CLOUD NATIVE
FINERACT WITH
SCALABILITY

Presented by Zoltan Mezei

FinTech Track

COMMUNITY
THE ASF CONFERENCE
CODE

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The Boring Slide

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BaaSFlow

Apache Fineract
Agenda

- Previously on ApacheCon2022…
- The AKF Scale Cube
- Fineract Instance Modes
- New Helm Chart
- Managed Platform Concept
- Terraform Guardrails
- Stay tuned for ApacheCon2024…
### The AKF Scale Cube and Fineract

**AKF Scale Cube**

- **X Axis** → database replication
- **Z Axis** → tenants

**Fineract 2022**

- **X Axis** → database replication
- **Z Axis** → tenants

**Fineract 2023**

- **X Axis** → database replication + Deployment/StatefulSet autoscaling + batch work distribution
- **Y Axis** → Fineract instance modes + Liquibase-only profile
- **Z Axis** → tenants

Source: *The Art of Scalability*
Fineract Instance Modes 2022

**AWS EKS**
- **Read-Only API Servicing**
  - Fineract Instance Pod
  - Fineract Instance Pod
- **Read-Write API Servicing**
  - Fineract Instance Pod
  - Fineract Instance Pod
- **Parallel Batch Execution**
  - Fineract Instance Pod
  - Fineract Instance Pod

**AWS RDS (Aurora PostgreSQL)**
- **Read-Only Instance**
- **Read/Write Instance**
- Scales up to the Master Database physical limits

**Messaging System - AWS MSK (Kafka) / Other messaging solution**
- Messaging system node
- Messaging system node
“Specific URIs” (in case you are really interested):

- /api/v1/jobs*
- /api/v1/scheduler*
- /api/v1/loans/catch-up*
- /api/v1/loans/is-catch-up-running*
Fineract on Kubernetes Highlights

- New Helm Chart packed with features
  - Support for multiple Workloads in the same chart
    - Liquibase run in the pre-installation/pre-upgrade hook
    - Multiple Deployment and StatefulSet instances with different configurations (files and environment variables)
  - Autoscaling and other production-ready performance, security and availability features
  - Unified Ingress instances for the automatic request distribution

- Disclaimer: currently supports AWS EKS + AWS load-balancer controller only
Helm Chart Screenshot

- Performance Tuning
- Availability
- Features

495 lines
Managed Platform Concept

2022 version

- Centralized management by BaaSFlow via Jenkins
- Centralized deployment by BaaSFlow in our own AWS accounts

Source: dreamstime.com
Managed Platform Concept

Obstacles

- Regulatory issues
  - Outsourcing is challenging
  - Data protection is challenging

- Organizational issues
  - Clients want to manage their own infrastructure
  - Separation of concerns

- Technical issues
  - Missing features (e.g. Liquibase-only mode, data archival solution)
  - Missing configurations guidelines for production-readiness
  - Bugs (e.g. JDBC driver parameters)
Managed Platform Concept

2023 version

- Guardrails provided by BaaSFlow
  - Split “management” to separate roles:
    - Owner → who pays for the component
    - Manager → who configures the component
    - Client(s) → who benefits from the component
  - Implemented cost allocation methods
  - Split non-production and production environment and data types

- Terraform and Jenkins code opened to our partners
  - Not open sourced yet - but stay tuned
variable "environment_type" {
    type = string
    description = "The type of the environment (dev/test/prod)."
    validation {
        condition = contains([ "dev", "test", "prod" ], var.environment_type)
        error_message = "environment_type validation failed"
    }
}

variable "data_type" {
    type = string
    description = "The type of the data handled in the environment (non-prod, prod)."
    validation {
        condition = contains([ "non-prod", "prod" ], var.data_type)
        error_message = "data_type validation failed"
    }
}
Conclusion and future plans

Conclusion

- The improvements contributed by BaaSFlow enables wider adoption of Fineract via improving the software’s non-functional capabilities

Future plans

- Working on better tenant management, separation, and security
- Adding archival capabilities
Thank you

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To learn more about BaaSFlow and our upstream contributions.

www.baasflow.com