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Pixie Training: Kubernetes Observability

3 days (21 hours)

Overview

Pixie provides real-time Kubernetes observability without application instrumentation, enabling you to quickly diagnose latency, errors, and network behavior. Ideal for production troubleshooting, analyzing traffic between services, and gaining a deep understanding of a cluster.

This training guides you through the installation and use of Pixie to automatically explore metrics, traces, and events at the kernel level (eBPF), then correlate these signals with Kubernetes resources (pods, services, namespaces). You will learn to investigate real-world incidents: timeouts, saturation, HTTP errors, bottlenecks, and inter-service dependencies.

The approach is hands-on: guided demos, investigation workshops, creating Pixie queries (PxL), and building operational dashboards. Deliverables: a monitored lab cluster, a set of reusable queries, and a diagnostic checklist applicable to your environments.

Like all our training courses, this one will introduce you to **the latest stable version** of the technology and its new features.

Objectives

- Install and configure Pixie on a Kubernetes cluster.
- Explore real-time views (network, HTTP, DNS, CPU) by namespace and workload.
- Write PxL queries to investigate latency, errors, and dependencies.
- Correlate Pixie signals with Kubernetes logs/events to isolate the root cause.
- Automate troubleshooting workflows and team dashboards.

Target Audience

- DevOps / SRE Engineers
- Kubernetes administrators
- Back-end developers in microservices environments
- Platform / Cloud Architects

Prerequisites

- Solid foundation in Kubernetes (pods, services, deployments, namespaces)
- Basic understanding of networking (TCP, DNS, HTTP) and latency
- Experience using a terminal and kubectl
- Understanding of observability concepts (metrics, traces, events)

Technical prerequisites

- Computer with at least 8 GB of RAM (16 GB recommended)
- OS: Linux, macOS, or Windows with WSL2
- Tools: kubectl, Helm, access to a Kubernetes cluster (local such as kind/minikube or remote)
- Code editor and internet access to download charts and dependencies

Our Pixie training program: Kubernetes Observability

[Day 1 - Morning]

Fundamentals of Kubernetes observability and Pixie's positioning

- Review: Kubernetes metrics, logs, traces, and events
- Use cases: latency debugging, application errors, CPU/memory saturation, DNS
- Introduction to Pixie: eBPF, instrumentation-free collection, available data
- Prerequisites and constraints: Kubernetes versions, CNI, RBAC permissions, resources
- Hands-on workshop: Quick cluster audit and defining observability goals.

[Day 1 - Afternoon]

Installation and introduction to Pixie on a Kubernetes cluster

- Pixie deployment: components, namespaces, agents, and controller
- RBAC configuration and best practices for access separation
- Connection and navigation: UI, views, PxL scripts, data exploration
- Initial diagnostics: pods, services, network requests, HTTP/gRPC errors
- Hands-on workshop: Install Pixie, validate data collection, and run basic PxL queries.

[Day 2 - Morning]

Network and application performance analysis with Pixie

- Mapping traffic flows: service-to-service, namespaces, ports, and protocols
- Identifying latency: p50/p95/p99, bottlenecks, and timeouts
- Diagnosing errors: HTTP codes, resets, DNS errors, retries
- Protocol inspection: HTTP, gRPC, PostgreSQL/MySQL (depending on environment)
- Hands-on workshop: Investigating latency along an application path and isolating the faulty service.

[Day 2 - Afternoon]

PxL: queries, scripts, and operational dashboards

- Understanding PxL: datasets, filters, aggregations, and time windows
- Writing targeted queries: top N, errors by service, latency by route
- Creating reusable views: parameters, templates, and best practices
- Standardization: runbook scripts, sharing, and standardization of analyses
- Hands-on workshop: Writing a PxL “runbook” script to diagnose 5xx errors and latency.

[Day 3 - Morning]

Security, governance, and production operations

- Access management: RBAC, multi-team, scopes by namespace
- Compliance and sensitive data: masking, retention, inspection limits
- Sizing: CPU/memory consumption, impact, and tuning
- Operational strategies: updates, Pixie monitoring, troubleshooting
- Hands-on workshop: Hardening access (RBAC) and validating an access model by team/namespace.

[Day 3 - Afternoon]

Integrations, SRE workflows, and end-to-end diagnostic scenarios

- Interoperability: exporting/consuming observability signals based on existing tools
- Incident workflow: triage, hypotheses, evidence collection, post-mortem
- Kubernetes correlation: deployments, rollouts, HPA, configuration changes
- Standardizing runbooks: checklists, PxL scripts, exit criteria
- Hands-on workshop: Incident simulation (latency + errors) and guided troubleshooting with Pixie.

Target Audience

This training is intended for both individuals and companies, large or small,

wishing to train their teams in new advanced IT technology or to acquire specific business knowledge or modern methods.

Assessment upon enrollment

The pre-training assessment complies with Qualiopi quality standards. Upon final registration, the learner receives a self-assessment questionnaire that allows us to evaluate their estimated proficiency with various types of technologies, as well as their expectations and personal goals for the upcoming training, within the limits imposed by the selected format. This questionnaire also allows us to anticipate certain connection or internal security issues within the company (intra-company or virtual classroom) that could pose challenges for monitoring and ensuring the smooth running of the training session.

Teaching Methods

Practical Course: 60% Practical, 40% Theory. Training materials distributed in digital format to all participants.

Organization

The course alternates between theoretical input from the trainer, supported by examples and reflection sessions, and group work.

Assessment

At the end of the session, a multiple-choice questionnaire is used to verify that the skills have been properly acquired.

Certification

A certificate will be issued to each trainee who has completed the entire training program.