
AWS
re:Invent
NOV. 28 – DEC. 2, 2022 | LAS VEGAS, NV

PRT302

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Modernizing a megascale database

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aws

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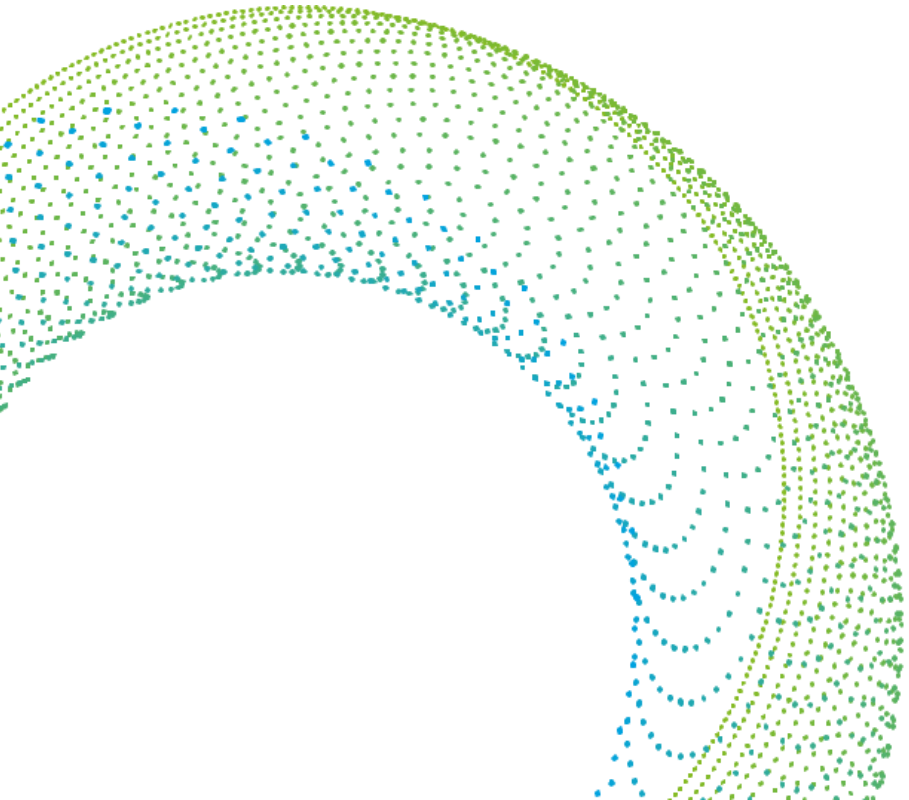
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NOVEMBER 2022

AWS re:Invent 2022

Agenda



- CalHEERS Background
- CalHEERS at a Glance
- CalHEERS Goals and Objectives
- CalHEERS Database Characteristics
- CalHEERS Database modernization methodology
- DataFury

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Background

CALifornia
Healthcare
Eligibility
Enrollment
Retention
System

CalHEERS is the web-based system serving as the eligibility and enrollment backbone for both the

Affordable Care Act process through Covered California

and

Medi-Cal

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CalHEERS at a glance

By the numbers

9.2M
User Accounts

450 TB
Production Data

43
Partner Agencies

72
External interface connections

540+
Total servers

3
Multi-Zone Deployment

1,200+
COTS & Open-source technologies

46
Environments

A collaboration between

- **Covered California**
- **Department of Healthcare Services**
- **State of California Office of Systems Integration**
- **Deloitte Consulting LLP**
- **AWS**

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Technology refresh goals and objectives

	Goal 1: Reduce Complexity	Goal 2: Improve Performance	Goal 3: Increase Resiliency & Cost Efficiency
OBJECTIVE	**Objective 1:** Restructure legacy architecture to easier to understand, develop, and test light weight (LW) architecture **Objective 2:** Improve modularity to reduce security risk	**Objective 3:** Implement service level scalability to optimize system resources and improve user response times	**Objective 4:** Increase system capacity by using cost-effective software licenses **Objective 5:** Modernize technologies to improve speed to market
FOCUS	• Containerize and modularize • Faster deployment times	• Scale services per demand	• Adoption of cost-efficient licenses

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Open-source, cloud-native adoption

Sprints towards a nimble, light-weight, containerized future-ready architecture in 18-months

Modernization season kicked-off !!!

February 2022

Start of Tech Modernization

May 2022

Platform: OpenShift Container

API Gateway: 3scale & FUSE

Address Validation: SmartyStreet

Lightweight: Foundation, Demographics, IVR

July 2022

Security: ForgeRock,

Webserver: Apache

Lightweight: Security, Correspondence, Dashboard

September 2022

Datawarehouse: Databricks, Snowflake

Lightweight: Eligibility, Verification, Document

February 2023

Lightweight: Account, Administration, Enrollment, DevTools

April 2023

Lightweight: Partner flow

May 2023

Aurora PostgreSQL

June 2023

Content Delivery Network: Cloud Front

Rules engine: Drools Decision Manager

Partner integrations: FUSE

FINISH LINE

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Characteristics of legacy database implementation and its challenges



Costly



Proprietary



Non-ANSI SQLs



CapEx licensing

150 TB
Production data

8033
Tables

460
Stored Procedures

4570
Queries

+15M
Cases

37
Compliance controls

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Fully managed opensource DB services accelerate innovations

Performance



Portability



Resiliency



Security



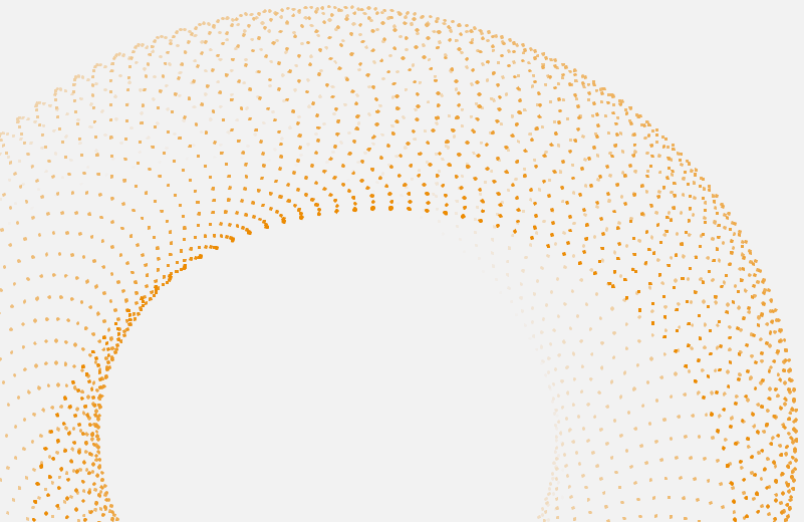
Scalability

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CalHEERS Database Re-platforming methodology

Discover

Refined estimates





As-is Portfolio & Target state



Gap Analysis



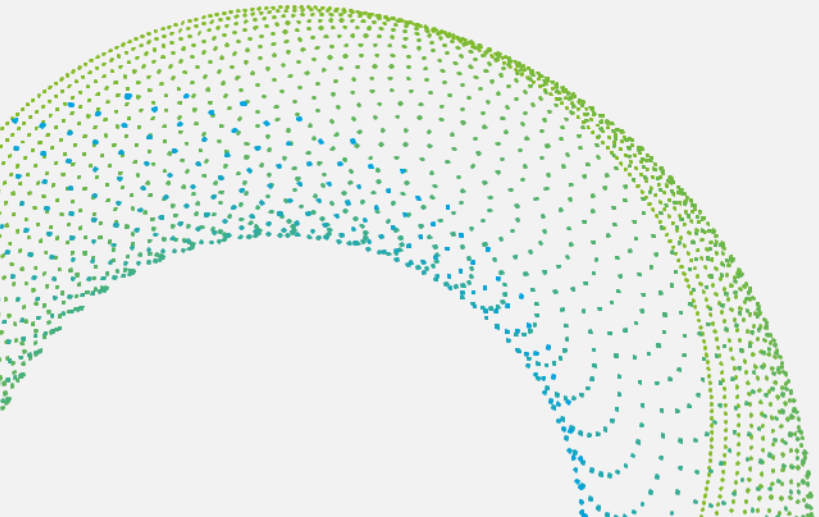
LOE and Timeline

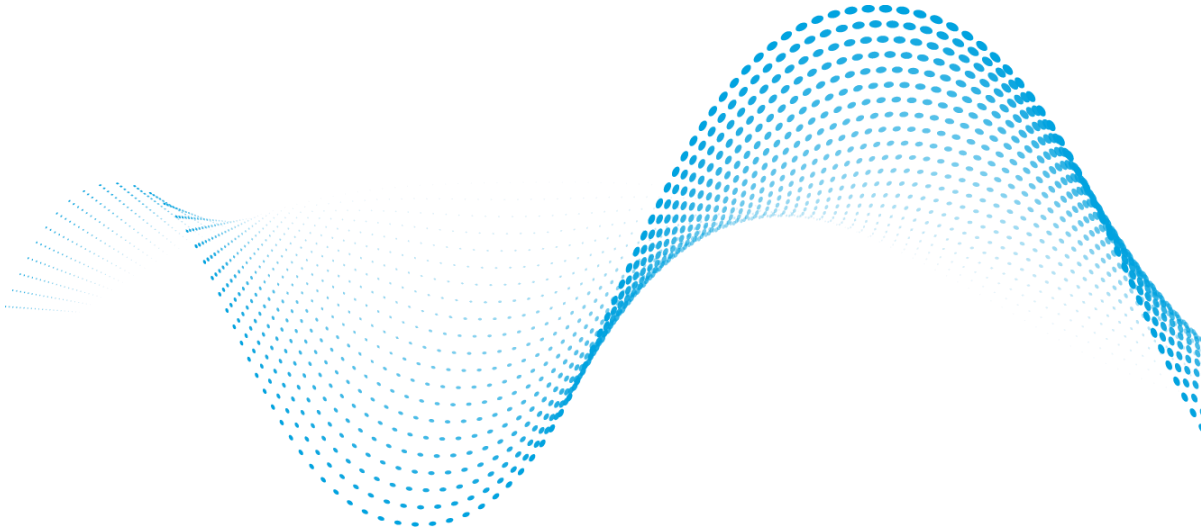
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CalHEERS Database Re-platforming methodology

Migrate

All database assets







SQLs



Data



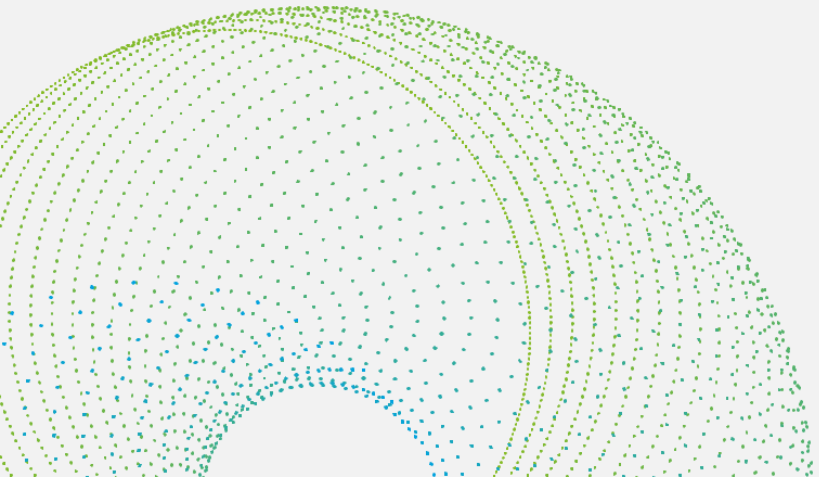
Controls

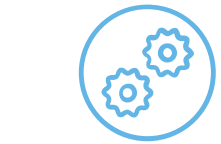
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CalHEERS Database Re-platforming methodology

Quality Attributes

-lity patterns





Efficiency



Availability



Security



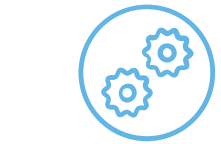
Portability

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CalHEERS Database Re-platforming methodology

Operate

Operations Transition



SOP update



Day-in-the-Life



Soft Launch



Cutover & Hypercare

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DataFury—database migration automation



Understanding the comprehensive set of retrofit changes and their level of effort is daunting



sonarqube



Assess



Migrate



Quality

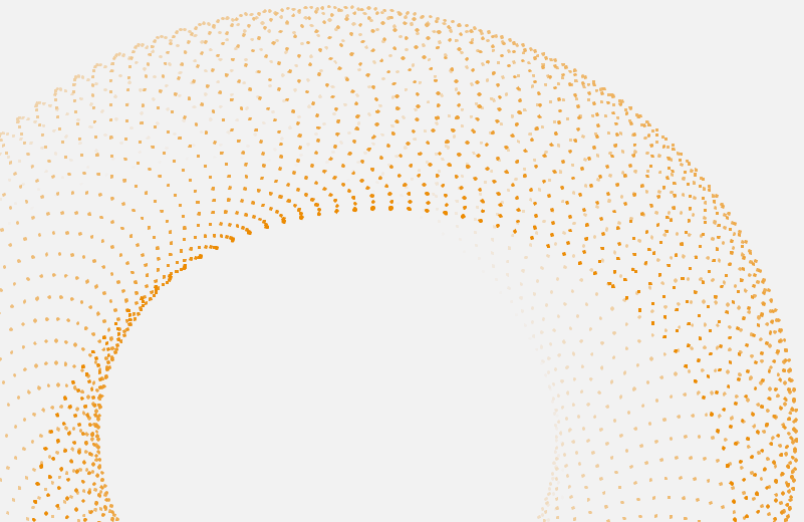
Deloitte's DataFury Database Code Analyzer extends AWS native migration methodology and tools for highly automated database migration

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DataFury

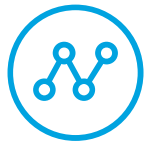
Assess

Refine level of effort





Scan code



Map Data



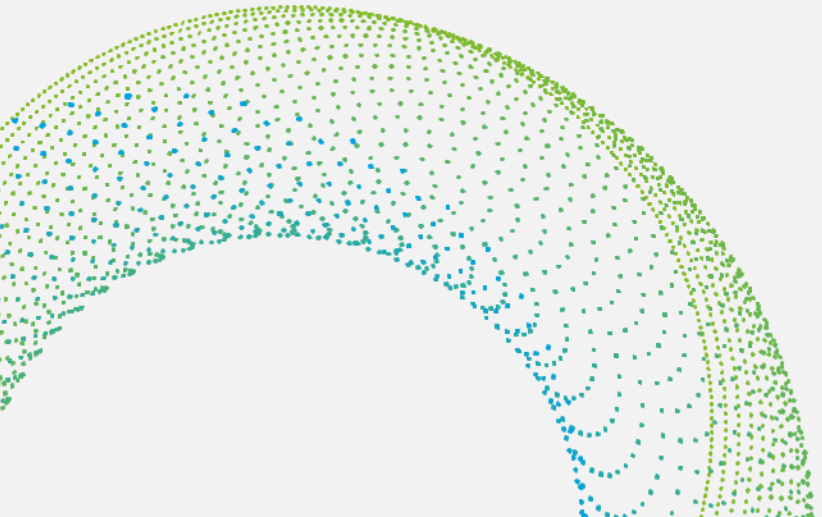
Estimate effort

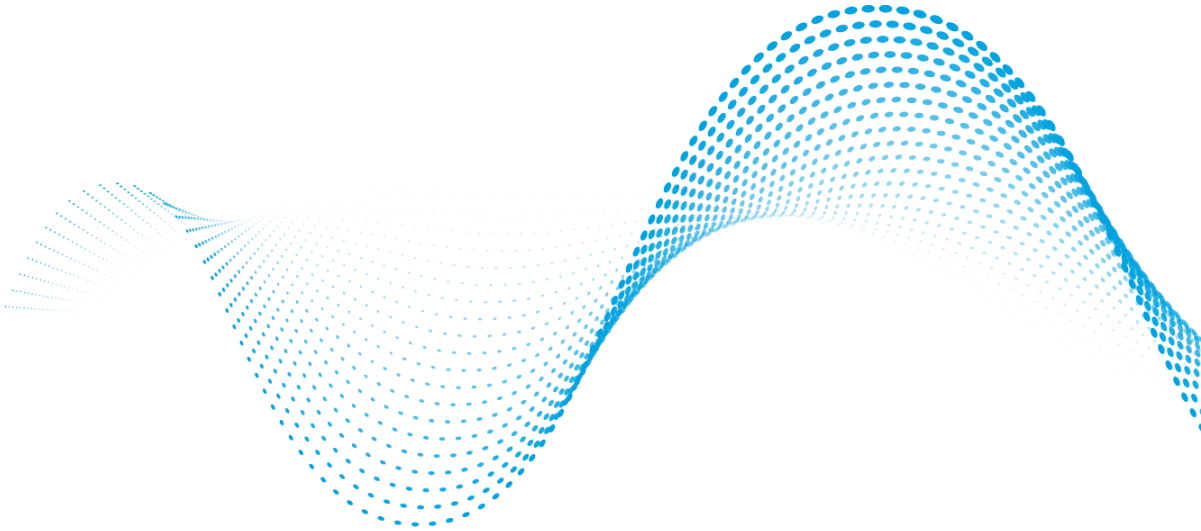
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DataFury

Migrate

Automation and validation





Modernize to ANSI SQL

Pre/Post Unit Tests

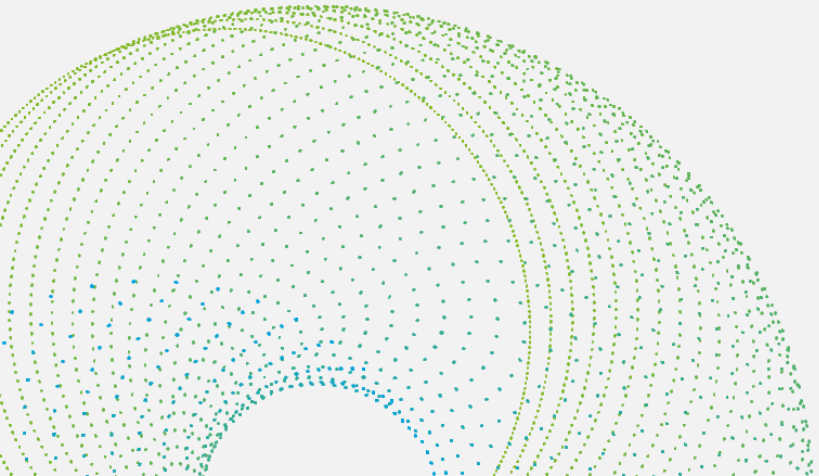
Validate Data

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DataFury

Quality

Automated validation





Scan Portability anti-patterns



Performance baseline

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DataFury—database migration automation

Manually reviewing application code for legacy database code patterns and assess migration effort is time consuming, resource intensive, and highly error prone.



AWS Schema Conversion Tool



AWS Database Migration Service

sonarqube

DataFury

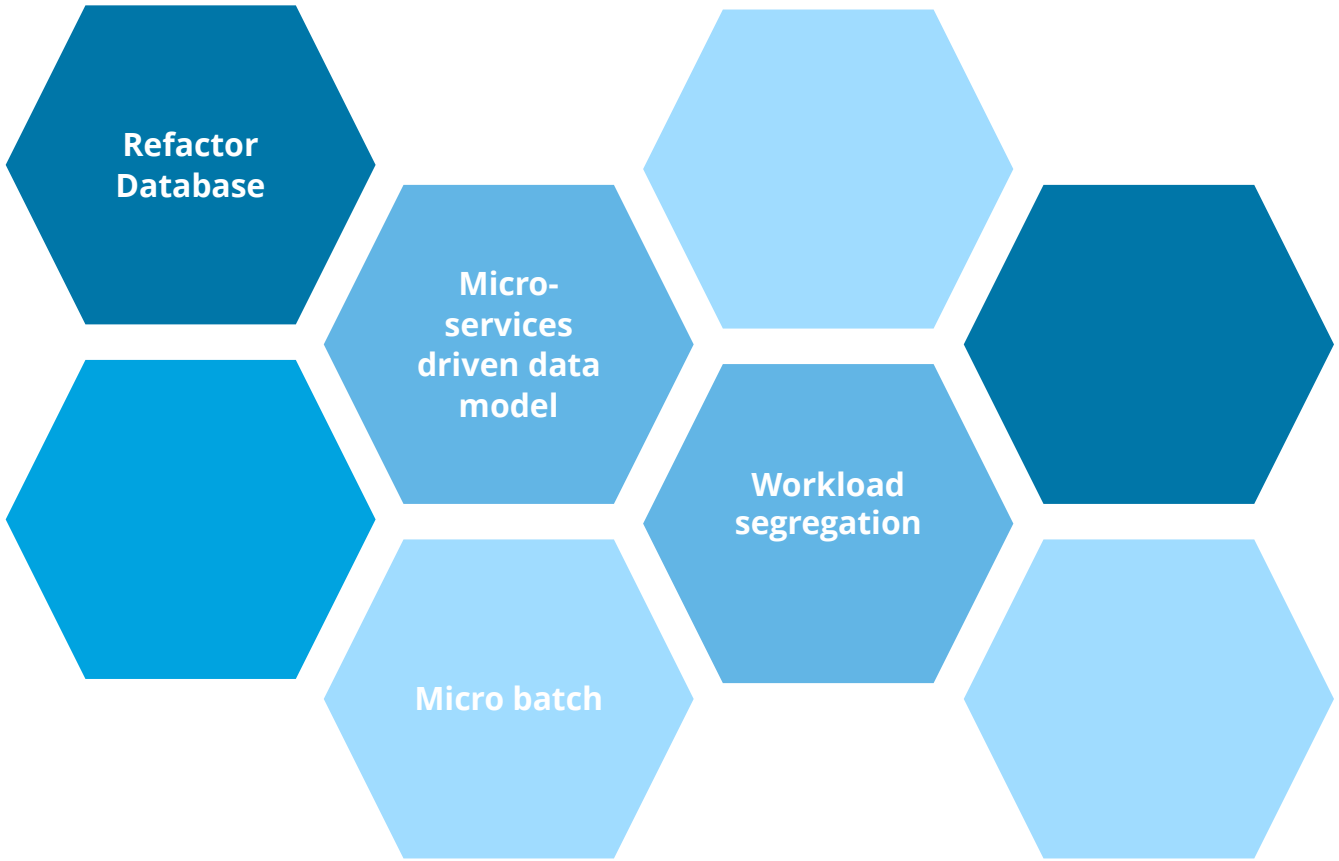
- **Refine Level of effort**
- **Migrate Complex SQLs**
- **Create SQL Unit Test**
- **Migrate complex data structures**
- **Validate migrated data/SQLs**
- **Baseline performance**
- **Scan Portability antipatterns**
- **Instrument Granular monitoring**

Deloitte's DataFury Database Code Analyzer extends AWS native migration methodology and tools for highly automated database migration

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A future ready Database!

Re-platforming lays the foundation for further database innovations



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Thank you.

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