



APP DYNAMICS

The History and Future of Monitoring

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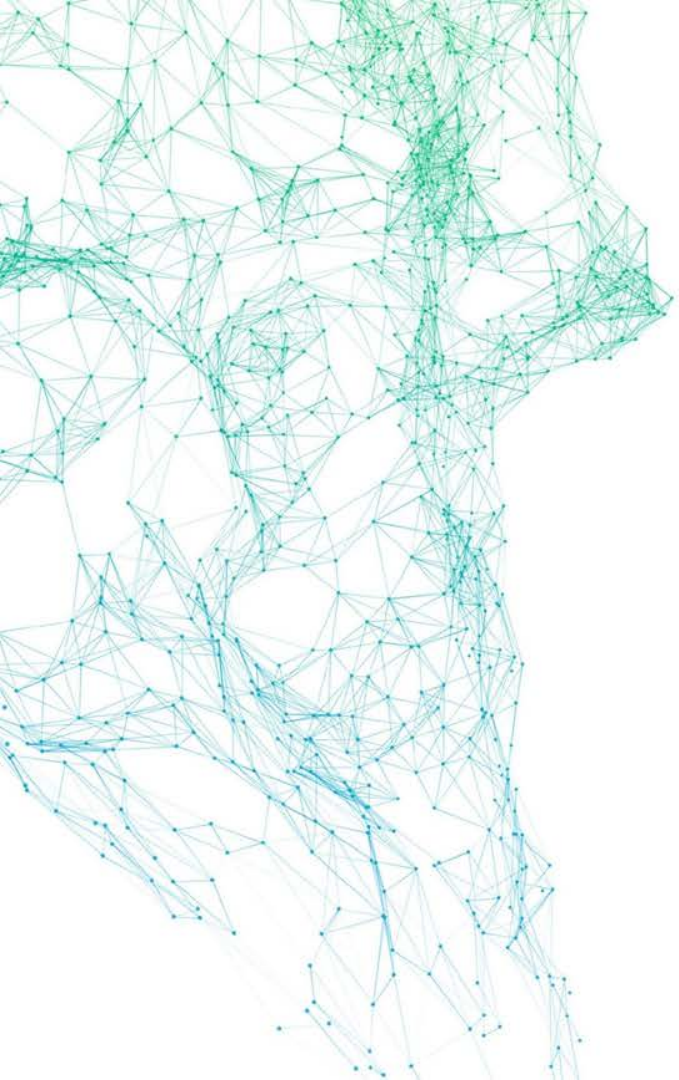
Jonah Kowall's background



- Over **20** years in IT
- Over **15** years working with Infrastructure and Operations enterprises and startups
 - Security - CISSP, CISA, PCI
 - Started one of the first content filtering companies
- Head of global monitoring at Thomson Reuters
- Head of IT Operations at MFG.com – Bezos Expeditions
- Gartner Research VP **4** years
- Strategy AppDynamics **3** years, acquired by Cisco in March 2017

Agenda

- Monitoring Fundamentals
- History of Monitoring
- Current State of IT Operations Management
- Future of Monitoring
- Solving Monitoring



Monitoring Fundamentals

Definitions

Instrumentation

“The design, construction, and provision of instruments for measurement, control, etc; the state of being equipped with or controlled by such instruments collectively.”

<https://en.wikipedia.org/wiki/Instrumentation>

Telemetry

“Automated communications process by which measurements are made and other data collected at remote or inaccessible points and transmitted to receiving equipment for monitoring.”

<https://en.wikipedia.org/wiki/Telemetry>



Software instrumentation types

- Metrics
 - Key value pairs (number/tag)
 - Can run maths on data
- Events
 - Text, such as logs
 - Can parse and extract metrics... and other values
- Paths or Topologies
 - Service
 - Transaction

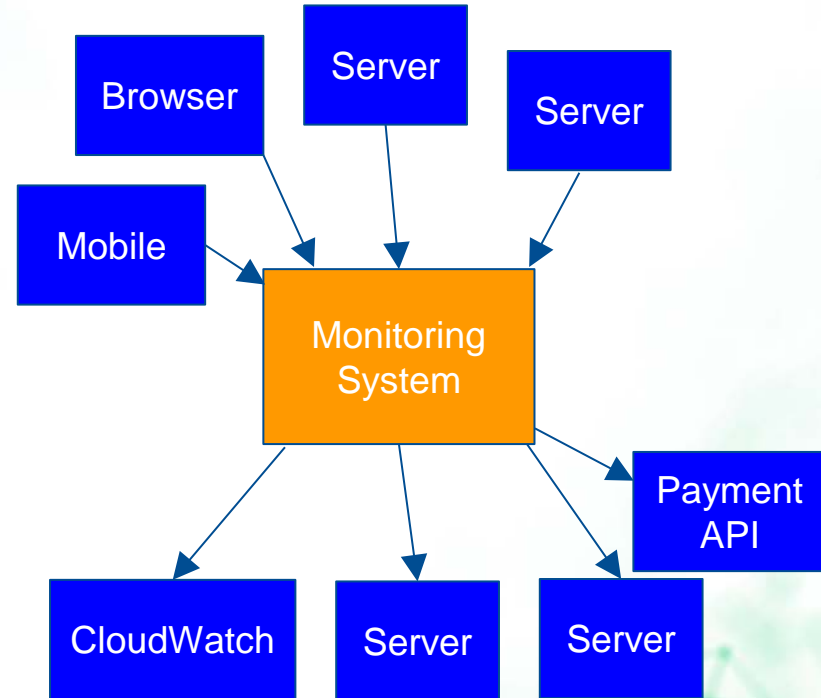


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Collecting Telemetry

- Push Collection
 - Manual code changes
 - Software agent to attach and extract
 - Code level or OS Level
- Pull Collection
 - Polling APIs - HTTP, SNMP, WMI



Both methods are scalable and useful for different reasons

Priorities of instrumentation....

by Technologists

- **Infrastructure**
- **Services**
- **Application**
- **Business**

by the Business

- **Business**
- **Application**
- **Services**
- **Infrastructure**

Uplevel the conversation

- Understand the customer
 - Internally and externally
- Requirements should be gathered across business and IT teams
- Responsibility for definition of monitoring should be shared



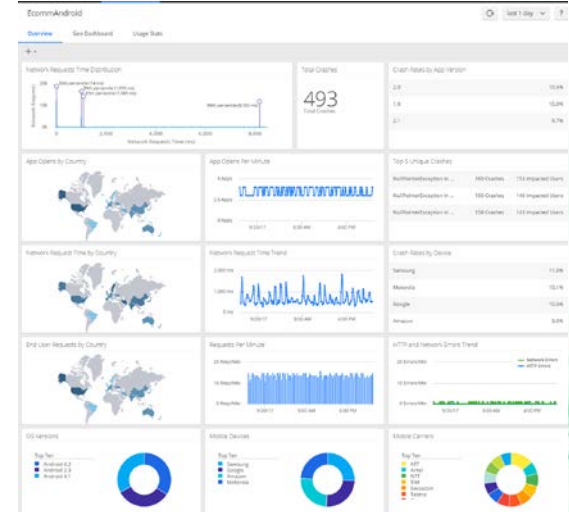
Business metrics and KPIs

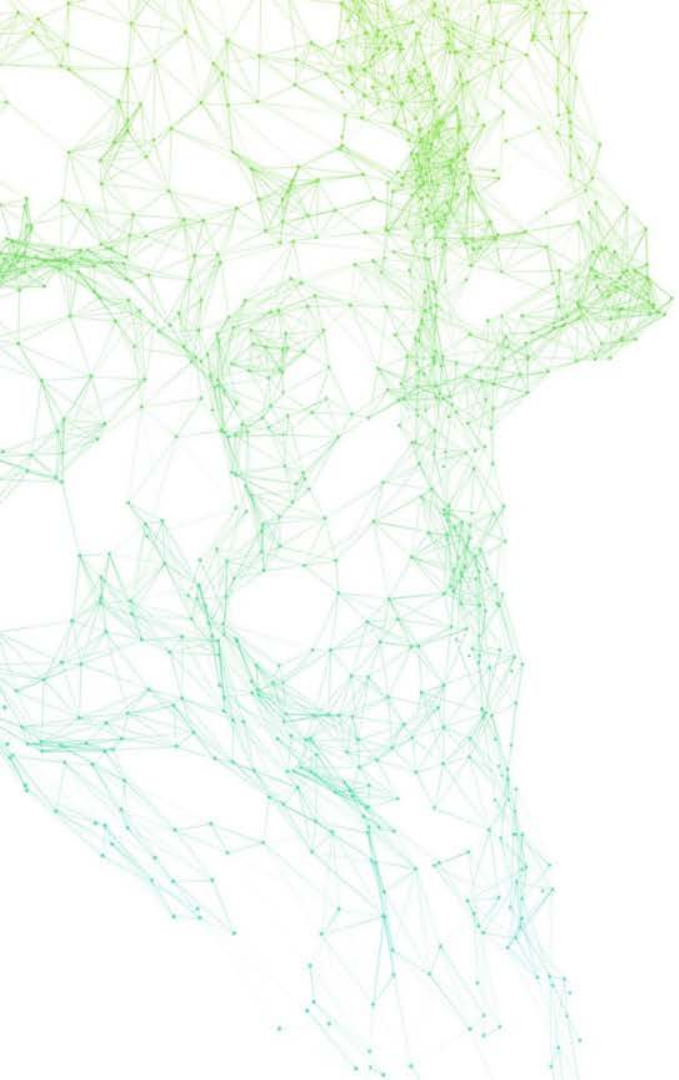
- Customer metrics
 - Conversion between products
 - Loyalty and retention (churn)
 - Usage metrics (feature and product)
- Sales / marketing metrics
 - Revenue
 - Cost of customer acquisition
 - User flows through applications



Technical metrics and KPIs

- End to end performance
 - User through transaction hops
 - Error isolation
- End user experience
 - Client side errors
 - Latency per element (page or app) + 3rd party
 - Client side DNS
- Application component performance
 - Metrics from app server
 - Metrics from code
 - Queries
 - Errors
- Intra application component performance





History of Monitoring

Mainframe

- Deep data capture
- Complex subsystems
- APM focused on subsystem level diagnostics
- No tracing across subsystems

Users using terminal applications

Simple networks and protocols



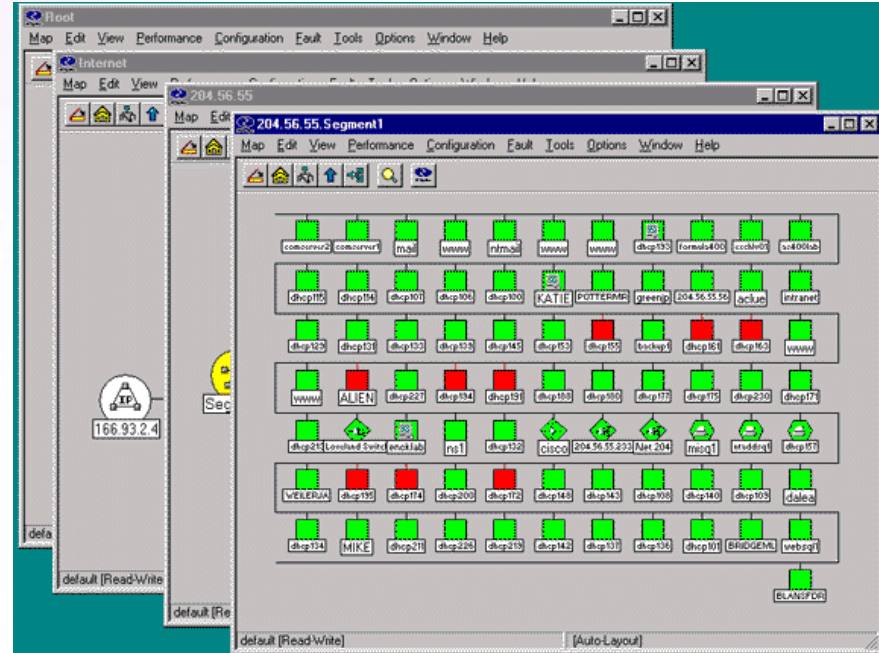
Distributed Systems Monitoring (Availability)

Networks evolved with Ethernet

- Availability / Health
 - Network monitoring (topology)
 - Server monitoring
- Created by IBM, HP, CA, BMC

Evolved by portfolio necessity to handle event correlation use cases. Mostly with organic development, which turned into acquisition.

Users using Windows applications



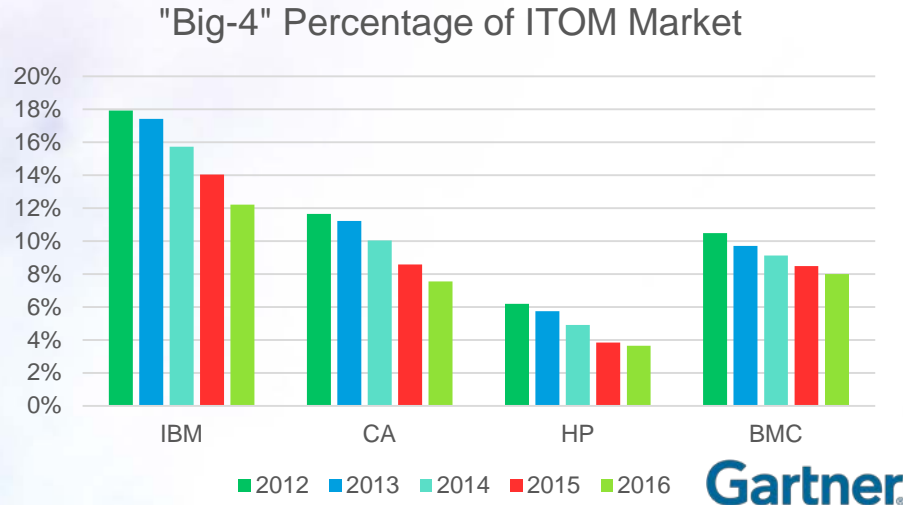
Availability Monitoring commoditizes

- Expensive tools from the big-4 replaced by low cost tools
 - Microsoft licenses NetIQ and creates SCOM
 - Eventually bundling this into enterprise agreements and suite SKUs
 - Lack of real usable non-Microsoft technology support
 - Nagios comes out and gains popularity
 - Difficult to manage, upgrade, and maintain
 - Hacked together for most users
 - Solarwinds creates easy and inexpensive tools
 - Doesn't support enterprise for a while, but that changes around 2010



Giving up

- Death of the “big-4”
- Gave up on ECA and complex integrated tool concepts
- Also gave up on the CMDB concept, but coming back into favor with ServiceNow



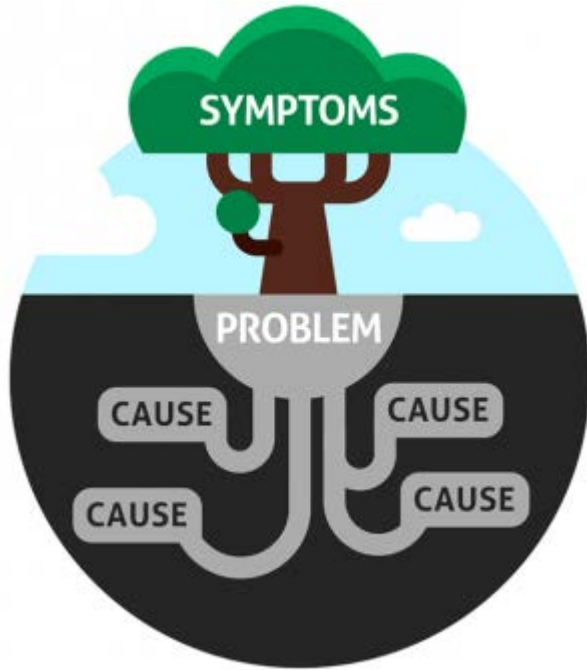
- Replacement by Solarwinds, SCOM and OSS (ELK, Nagios, Prometheus)

Buy or Build?

- Vendors and End Users decide
 - Ongoing maintenance and support
- Larger vendors have trouble innovating
 - Mix of acquisition and building
 - Acquire is increasingly popular
- Integration is difficult
 - Especially with large acquisitions
 - Strategy is always shifting
 - End users end up with too many disjointed tools

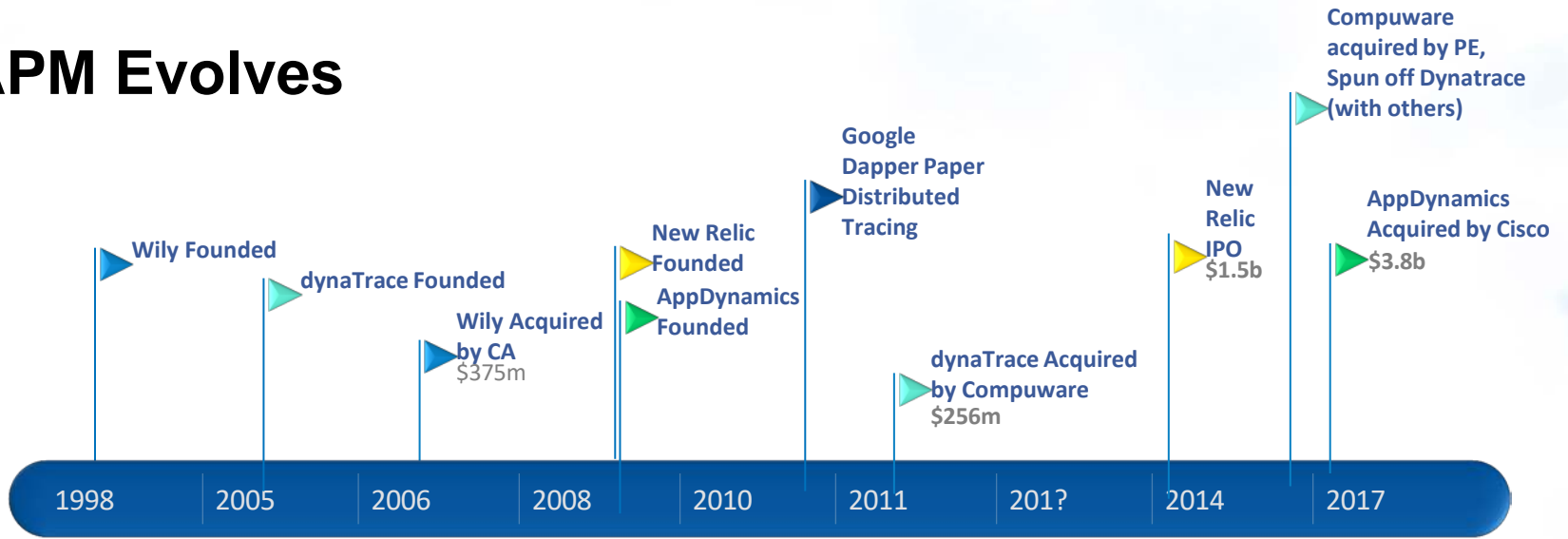


APM Enters



- Introduction of transaction tracking/stitching for RCA
- Code level visibility for languages at runtime
- Evolved to support many languages as stack evolved
- Production profiling (but also test/dev)

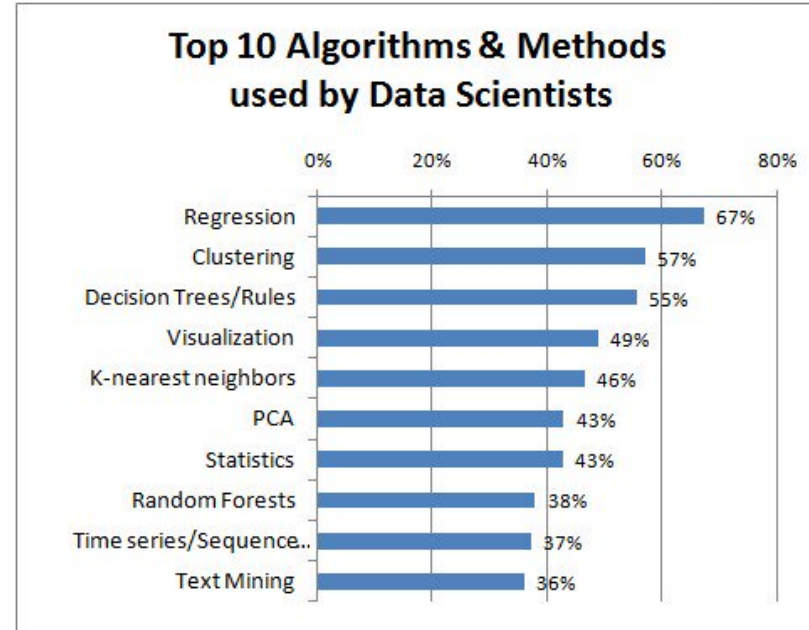
APM Evolves



Enter Analytics

- Event Correlation was a shortcut which failed
- Log Analytics emerged as an easier way (without workflows)
- Event Correlation is coming back with Machine Learning

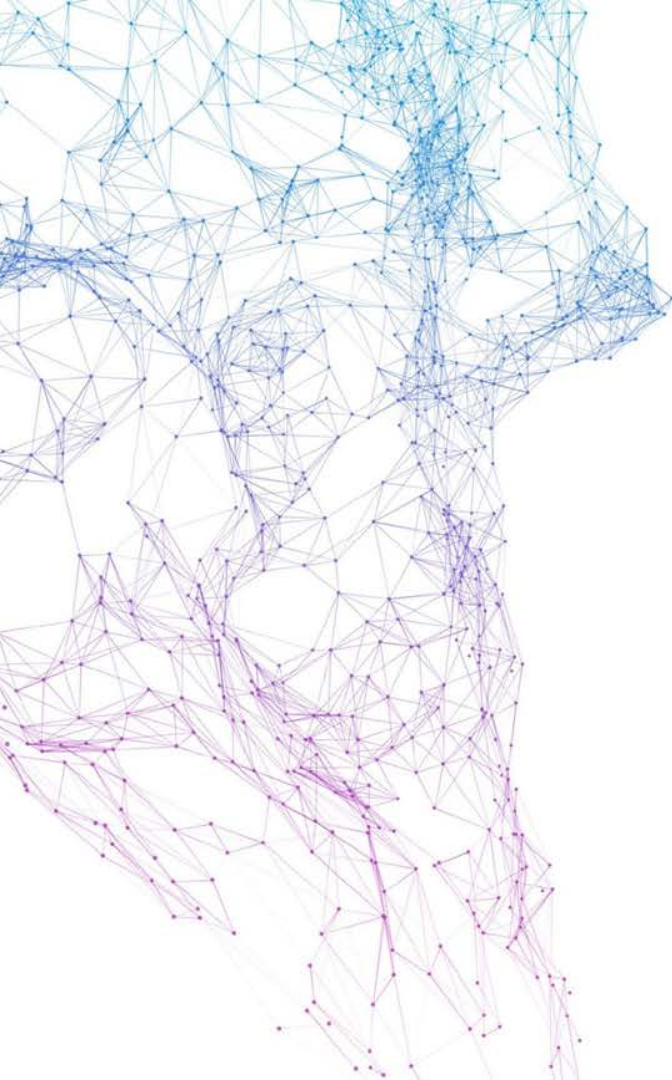
Machine Learning being applied to multiple Ops problems and datasets



APM is the new Unified Monitoring

- Most deploying on hybrid infrastructure with heavy abstraction (Virtualization and Containers)
- DevOps and cross-functional teams to drive agile have created the need for application centric views
- APM leaders are now doing lightweight infrastructure monitoring to augment application depth





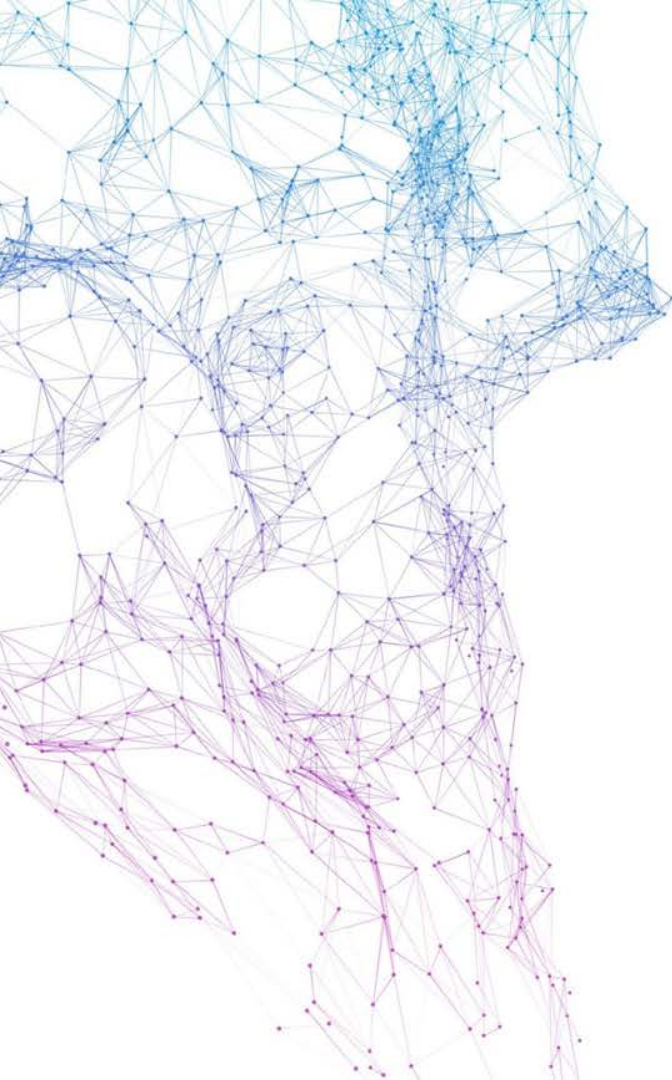
Current State of IT Operations Management

Market Segmentation

IT Operations Management / Systems Management

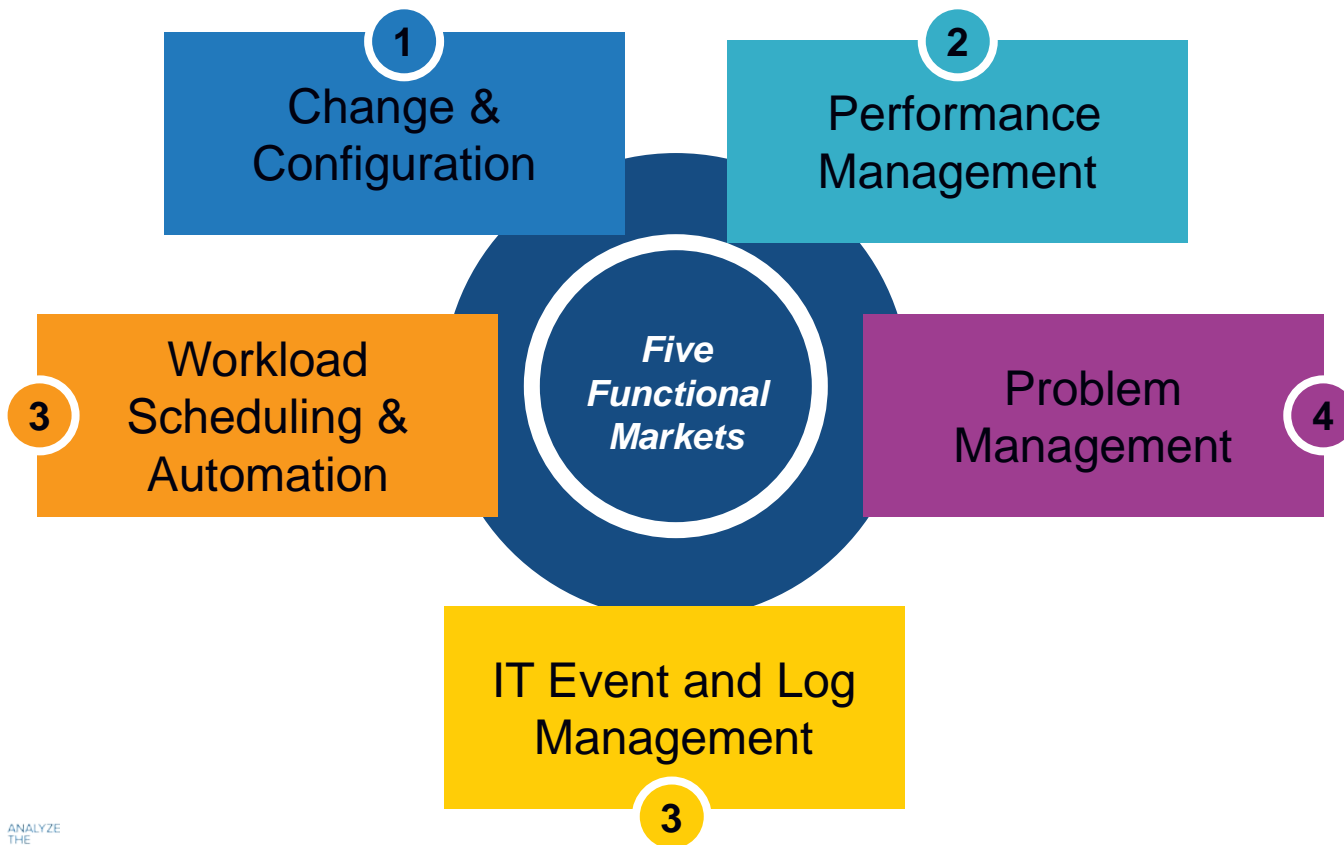
- Configuration Management
- Monitoring
 - Infrastructure
 - APM (End User Included)
 - ITOA (Substantially log, Splunk major contributor)
 - Network Performance
 - Event Management
- Workload Management and Scheduling





IDC's Take

Enterprise Systems Management Software Scope



Top Trends

Automation & Orchestration

- ▶ DevOps, Cloud, Containers increase the rate of change, the density of computing and the complexity of operations
- ▶ Automation & orchestration become critical to managing enterprise computing and applications at scale



Digital Transformation

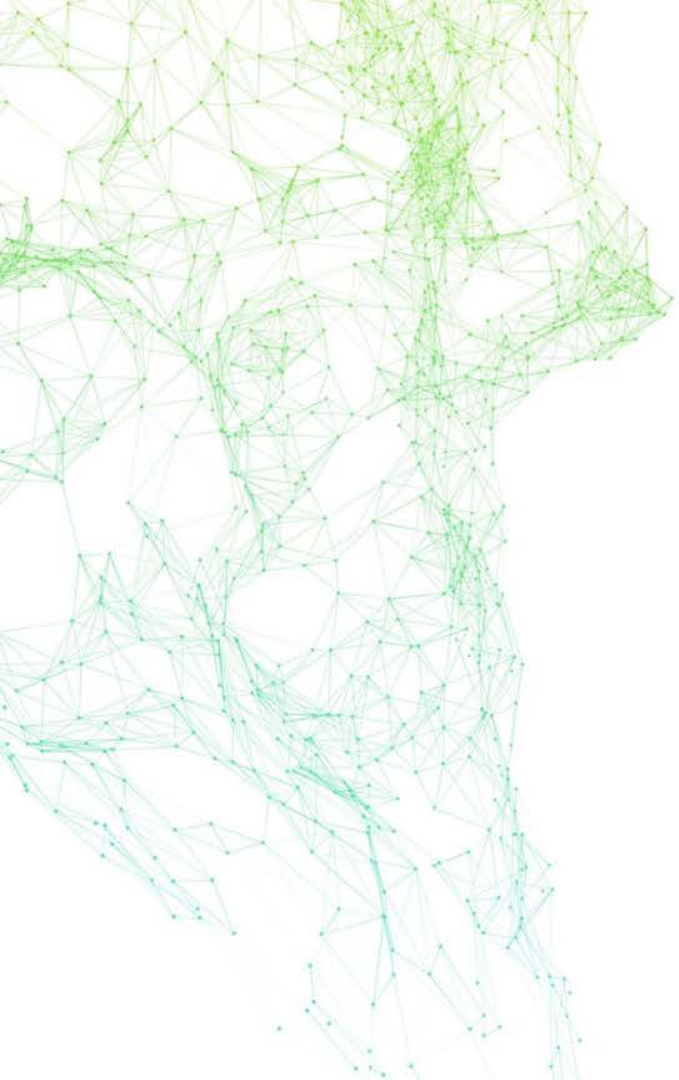
- ▶ Digitization of business demand infrastructure and application modernization
- ▶ Greater use of public cloud services drives creates operational complexity

DevOps

- ▶ Majority of IT spend impacted by LOB and Dev demands
- ▶ Cloud native applications must integrate with traditional applications and infrastructure
- ▶ Governance, policies and controls must support old and new roles and resources

Power of Analytics

- ▶ Application performance and end user experience are top priorities
- ▶ Big data analytics enable new generation of proactive and predictive insight
- ▶ DevOps demands near real time control



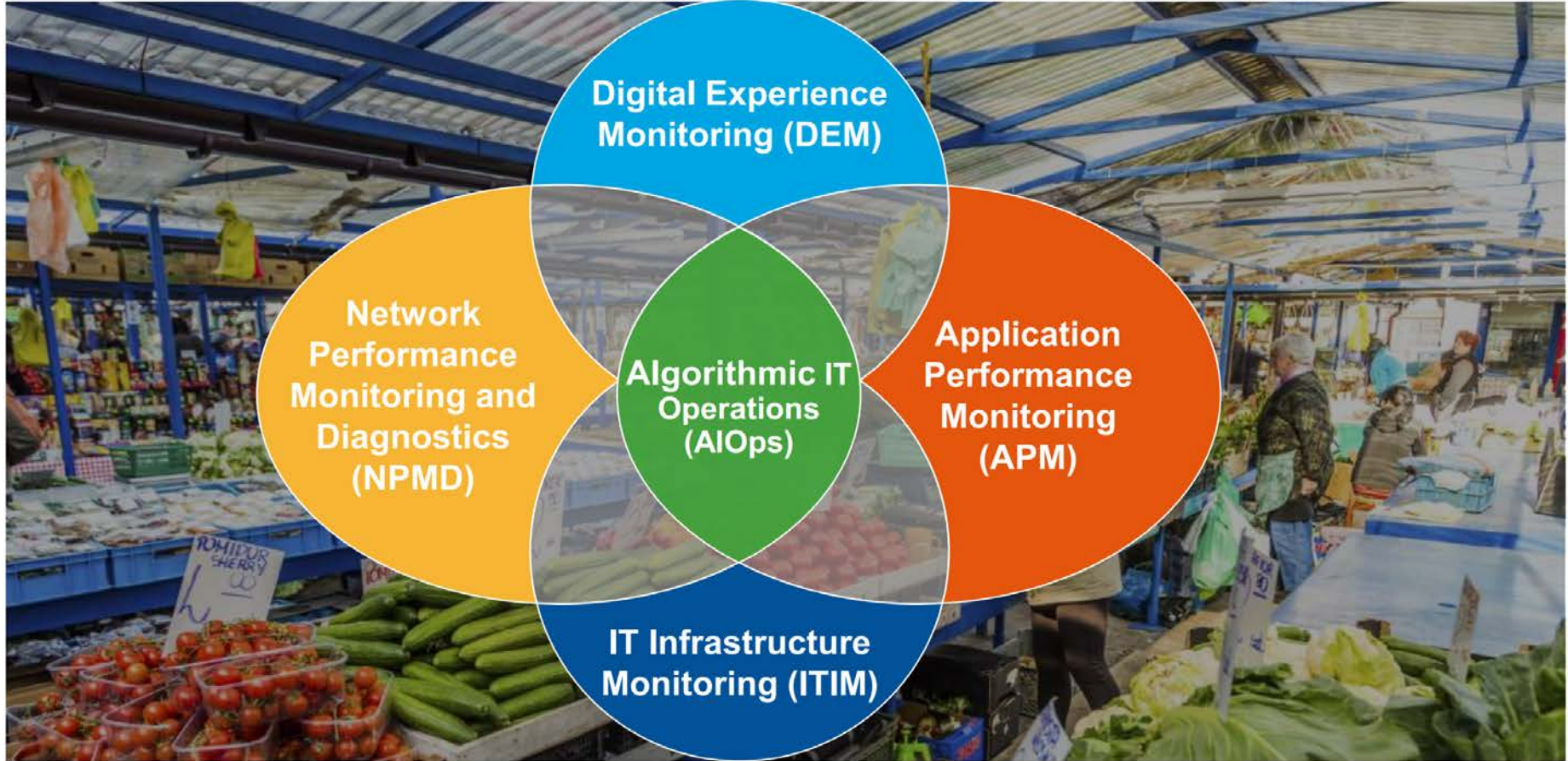
Gartner's Take

Strategic Planning Assumption
by 2022

90%

of successful I&O leaders will
focus on facilitating transactions,
not building and running infrastructure,
up from less than 1% today

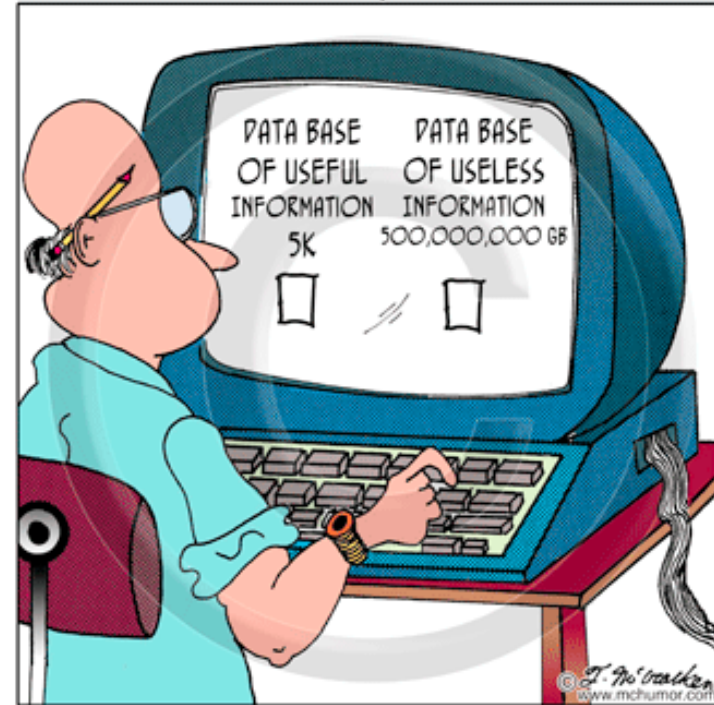
Monitoring Silos Will Continue to Converge



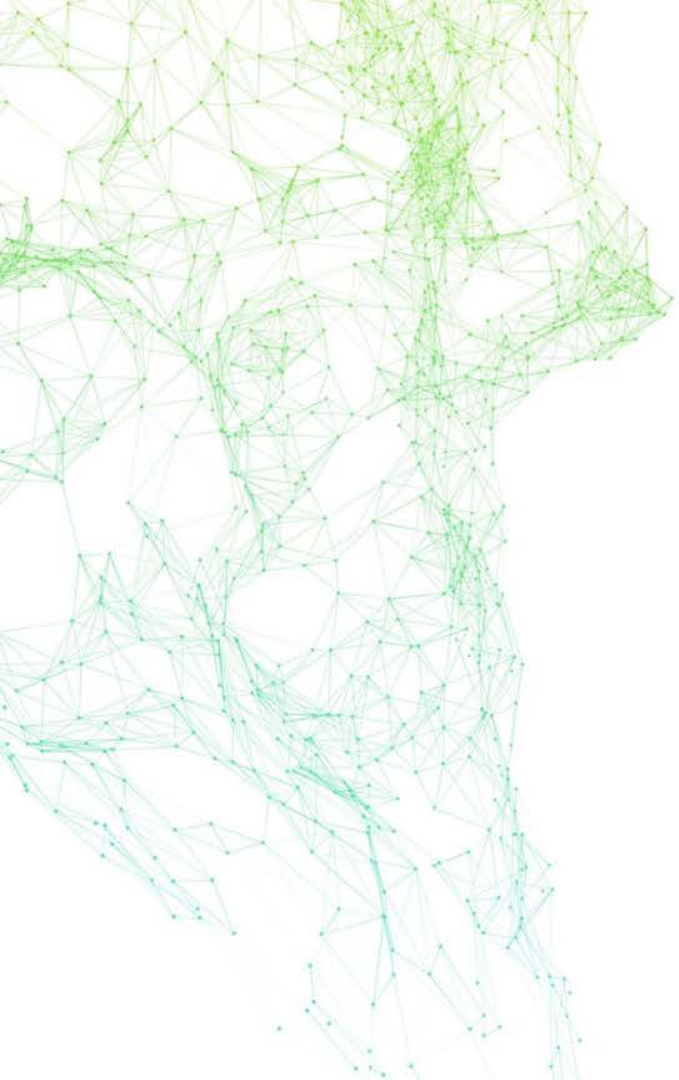
Monitoring = Big Data

- Monitoring is a big data problem
- Two opposing viewpoints
 - Distill and lose granularity OR keep it all and become overloaded
 - Store it all? Oh, wait it costs \$ to store?
 - Value questionable
- Future is edge computing (which we do already to some extent)

MCHUMOR.com by T. McCracken



©T. McCracken mchumor.com



Future of Monitoring

Open Source Grows Up

- ELK / ElasticStack (Logs)
- Prometheus (metric collection/alerting)
- Grafana (Time Series can use several backends)
- Keep an eye on TICK (InfluxData)
- Tracing (part of APM)
 - OpenTracing (Dapper)
 - OpenZipkin (Twitter, Pivotal)

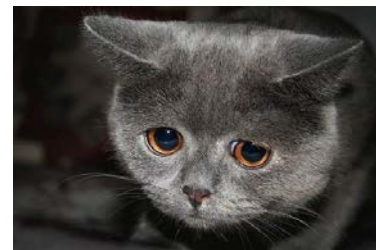


Devs do the work for app layers

Choose what to log/instrument

Remember!

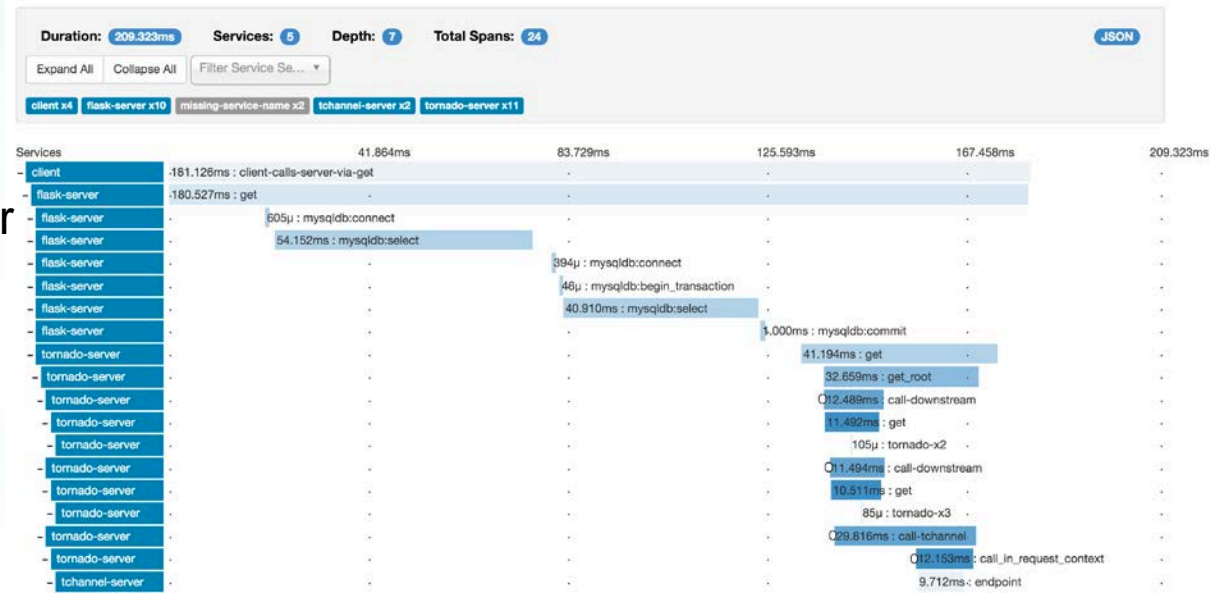
Each log or instrumentation creates overhead



Future of Open Source



- Automated instrumentation
 - Brave for Java
 - JavaScript, .NET Core, Go, Ruby, and many others
 - Integrated into Pivotal Cloud Foundry for automated tracing
- Manual instrumentation library for many other languages



Gartner APM Definitions Pre 2016



5 Dimensions of APM

- **End-user experience monitoring (EUEM) -**

The capture of data about how end-to-end latency, execution correctness and quality appear to the real user of the application. A secondary focus on application availability may be accomplished by synthetic transactions emulating the end user.

- **Application topology discovery and visualization**

The discovery of the software and hardware infrastructure components involved in application execution, and the array of possible paths across which these components communicate to deliver the application.

- **User-defined transaction profiling**

The tracing of user-grouped events, which comprise a transaction as they occur within the application as they interact with components discovered in the second dimension; this is generated in response to a user's request to the application.

- **Application component deep dive**

The fine-grained monitoring of resources consumed and events occurring within the components discovered in the application topology discovery and visualization dimension. This includes the server-side components of software being executed.

- **IT operations analytics (ITOA)**

The combination or usage of the following techniques: complex operations event processing, statistical pattern discovery and recognition, unstructured text indexing, search and inference, topological analysis, and multidimensional database search and analysis.

Gartner APM Definitions Change



Digital experience monitoring (DEM) —

- availability and performance monitoring ... optimization of the operational experience and behavior of a digital agent, human or machine, as it interacts with enterprise applications and services. real-user monitoring (RUM) and synthetic transaction monitoring (STM)

Application discovery, tracing and diagnostics (ADTD)

- Understand the relationships between application servers, to map transactions across these nodes, and to enable the deep inspection of methods and other host resources.

Application analytics (AA)

- Application analytics enables the automated detection of the source (or root cause) of performance anomalies through machine learning, statistical inference and/or other methods.

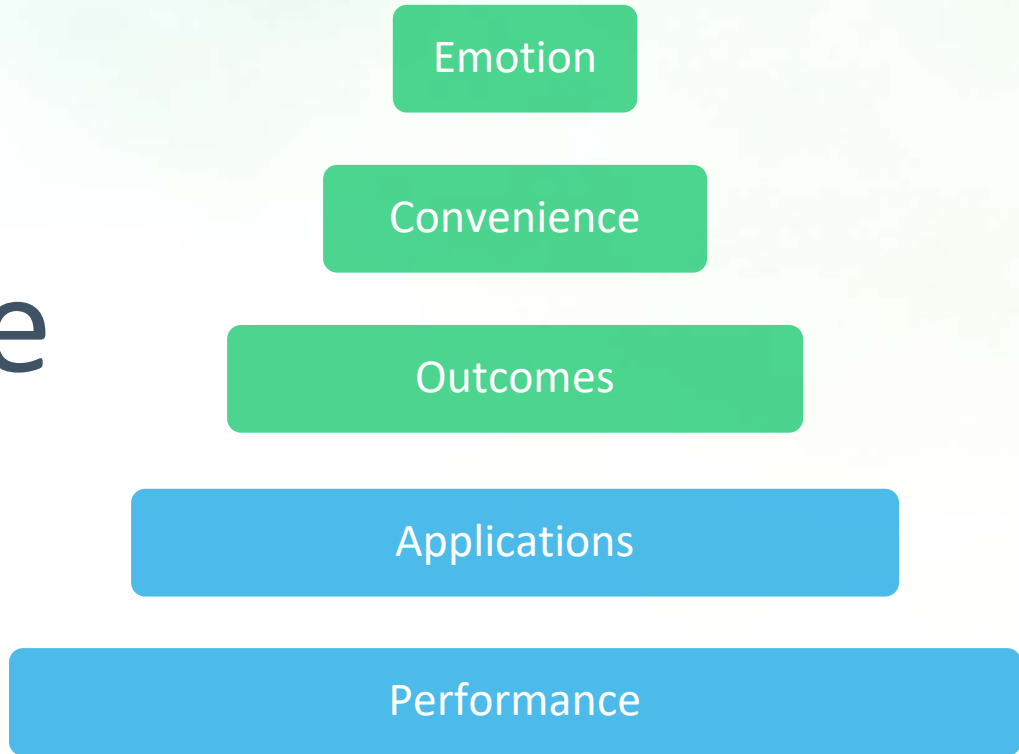
Observed Changes: Back to the Basics

- Mapping is articulated more clearly
- Analytics definition is optimized to focus on troubleshooting



- Increased focus on Synthetic
- Mapping is combined with the code level deep dive diagnostics
- Infrastructure and network are de-emphasized
- Ecosystems not relevant

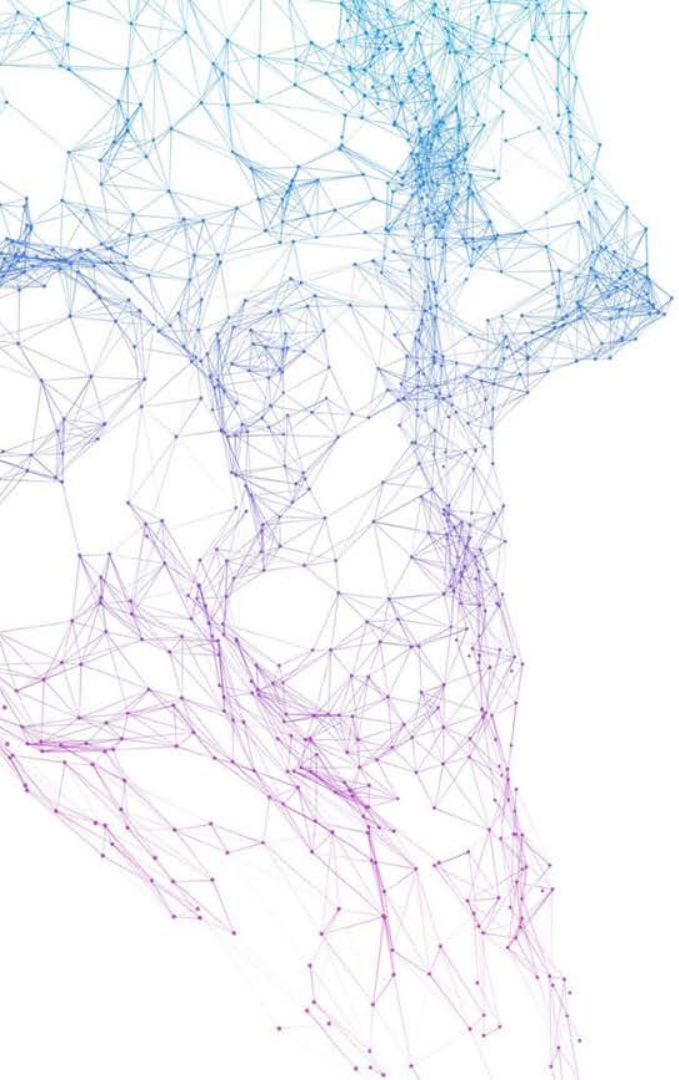
Customer Experience



Digital Experience Monitoring

- Customer Experience = Digital Experience
- Measure the end user browser (JavaScript) and mobile app (Library for now...)
 - Realtime performance and usage insights
- Diagnose faster use DEM as an early warning indicator
 - Understand sporadic issues and specific user problems
 - Correlate to backend for diagnostics





Solving Monitoring

Graphs and dashboards don't scale



Called analytics?
Who's doing the
analysis?

You are!

If you don't stop vendors will keep pouring money and time into dashboards, because it sells software



Digital Businesses must relate Users/Apps to the infrastructure



Checkout Transaction



Mobile/Web



App



Middleware



Database



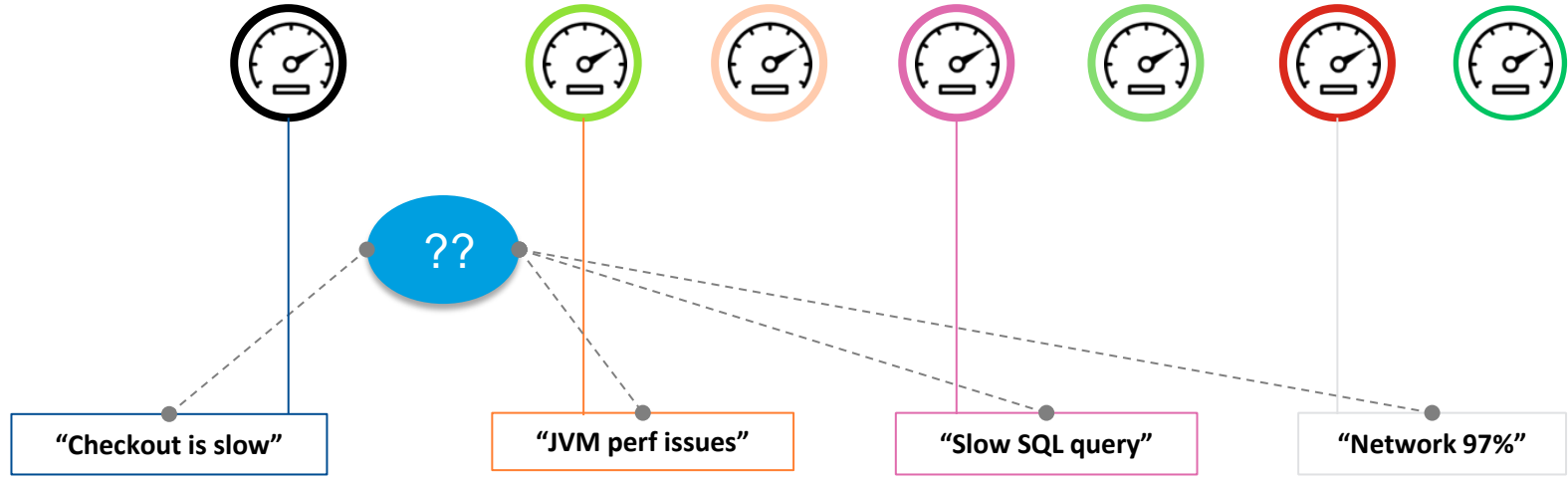
Server



Network

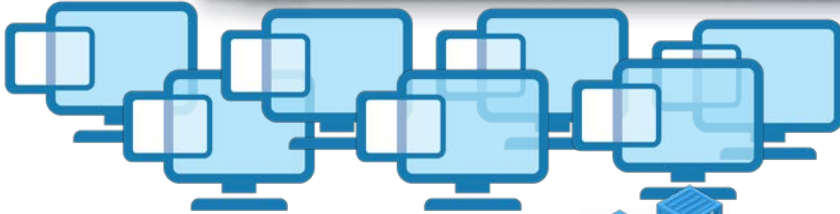


Storage

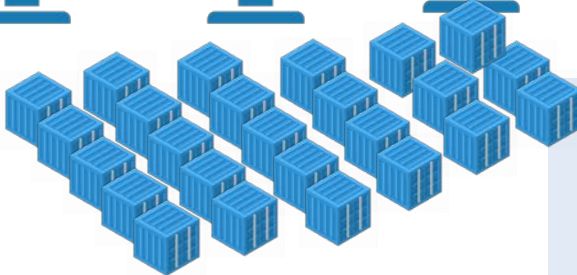


An abstract, light green geometric pattern consisting of interconnected lines forming various polygons, primarily on the left side of the slide.

**But... the infrastructure
is changing**



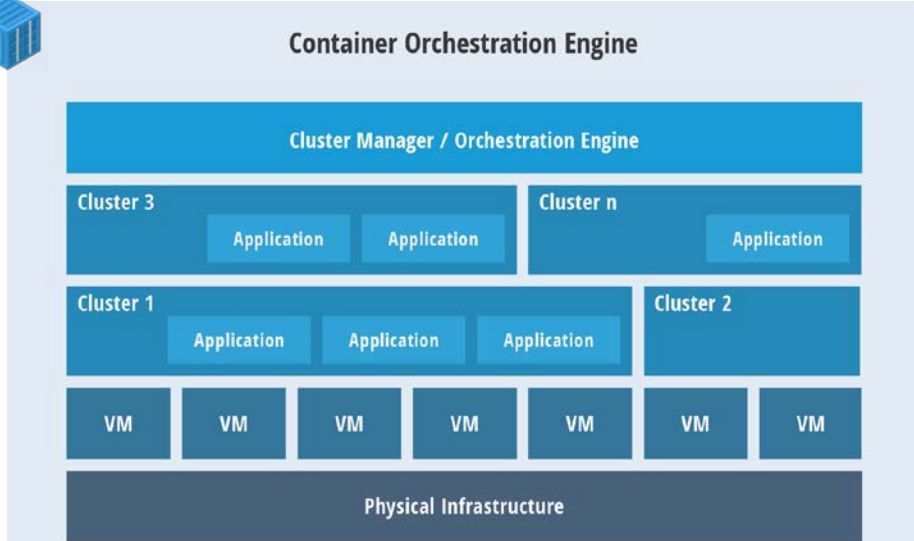
20 VMs




150 Containers

Each layer has tools

Orchestrated



An abstract, light green geometric pattern consisting of interconnected lines forming various polygons, primarily triangles and quadrilaterals, is visible on the left side of the slide. The pattern is semi-transparent and blends into the white background.

**And... the applications
are changing**



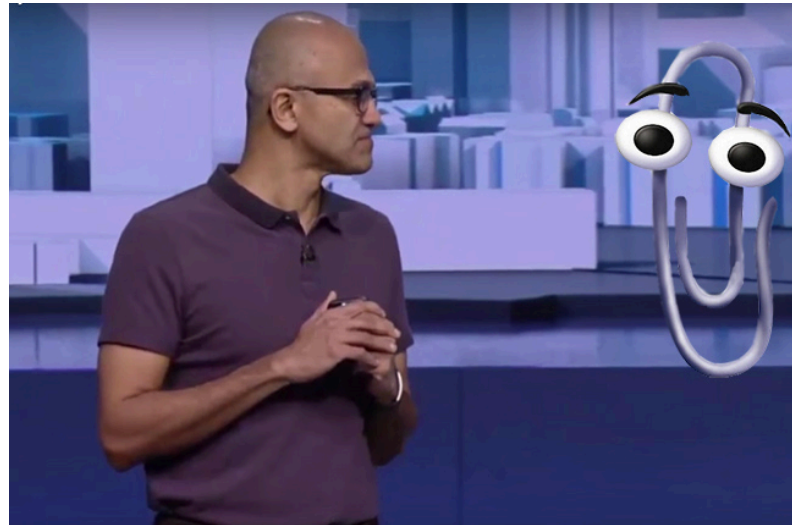
We must also fix how we work

- ITSM and ticketing are silos in legacy environments today
 - DevOps
 - CI/CD
 - Human intervention
- CMDBs don't handle dynamic workloads or automated environments
 - Driven by discovery every 1-7 days
 - Lack business context
- Need better collaboration to resolve incidents



The allure of AI

- You'll hear AI from everyone
- AI is not about using rulebooks and programmed outcomes
- AI is unsupervised learning
- AI must be driven by learning how humans interact and collaborate





Thank you

APPDYNAMICS

@jkowall