

ORACLE®

Creating a Consortium Blockchain

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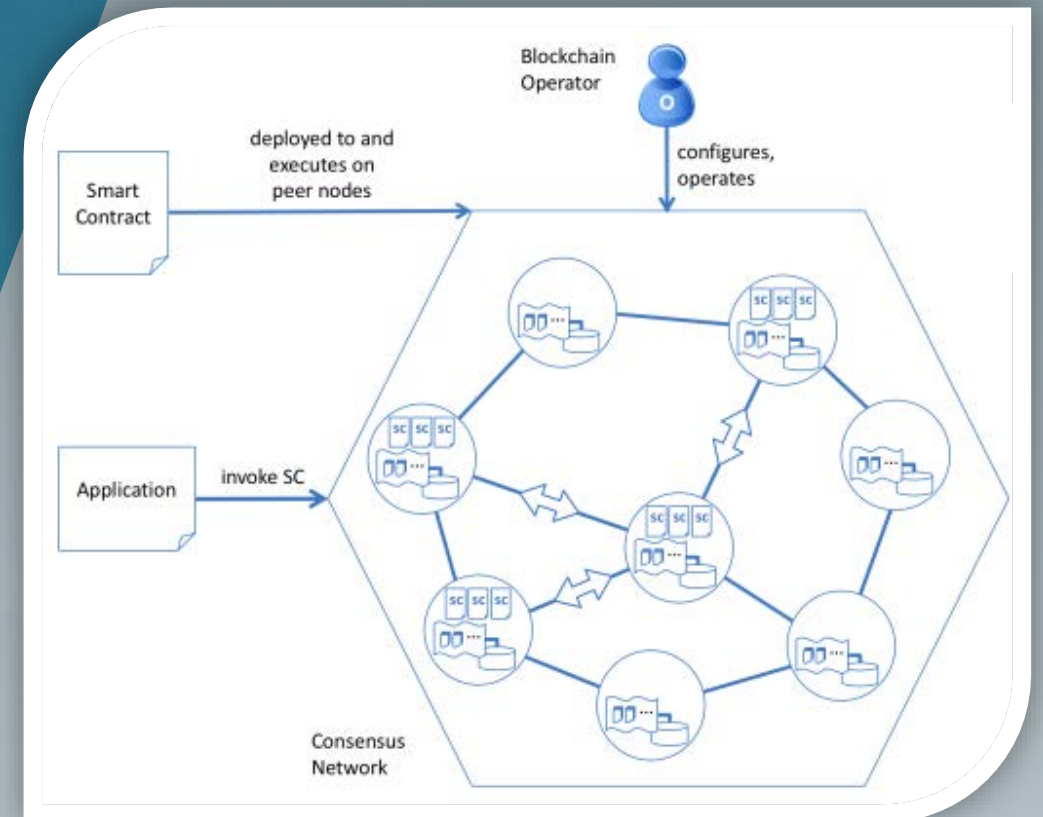


Agenda

- 1 Introduction to Consortium Blockchains
- 2 Forming a Blockchain Consortium
- 3 Administering a Consortium Blockchain
- 4 Summary
- 5 Q & A

What is a Blockchain

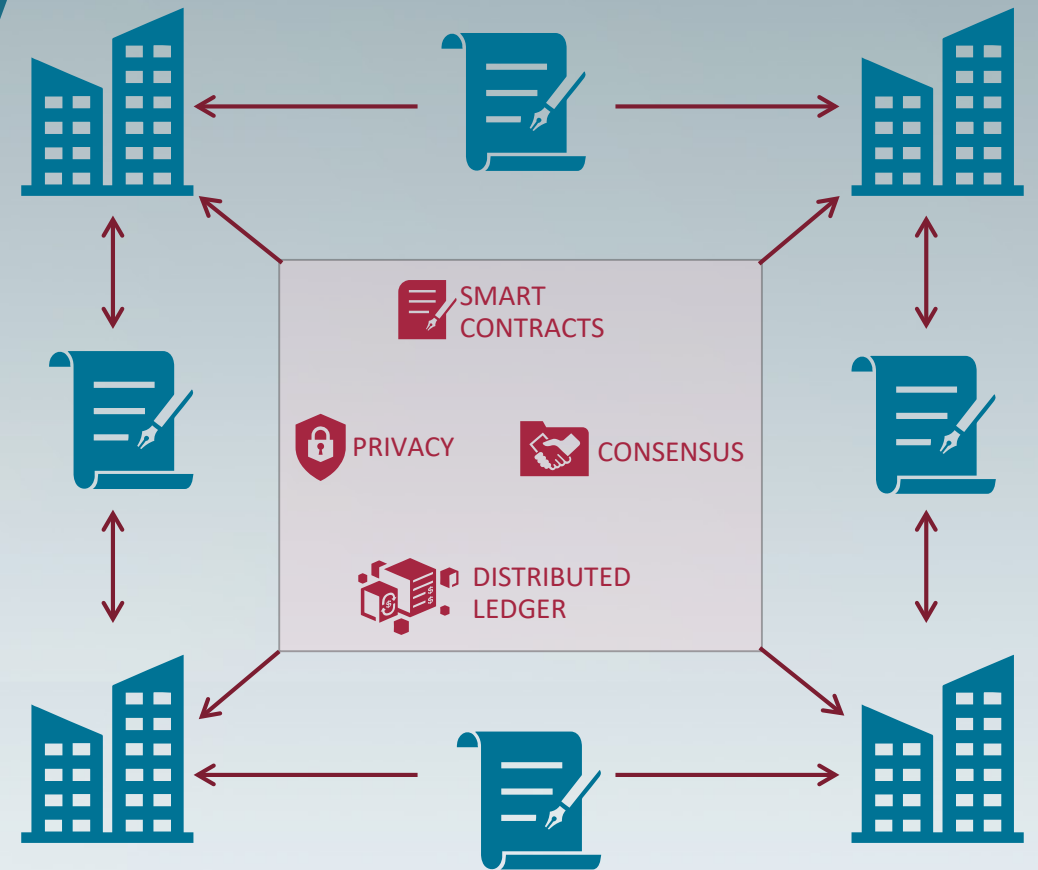
- System for maintaining distributed ledgers in a peer-to-peer network
- Allows multiple parties that may not fully trust one another to do business securely
- Reduces need for third-party intermediaries
- Near real-time and unalterable records replicated among all participants



How Does a Blockchain Work?

Improve the process

- Maintains distributed ledger of facts and history of the updates
- Changes to the ledger are made by smart contracts (business logic) when triggered by transactions from external applications
- Participants execute smart contracts on the validating nodes (peers) and follow consensus protocols to verify results
- When consensus is reached under network's policies, transactions and their results are grouped into blocks, which are appended to the ledger with cryptographically secured hashes for immutability



Four Key Properties of Blockchains

- Shared & Transparent Data Access
- Immutable/Tamper-evident Ledger
- Validated/Non-Repudiable Transactions
- Confidential Records and Transactions

Key Components of a Blockchain System

Applications

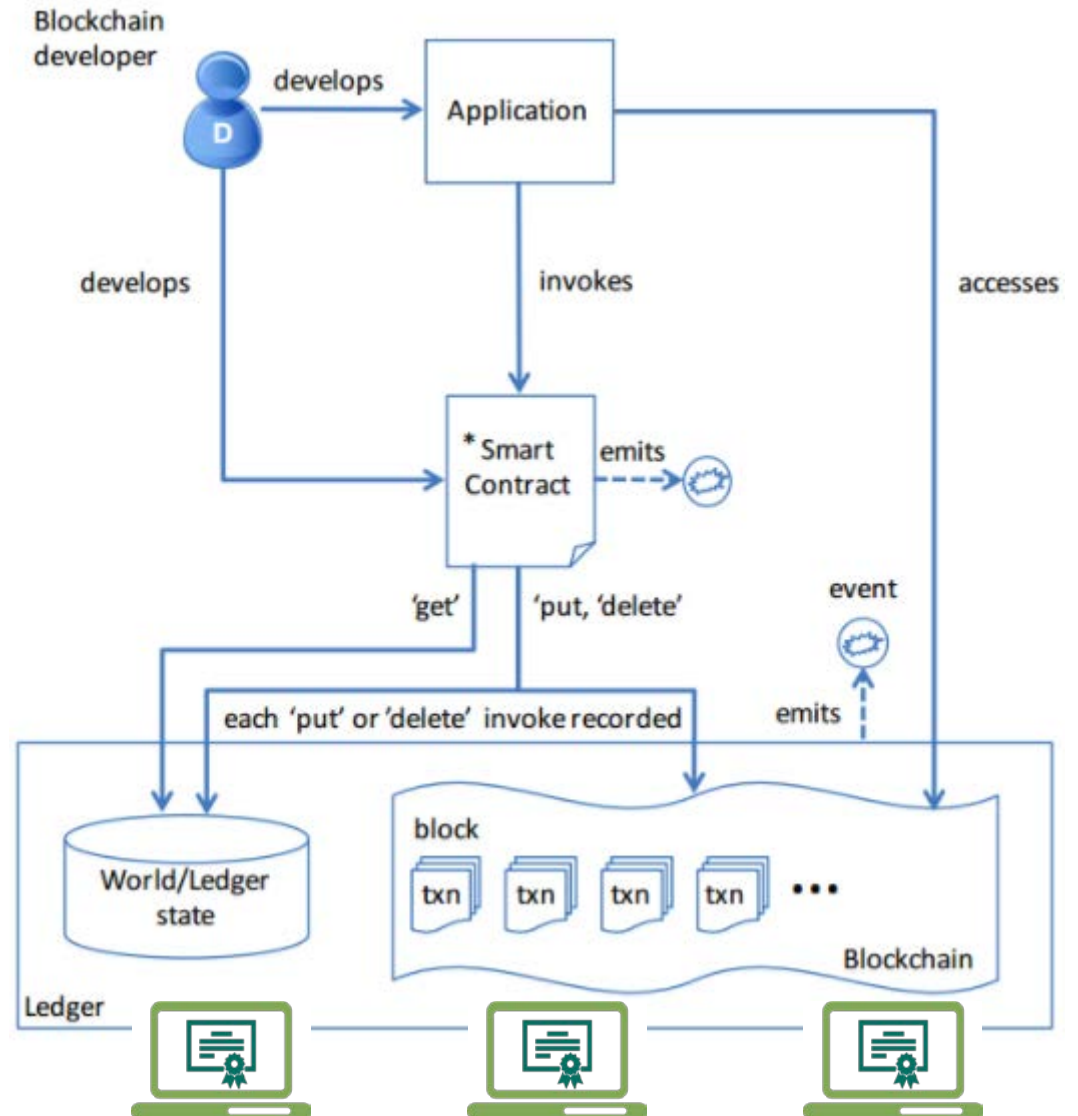
- Register users
- Invoke smart contracts to update or query data
- Consume events

Smart Contracts

- Business logic to update the ledger
- Query data
- Publish events

Blockchain Infrastructure

- Network of validating nodes
- Distributed Ledger
- Membership services (for permissioned)



Types of Blockchains

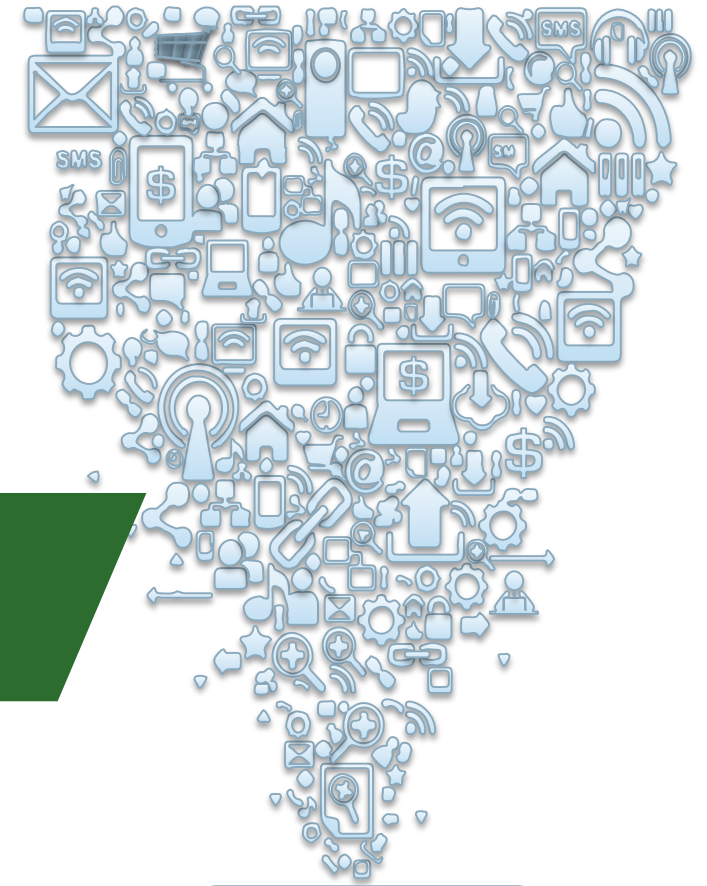
- Permissionless – Anyone can join, i.e., validate and/or submit transactions aka Public – typically rely on mining to validate transactions
- Permissioned – Only duly authorized participants can join – aka Private – members are known
- Consortium – Type of permissioned blockchain – participants are invited to join – used to facilitate transactions between organizations



Disruptive Characteristics/Benefits of Blockchain

- **Decentralized, peer-to-peer network – No central, controlling authority** → Eliminating intermediaries means reduced transaction costs and near real-time transaction execution
- **Distributed ledger** - All participants maintain a copy of the ledger → Eliminates manual efforts and delays due to reconciliation needs since data consistency is a key attribute of the distributed ledger
- **Immutable transaction history** – Impossible to make changes to existing transactions in a blockchain without detection → Increased confidence in the information and reduced fraud opportunities
- **Smart contracts** – Business logic deployed on a blockchain and shared and validated by participants. → Automated business processes in a trusted way. Represent any asset digitally.
- **Transparent** – Transactions on a blockchain are visible to the authorized participants. → Increased auditability and trust, reduce cost of fraud and audits

What You Can Use Blockchain For?



**Enable distributed,
autonomous marketplaces**

**Reduce friction in business
transactions and reconciliations**

**Securely maintain and share
decentralized records**

**Track the provenance of
products and materials**

Single source
of Truth

Trusted
transactions

Near-real time
data sharing

Immutable
ledger store

Forming a Blockchain Consortium

- Who: Typically existing business partners
- Often starts with a founding member
- Others invited to join
- Need to establish governance policies
- Need to select blockchain platform

Governance Policies

- Membership policies
 - Membership requirements/responsibilities
 - Adding and removing members
- Consortium Management Policies
 - Governing board
 - Decision making policies
- Incentives, Costs, Fees

Selecting a Platform

- Must support consortium style blockchain
- Must provide the necessary resilience
- Must support performance requirements
- Ideally support cloud and on-premise
- Must meet privacy and confidentiality requirements
- Recommend Hyperledger Fabric

Oracle Autonomous Blockchain Cloud Service

Industrialized, hardened blockchain cloud platform for enterprise applications

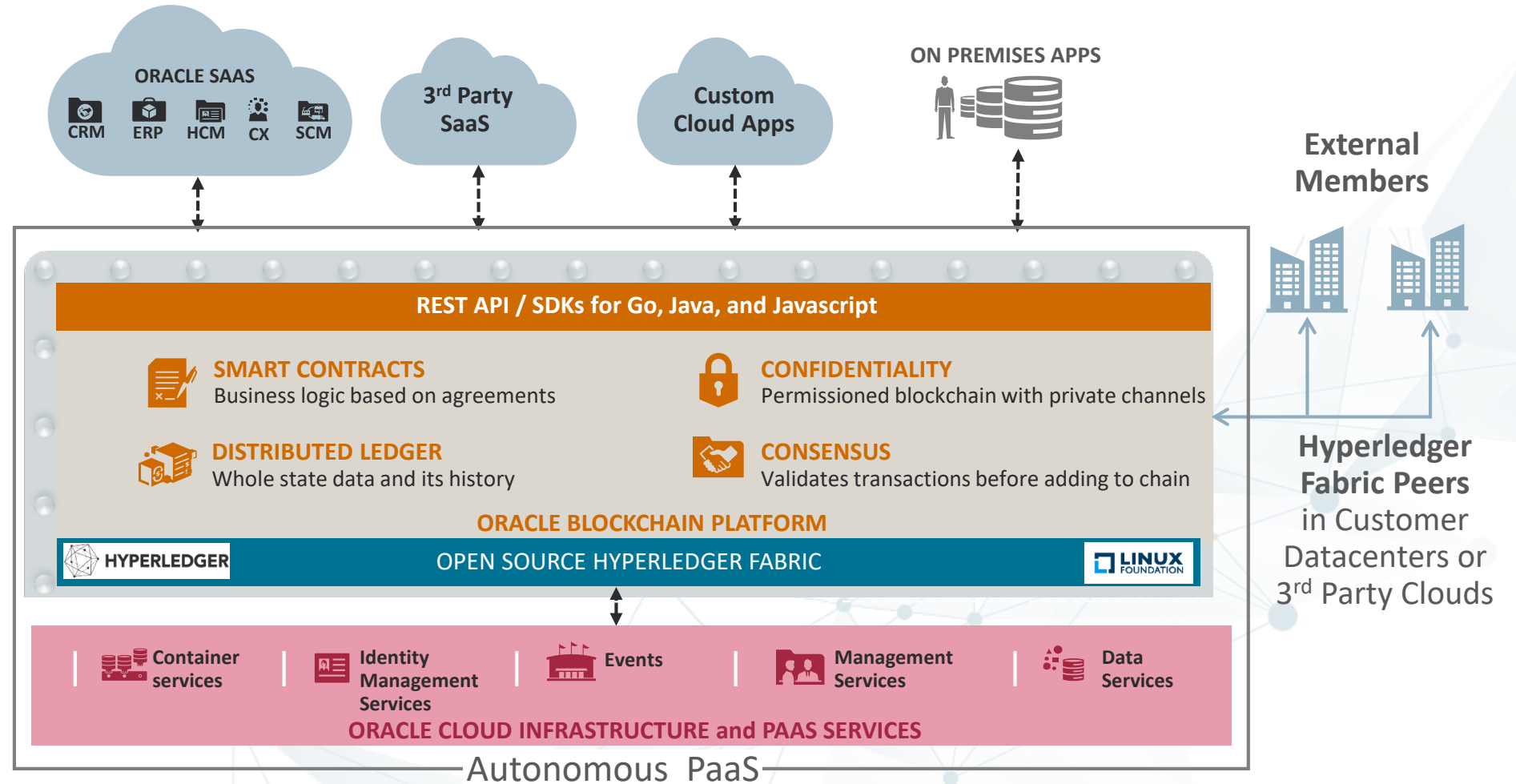
Pre-Assembled

Open

Plug and Play
Integrations

Enterprise-Grade

Autonomous



OCI Compute: *Broadest Set of Compute Options in Cloud*

**High
Performance**

Consistency

Control

**Bare Metal
Compute**



Your Hypervisor

VM Compute



Hypervisor

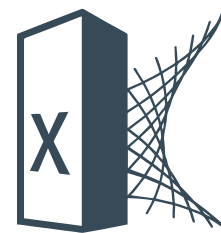
Container Service



**VM Migration
Services**



**Engineered
Systems,
Cloud@Customer**



**Dedicated
Compute,
SPARC**



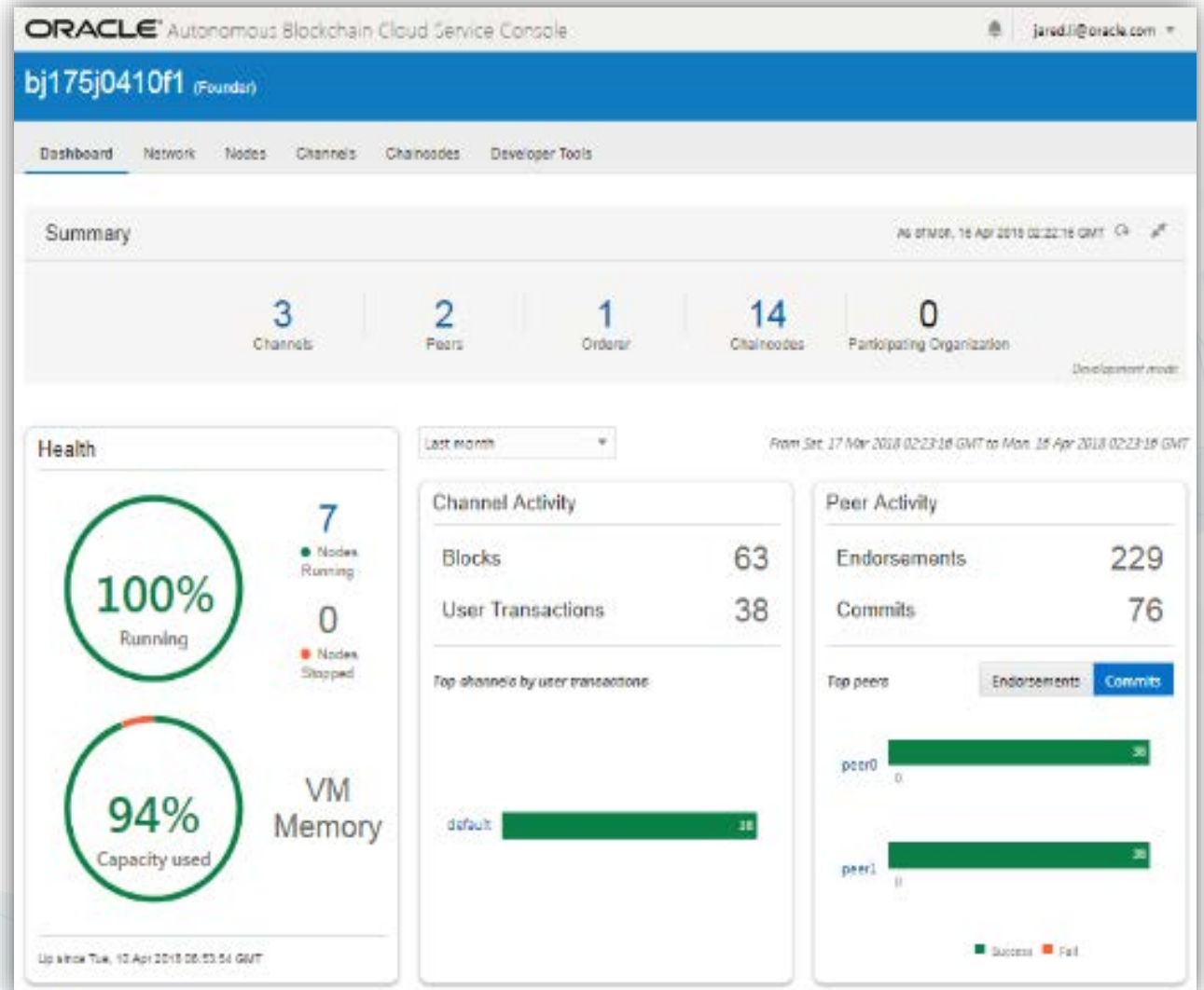
Administering a Consortium Blockchain

- Local administration
 - Operation, administration, and management of your instance
 - Normal patching, upgrading, backing up, etc.
 - Adhere to the consortium governance policies
- Consortium Blockchain Administration
 - Typically agreed upon and coordinated out of band
 - Network configuration changes
 - Membership changes – add/remove members
 - Ledger creation – channels in Fabric
 - Smart contract creation and deployment



Monitoring a Consortium Blockchain

- Monitoring required at multiple levels
 - Compute resources
 - CPU
 - Network
 - Disk
 - Blockchain activity
 - Transactions
 - Blocks
 - Ideally blockchain application
 - Response time
 - Errors
- Usually difficult to view all details due to decentralized nature
 - Can't see other orgs infrastructure



Oracle Strategy

- Deliver Enterprise-Grade Blockchain Cloud Platform
- Help Customers In Many Industries Adopt Blockchain and Distributed Ledgers
- Enable Rapid Experimentation and Production-Readiness
- Simplify Integration to Accelerate Blockchain Use in SaaS and PaaS Applications
- Deliver Blockchain SaaS Apps for Common Use Cases
- Leverage Oracle IP and Open Source to Advance the Enterprise Blockchain Capabilities

Key Oracle Focus Areas in Blockchain



Enterprise-Ready

- Highly secure, built-in privacy
- Scalable business networks
- Highly resilient, built-in backups and recoverability



Ease of Integration

- REST API for API-driven integration
- SDKs for Java, Node.js
- Plug-n-play integration from Oracle SaaS, PaaS, and on premises apps



Quick Time-to-Value

- Pre-assembled, managed PaaS
- Dynamic configurability and member on-boarding
- Start developing applications within minutes

Extending Enterprise Boundary



- Securely extend ERP/SCM/GL business processes in Oracle SaaS, on premises and non-Oracle systems to streamline data exchange and conduct trusted transactions with other organizations
- Enables trusted transactions between Corporates and Banks in Oracle's Digital Innovation Platform for Open Banking



Q&A

For more information of Oracle Autonomous Blockchain Cloud Service:

<https://www.oracle.com/blockchain/>

Integrated Cloud

Applications & Platform Services

ORACLE®