure, and scale**

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# Collecting logs, events, and metrics



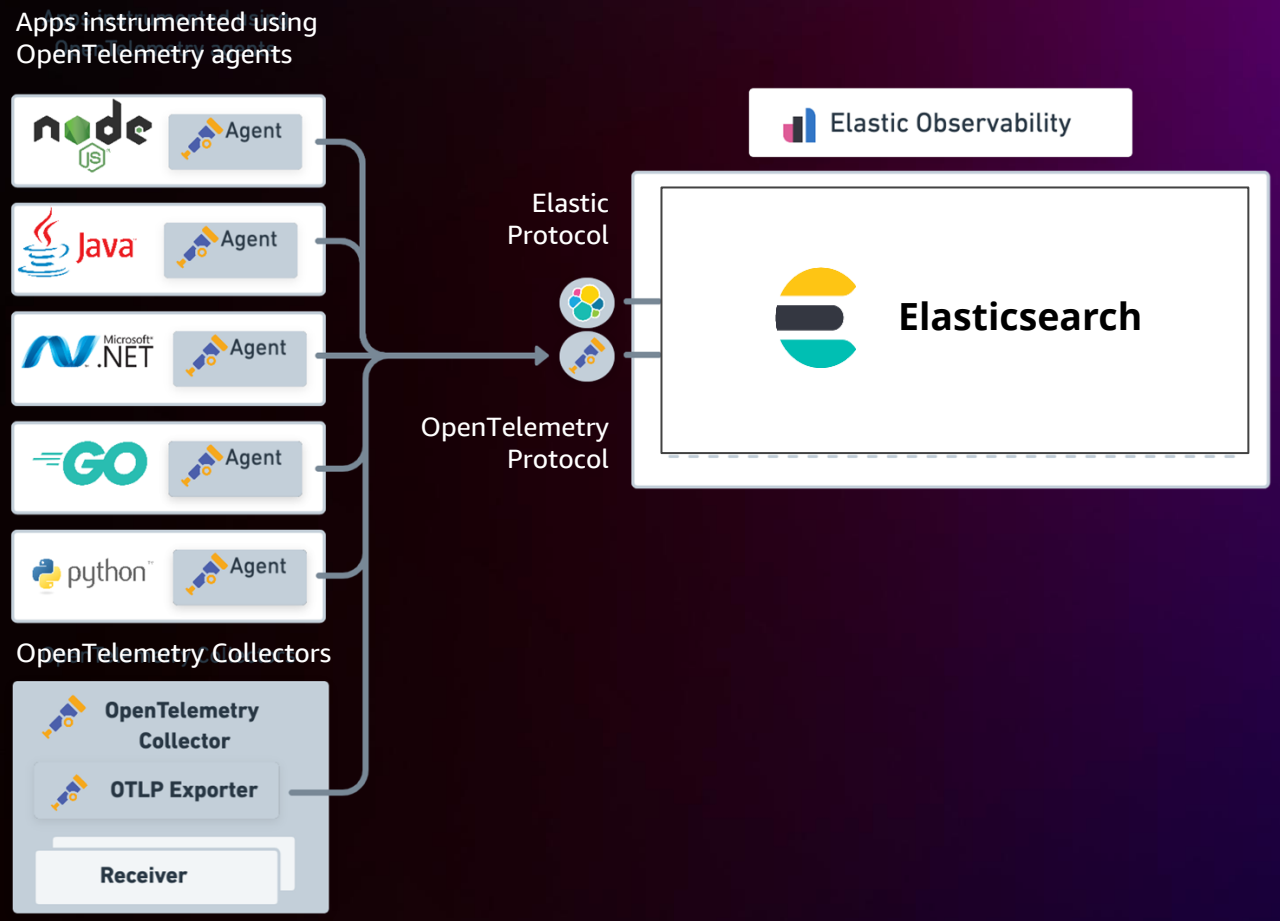

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# Elastic APM: Flexible options for tracing

Multiple instrumentation options delivering choice

- Elastic APM agents with auto-instrumentation
- OpenTelemetry
- Jaeger

Instructions are right in Kibana

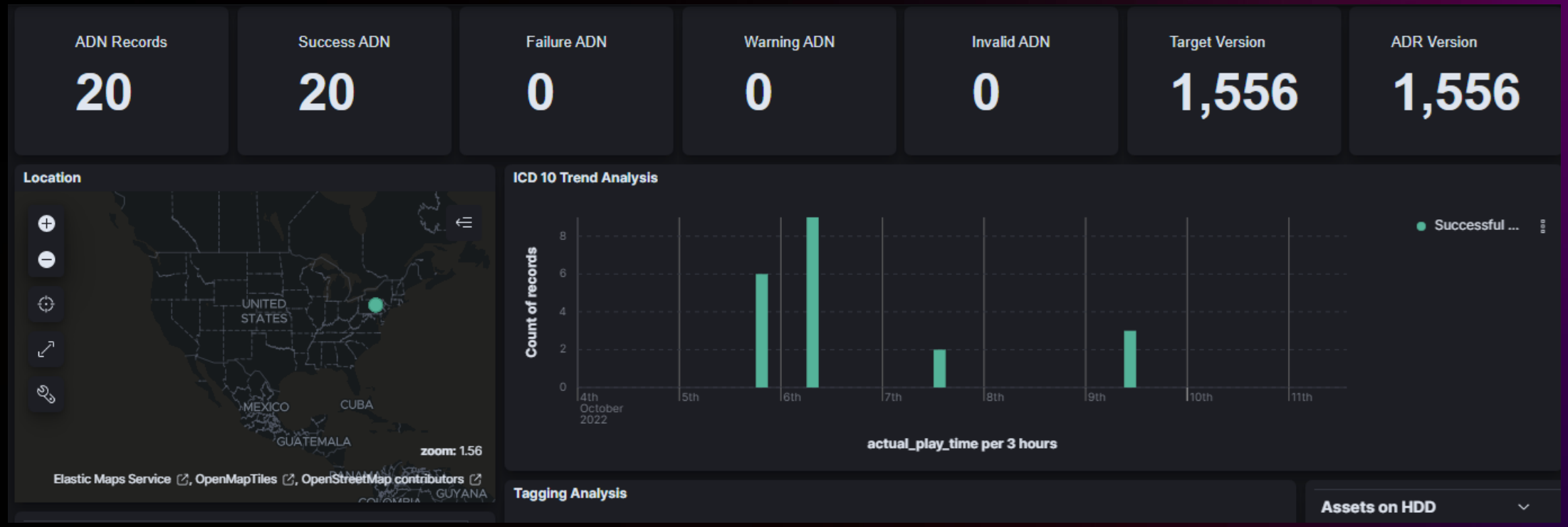



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# Step 2
# Actionable insights

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# Enrich the data for insights

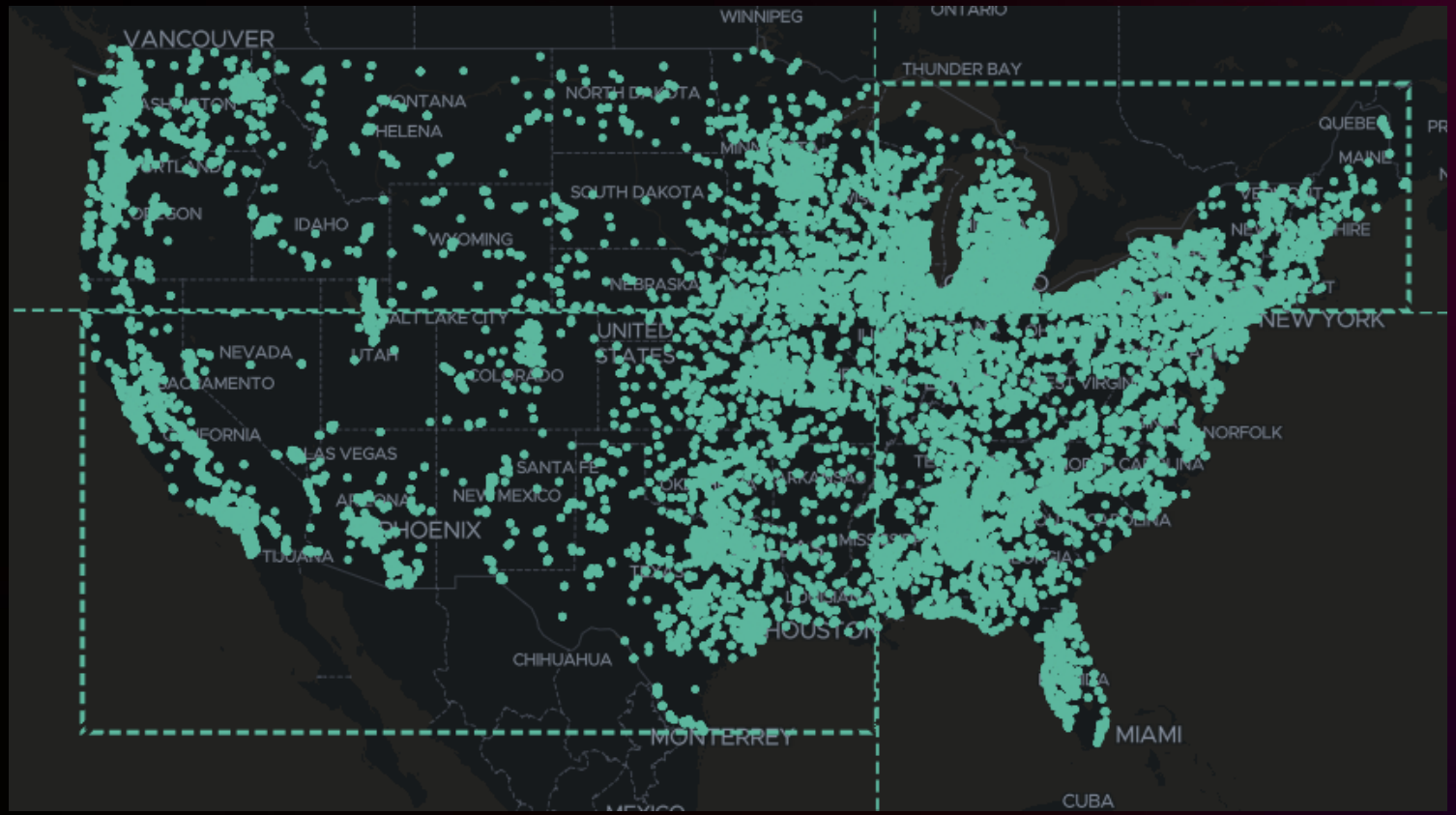



- Enrich data with business identifiers
- Merge data from other sources

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# All data easily accessible for analytics

"We would like to know the density of our customers across the country."




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# Benefits of full observability for insights

## BEFORE OBSERVABILITY

- Flat file of customers
- Used Google Maps
- Static data – unable to answer business questions
- Only provided single metric data

## AFTER OBSERVABILITY

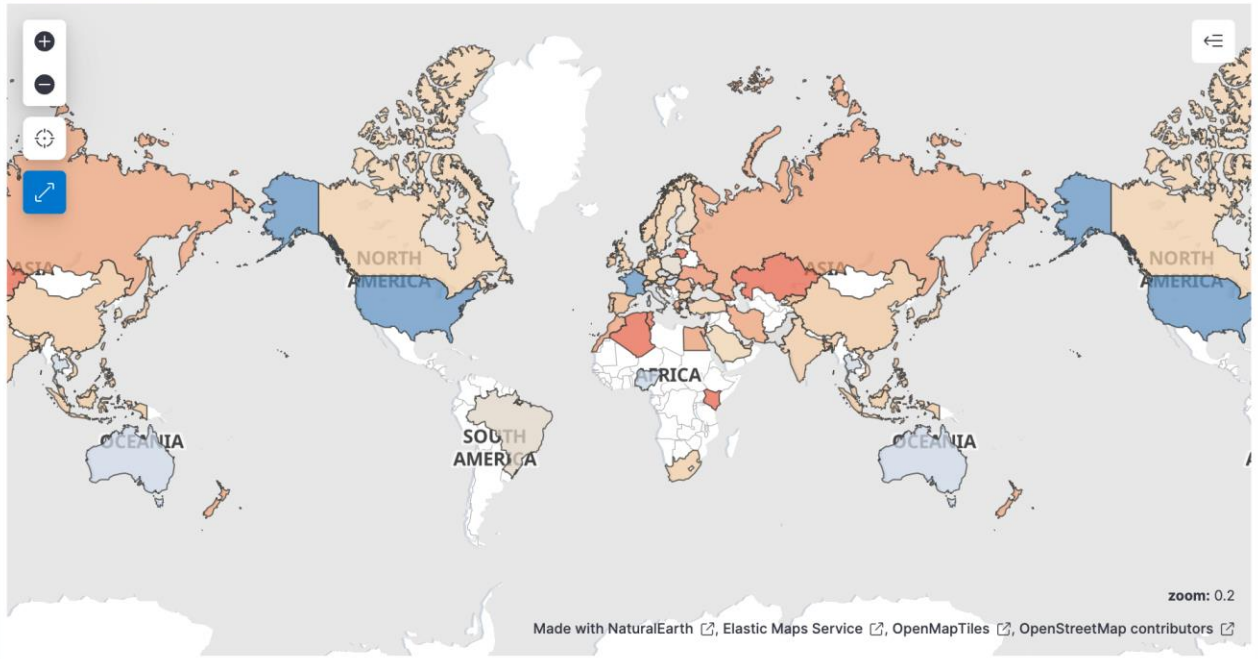
- Single tool
- All data instantly available
- Correlation between datasets
- Ask any question, get answers in seconds

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Panel filters




Panel filters

**26,020**
number of Ads

**1,138,402**
revenue in $

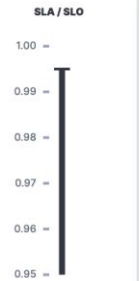
Panel filters

**26,526**
products shipped

| | | |
|---|---|---|
| United States 295.57K | France 150.75K | China 23.81K |
| United Kingdom 8.1K | Germany 7.86K | Japan 7.6K |
| South Korea 7.47K | India 3.18K | Australia 2.88K |
| Netherlands 2.71K | Russia 2.69K | Other 43.14K |

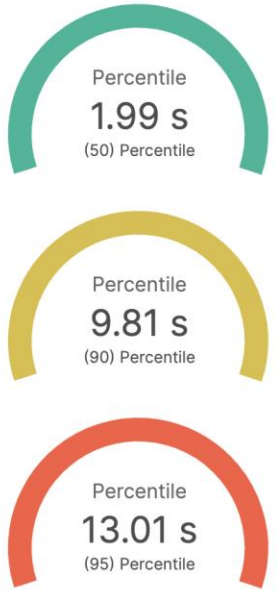
Panel ...



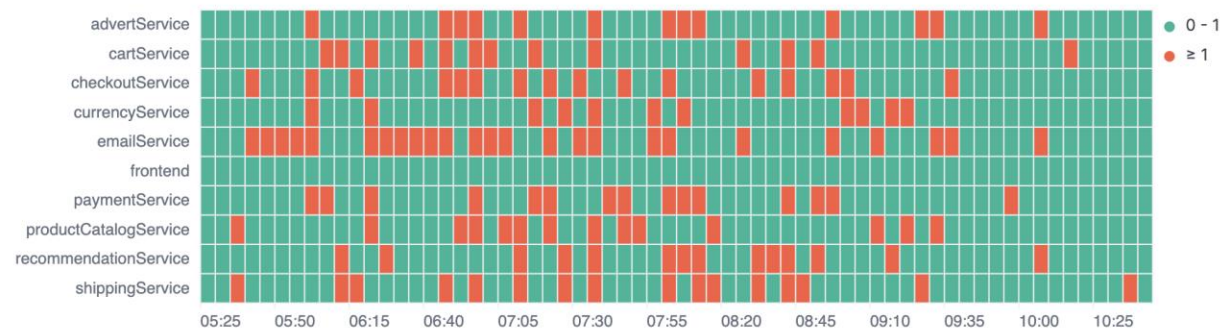




Frontend Response Times

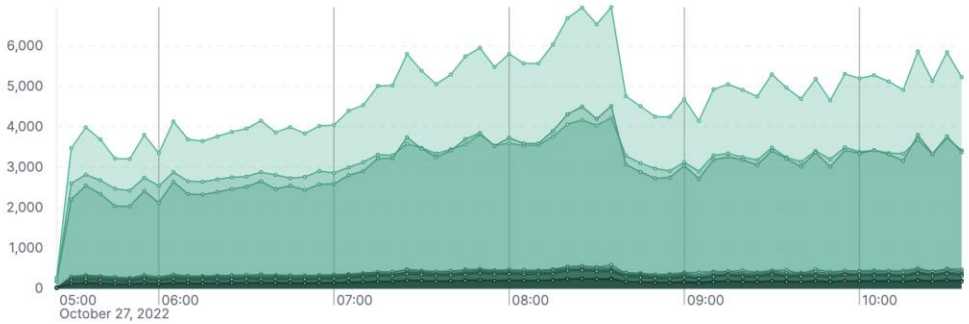
Panel filters




Service Status




Logs by Service



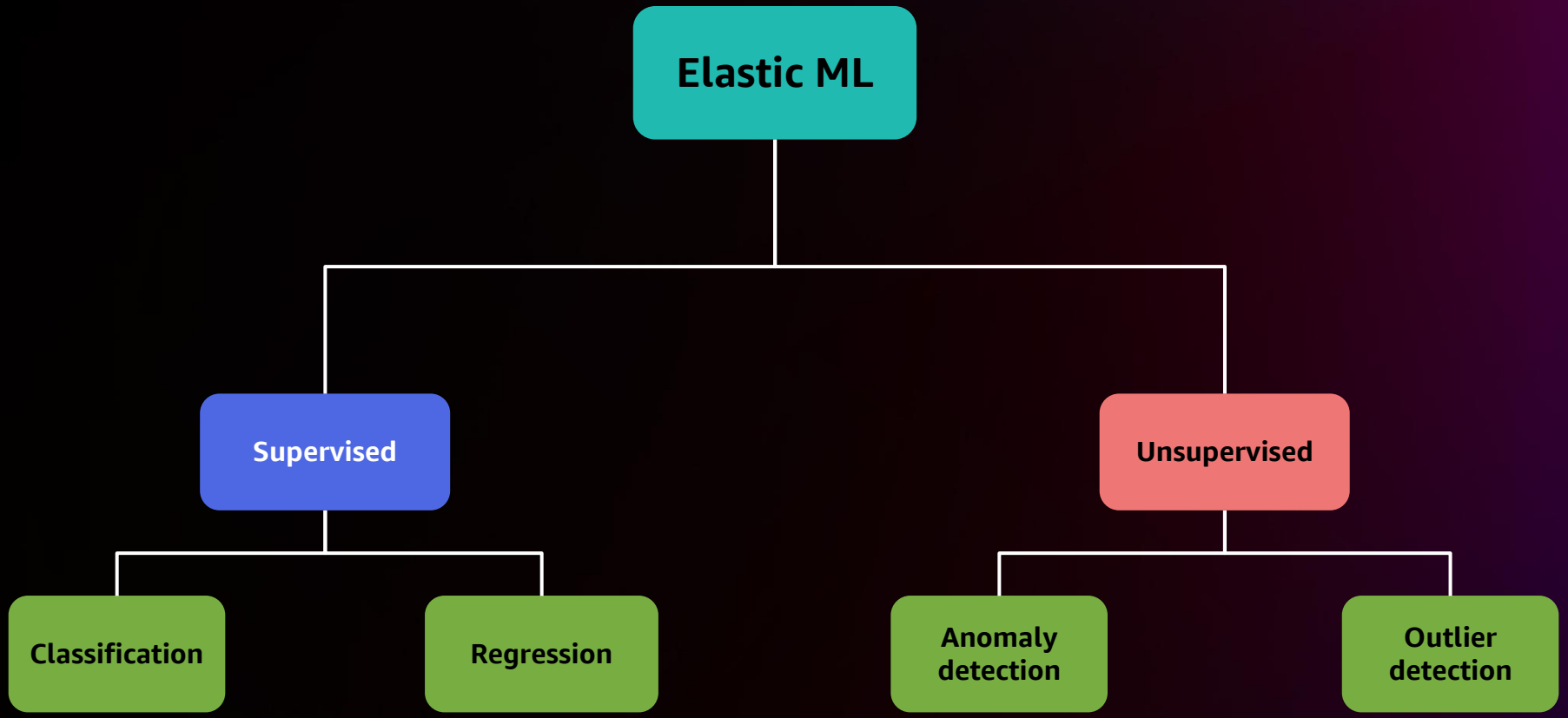

| | |
|---|---|
| productCatalogService | 5,234 |
| postgres | 3,423 |
| frontend-node | 3,380 |
| advertService | 478 |
| shippingService | 421 |
| cartService | 376 |
| currencyService | 356 |
| checkoutService | 322 |
| recommendationService | 200 |
| paymentService | 183 |

# Step 3
# Leverage machine learning

# Find answers to difficult questions with precision

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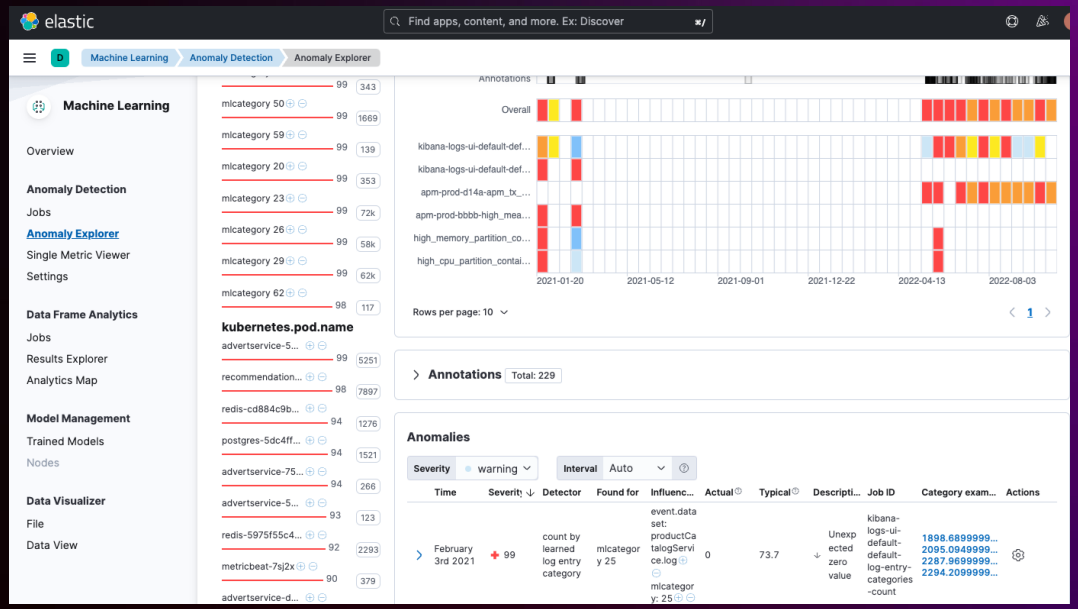
# Leverage comprehensive machine learning




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# Go from reactive to proactive

- Thresholds
  - Day to day monitoring - alerts on out of bounds
- Outliers
  - Correlation models
  - Anomaly detection
  - Logs or any other dataset
- Forecasting
  - Smart budgeting
  - Future infrastructure requirements

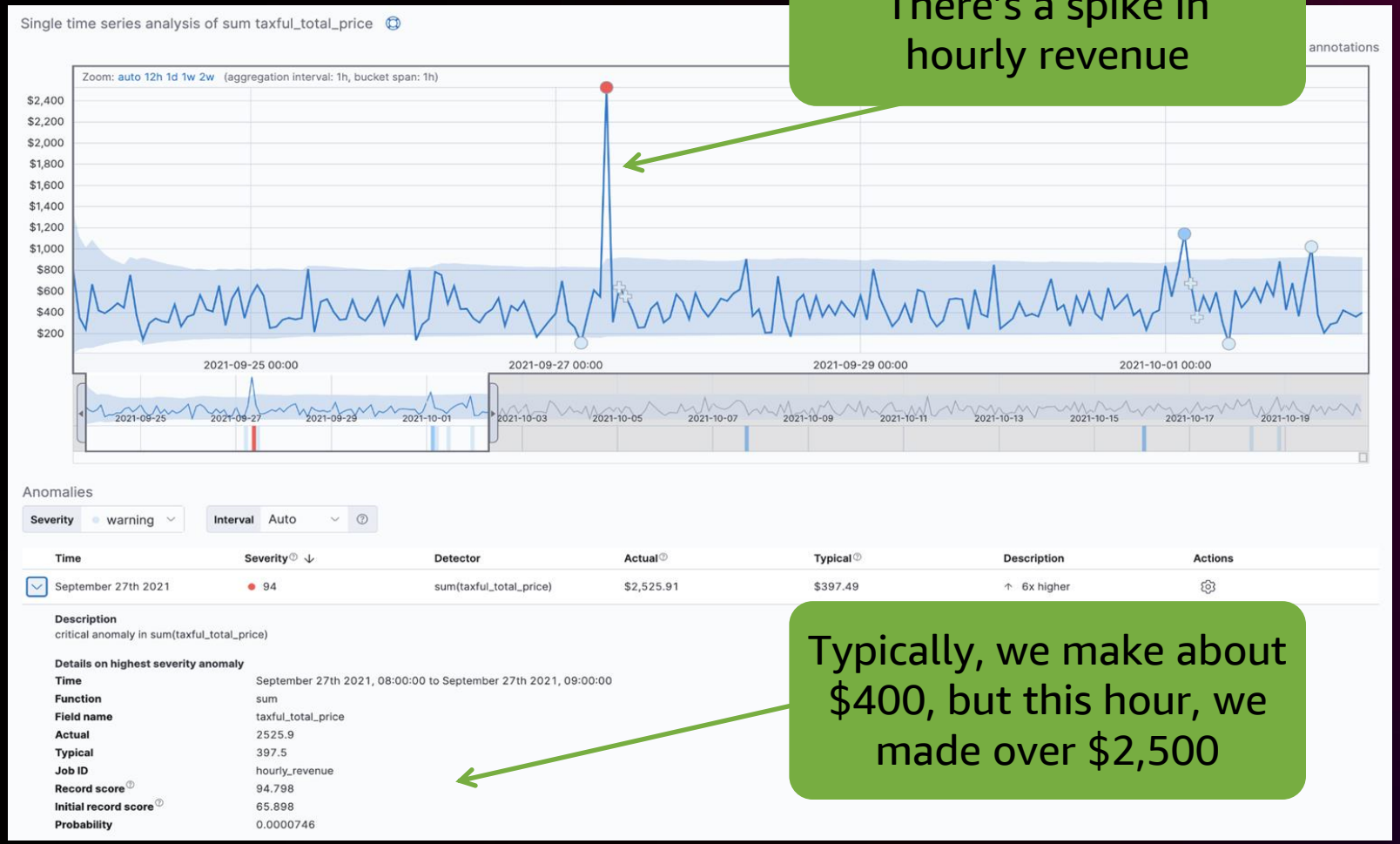






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# Machine learning applied to business data




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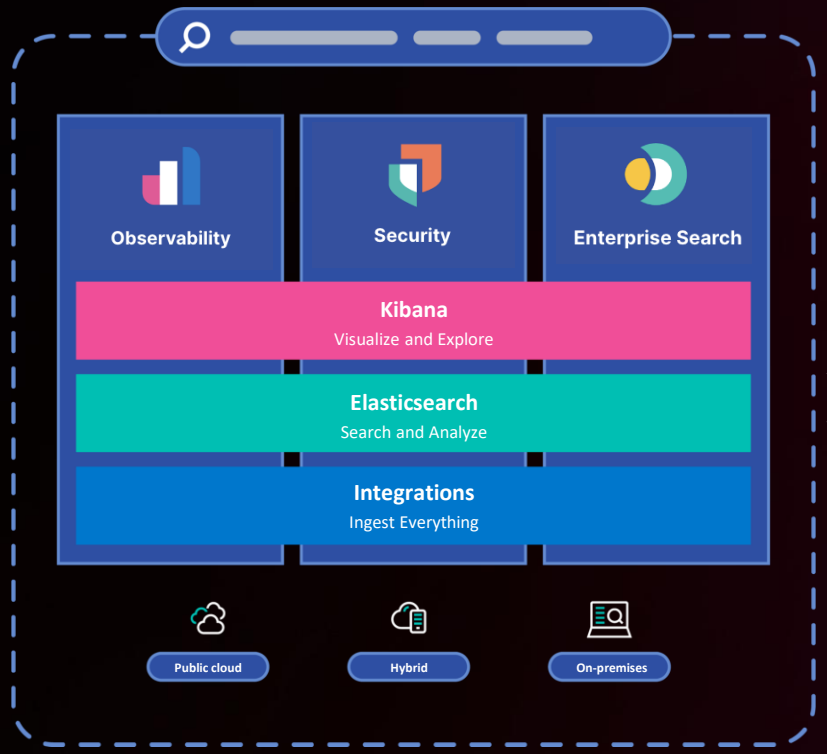
# Step 4
# Automate and secure

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# Observability and security: Start from development, not production

Business KPIs, case management

DevOps/infrastructure as code tools



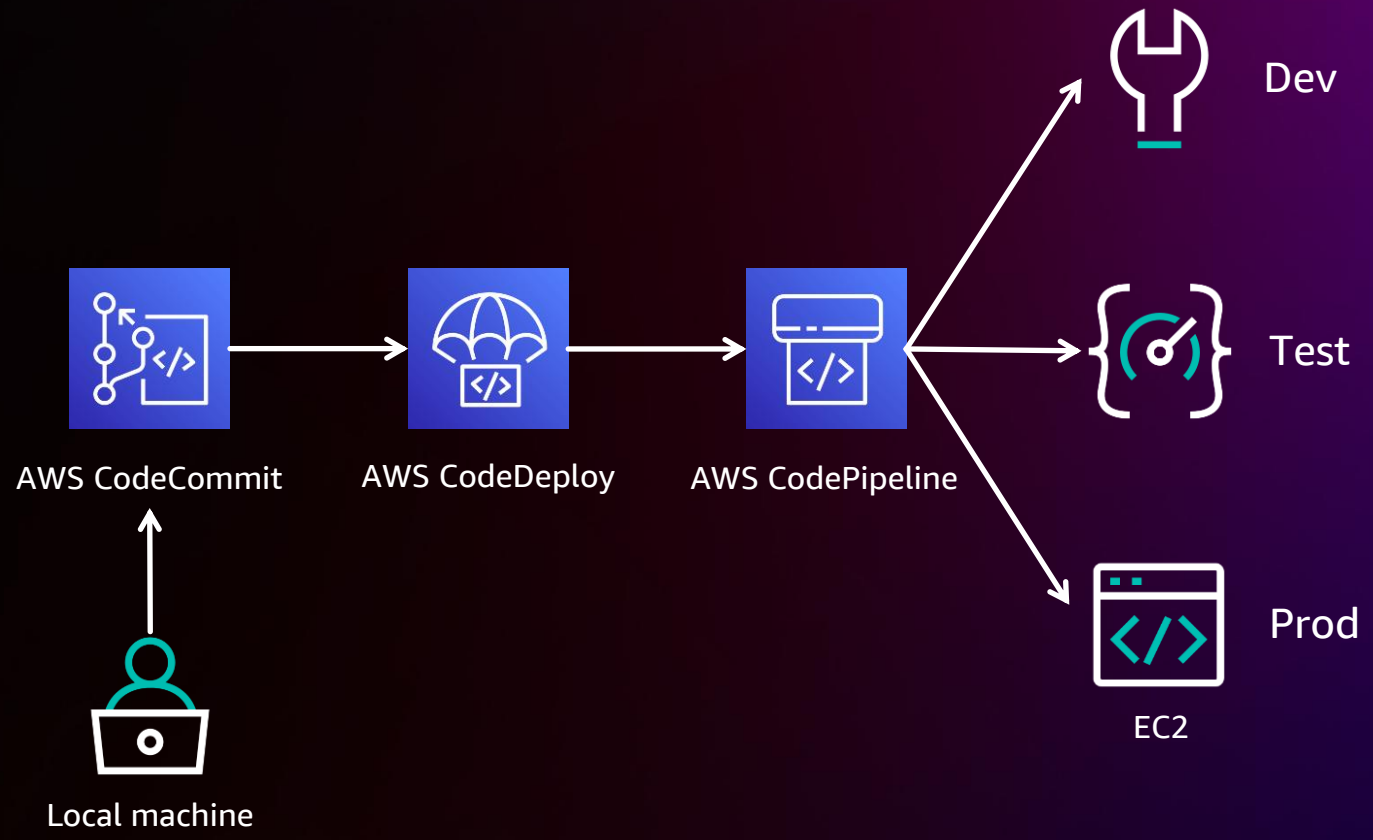

Metrics, traces, logs

Security

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# The Dish dev cycle: Or do you test in prod?

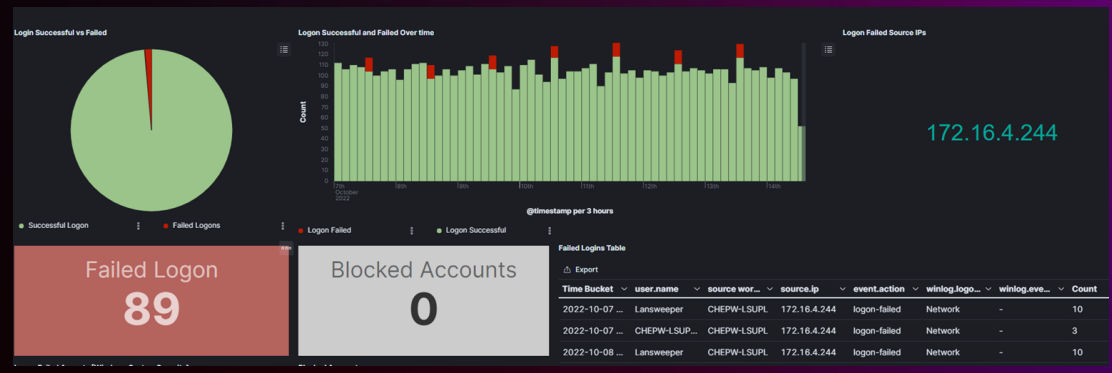
- 3 environments
  - Development
  - Test
  - Production
- CI/CD pipelines
- User acceptance criteria
- Agile (monthly sprints)
  - Prevent sprawl
  - Known backlog
  - Controlled rollout cycles




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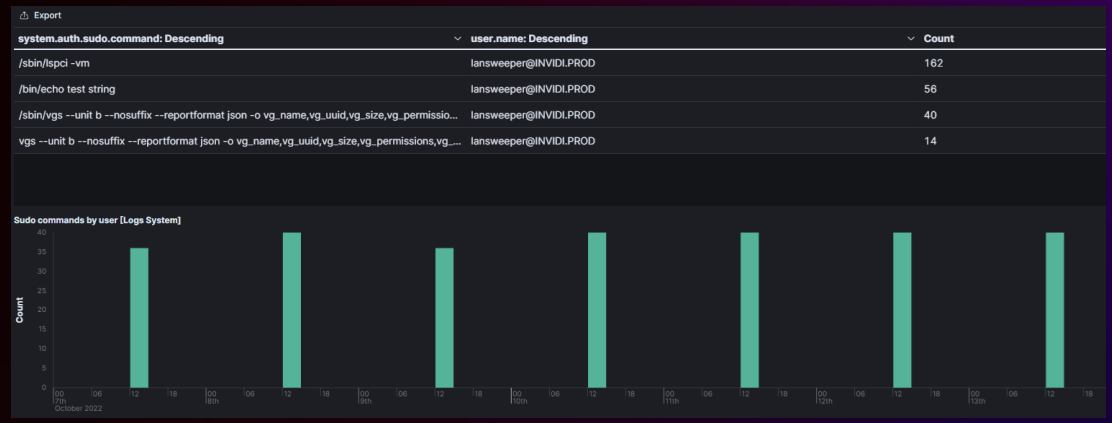
# Security monitoring

- Provided endpoint security
  - Process monitoring
  - Authentication logging
  - SUDO access logs
  - Patch verification
  - Anomaly detection
- Cloud security
- Threat intelligence
  - Real-time IOCs
  - Complements Rapid7









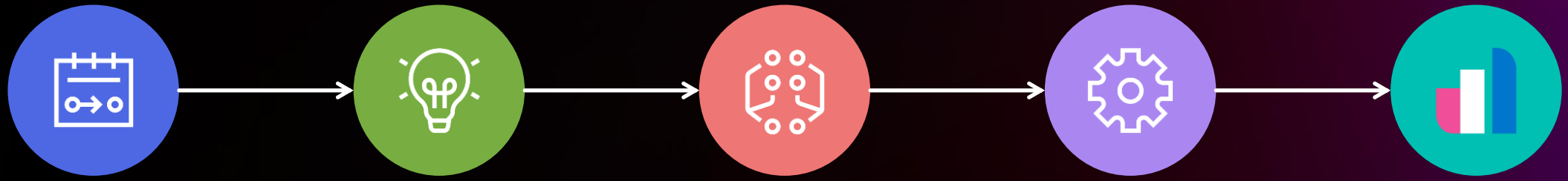

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# Step 5
# Tips and Tricks!

## Welcome to your full observability solution

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# The journey to full-suite observability



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Welcome to observability!

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# Yes! Things are better with observability

## BEFORE OBSERVABILITY

- Slow data reporting
- Only 10% of data actively reviewed
- Development teams required to generate business reporting
- Manual verification of behaviors took hours
- Business inquiries needed to be concise

## AFTER OBSERVABILITY

- Near-instant reporting
- ALL data searchable
- Correlated data points
- Business reporting without developers
- Single pane of glass for entire business line
- Forecasting now available

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# Before you go, here are tips to take with you

## DON'T

- Ignore data cleaning
- Work on entire dataset at once
- Work independently
- Forget how data will be used

## DO

- Understand your data
- Create retention policies
- Start with small footprint
- Find a process for CI/CD
- Create an intake process
- Find the small wins

Operational  Business

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# Maximize your observability ROI

## Break silos

Data tiers for massive data

Searchable snapshots
Data tiers

## Open first

Future proof your applications

OpenTelemetry avoids vendor lock-in

## Machine learning

Use machine learning on all your data

Leverage ML to become proactive

## Full suite

APM, logs, metrics, and security

Get full context and correlation of all your data

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# Thank you!

John Haskell
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David Hope
david.hope@elastic.co



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