Break New Ground

ORACLE CODE

Developer Meet Up

Build a Blockchain solution in 45 minutes

Using Oracle Blockchain Cloud Service

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Who am I?

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Blockchain across Oracle

Blockchain across Oracle gives you the professional orientation to Blockchain that you need as an Oracle developer in today's changing world. Written by Oracle Developer Champion Robert van Mölken, this book gives you everything you need to get up to speed with the details of Blockchain. You'll really get to understand the Blockchain inside and out - and gain key insights into how the Blockchain affects Oracle developers and customers in this modern and disruptive era.

You'll take a detailed look at the cutting-edge Oracle cloud solutions that allow you to work with the Blockchain as an Oracle developer. You'll learn about Hyperledger Fabric, the opensource Blockchain framework used by Oracle as its core, and how to set up your own Oracle Blockchain Network. You'll design and develop a smart contract and learn how to run it on the Oracle Blockchain Cloud Service.

The final key section of this book looks at how the Blockchain will affect your customers across industry sectors. By studying key trends in the financial services sector, healthcare industry, and the transport industry, you'll discover how the options and possibilities for you and your clients are being transformed by the Blockchain across Oracle. You'll complete this professional orientation with a look at Blockchain future industry and technology directions.

Things you will learn:

- A full introduction to the Blockchain
- How the Blockchain affects Oracle developers and customers
- Core concepts including blocks, hashes, and chains, assets, transactions, and consensus
- How to work with Oracle Cloud to implement a Blockchain Network
- Design, develop, and run smart contracts on the Oracle Blockchain Cloud Service
- Blockchain security and privacy for Oracle developers and clients
- Public and private Blockchain decisions for Oracle architects and developers
- Industry analysis across finance, governance, and healthcare sectors
- Industry trends and the future of the Blockchain technology

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Blockchain across Oracle

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EXPERT INSIGHT

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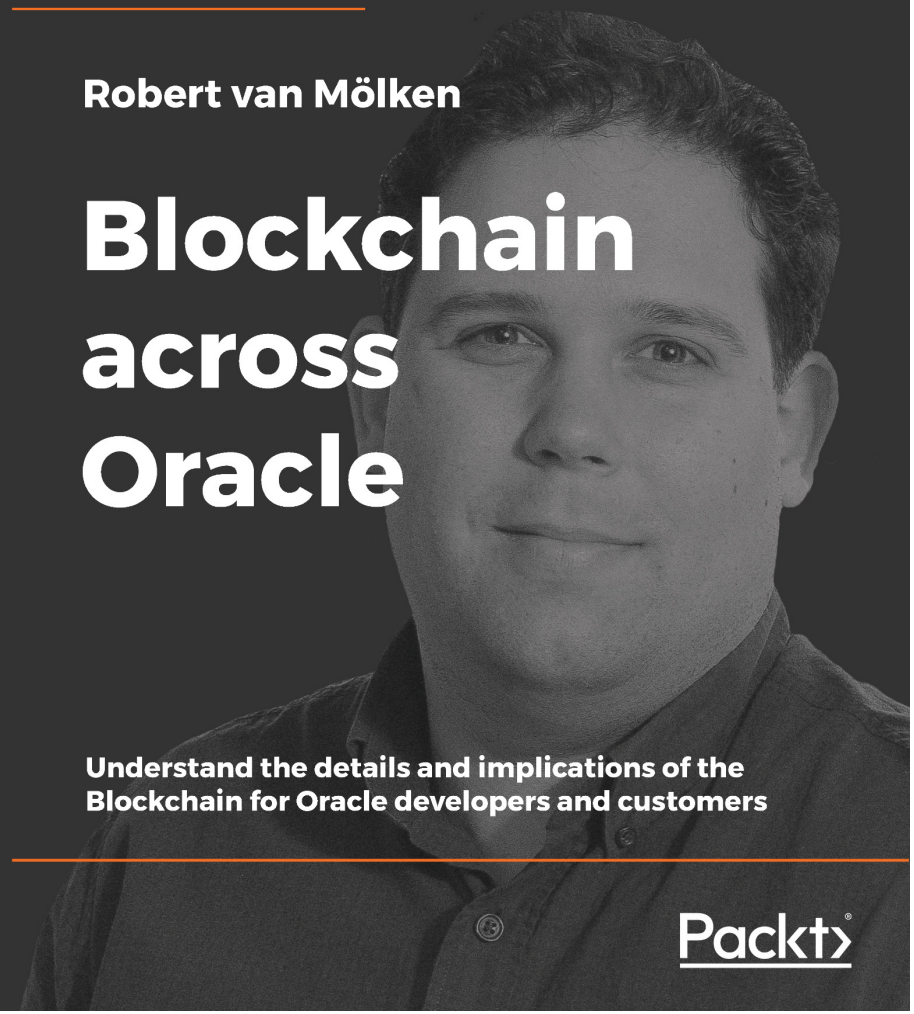
Blockchain across Oracle



Understand the details and implications of the Blockchain for Oracle developers and customers

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Build a Blockchain solution in 45 minutes

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- What is a decentralized blockchain application?
- What is a suitable solution for using blockchain?
- What do we need to run this business solution?
- Demo: how to start building a blockchain solution

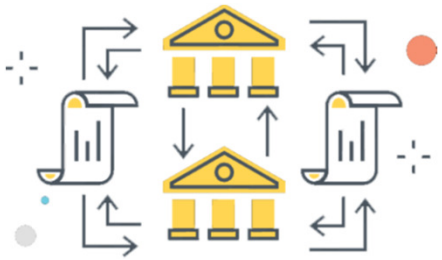
AGENDA

What is the Blockchain?

A **blockchain** is a system for maintaining **distributed ledgers** in a way that allows a group of entities who **don't** fully trust each other to **agree** on the updates to the ledger using a **peer-to-peer** protocol and transact with each other without a **central authority** or an offline reconciliation process.

Blockchains have **no single point** of failure, so entities can appear, disappear or malfunction **without** affecting the group as a whole.

What is the Blockchain?

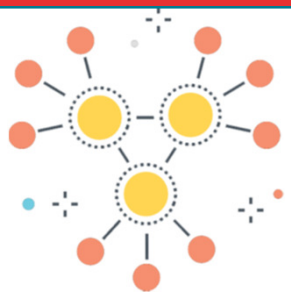


Distributed Ledger Technology
(*acronym:* DLT)

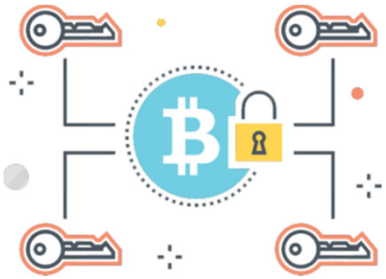
Ledger records
ALL transactions

'key/value' database with
current state (optional)

blockchain == 'digital trust'



Decentral peer-to-peer
network of nodes



Public key-cryptography
without central authority

Any transaction added is
validated by multiple entities

Blockchain alone is not a technology that magically fixes tracebility and accountability

It requires a combination of aligned Business Processes, Code, IoT & AI/ML

What is a decentralized blockchain application (Dapp)?

A **Dapp** is a *'blockchain enabled'* web-app, that runs on a **peer-to-peer** *network* of computers rather than a single server, where **Smart Contracts** are allowing it to connect to the **blockchain** data. It contains both **front-end** and **back-end** and run **independently** on all nodes!

What does a decentralized app on the blockchain look like?

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- Back-end powered by Smart Contracts
- Agreements between parties with automated execution that can act as a complement, or substitute, for legal contracts or business transactions
- Computer program code that is capable of facilitating, executing, and enforcing the negotiation or performance of an agreement
- Example shows contract to place an order to buy a vehicle and emits an events when order is placed

```
/**
 * Place an order for a vehicle
 * @transaction
 */
function placeOrder(placeOrder) {
    console.log('placeOrder');

    var factory = getFactory();
    var NS_M = 'org.acme.vehicle.lifecycle.manufacturer';
    var NS = 'org.acme.vehicle.lifecycle';
    var NS_D = 'org.vda';

    var order = factory.newResource(NS_M, 'Order',
                                    placeOrder.orderId);
    order.vehicleDetails = placeOrder.vehicleDetails;
    order.orderStatus = 'PLACED';
    order.manufacturer = placeOrder.manufacturer;
    order.orderer = factory.newRelationship(NS,
                    'PrivateOwner',
                    placeOrder.orderer.getIdentifier());

    // save the order
    return getAssetRegistry(order.getFullyQualifiedType())
        .then(function (registry) {
            return registry.add(order);
        })
        .then(function(){
            var placeOrderEvent =
                factory.newEvent(NS_M,
                                 'PlaceOrderEvent');
            placeOrderEvent.orderId = order.orderId;
            placeOrderEvent.vehicleDetails =
              order.vehicleDetails;
            emit(placeOrderEvent);
        });
}
```

What does a decentralized app on the blockchain look like?

A decentralized application also includes:

- Data model describing participants, assets, transactions and optional events
- Authorization and permission model
- APIs that let's the front-end connect with the back-end
- A front-end web application (can run outside of blockchain)

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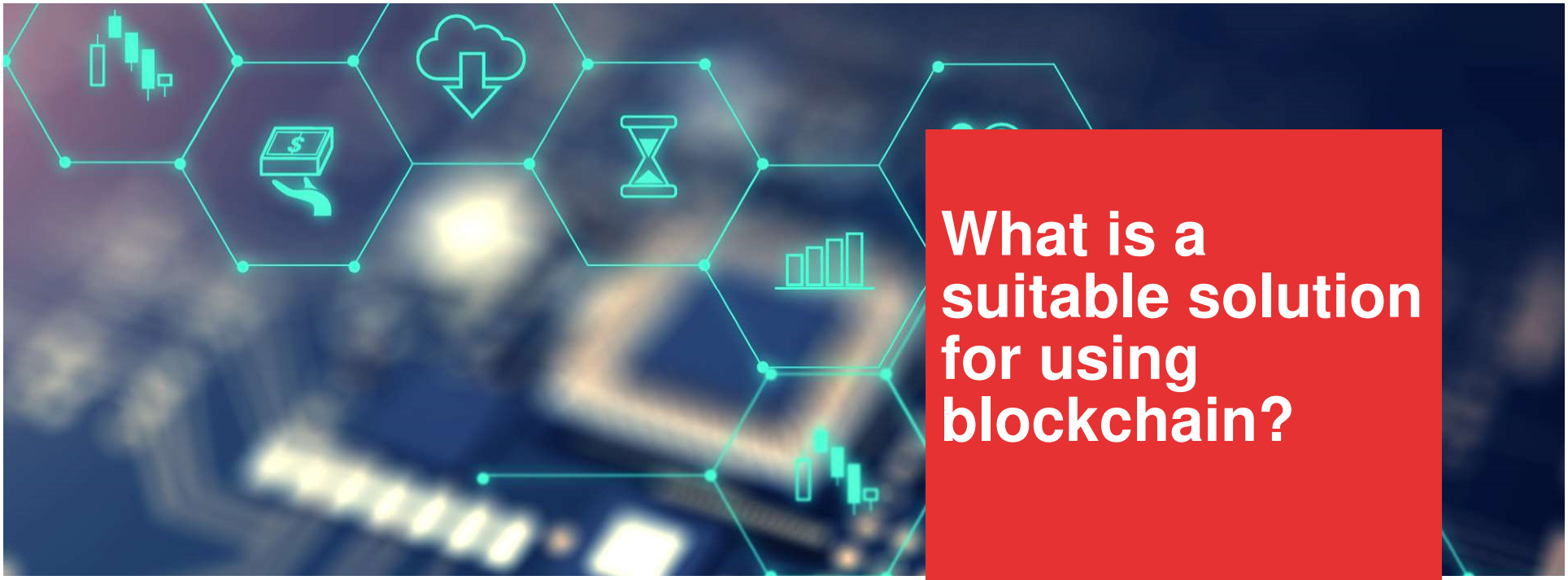


What is a suitable solution for using blockchain?

Blockchain's Business Value

Reduce fraud and risk with end-to-end tracking and instant visibility.

Reduce audit costs

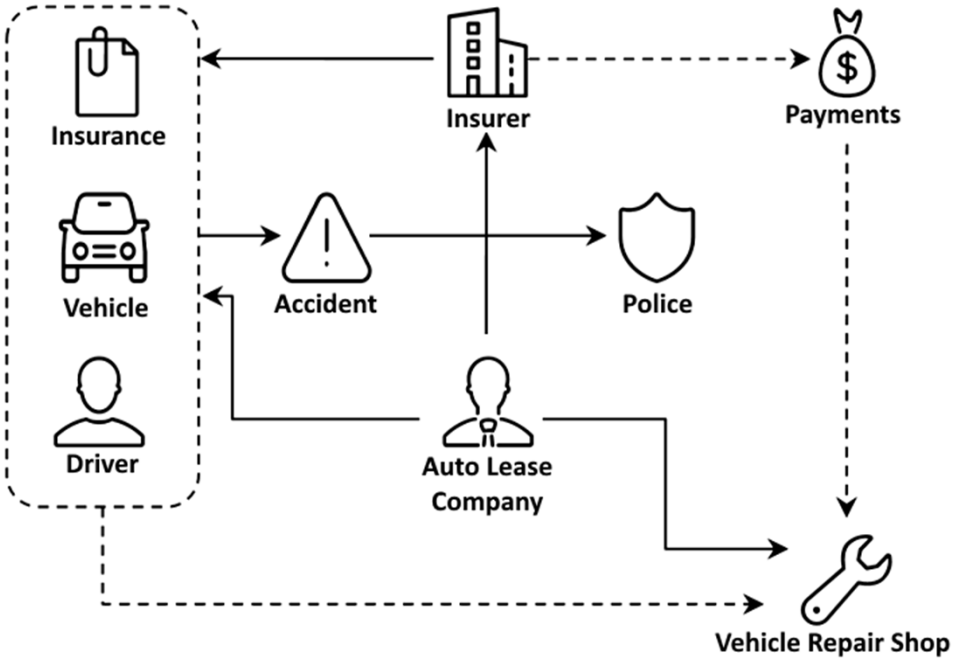
Increase business velocity and reduce cost by delivering automation

Increase business success by enabling new business models and revenue streams

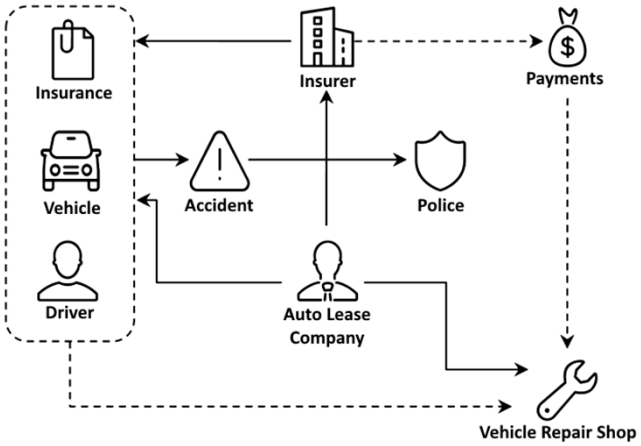
Improve data quality and timeliness by avoiding offline reconciliation and manual exception handling

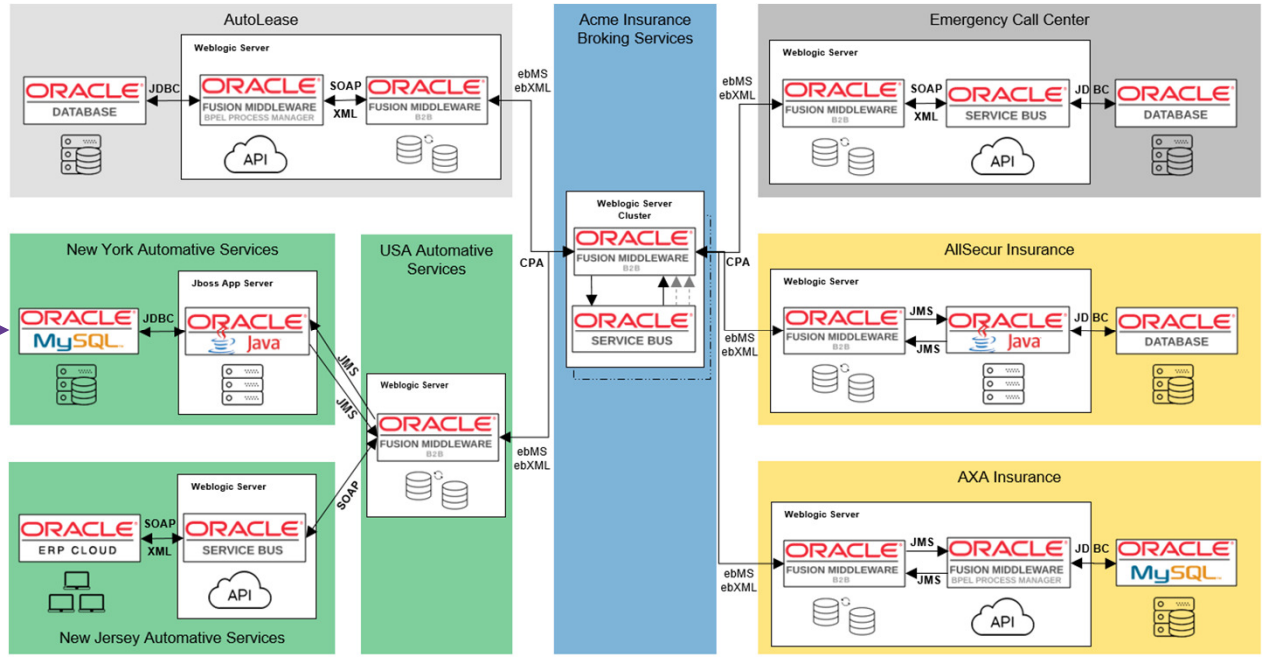
Reduce cost and risk of using intermediaries

Traditional Solution

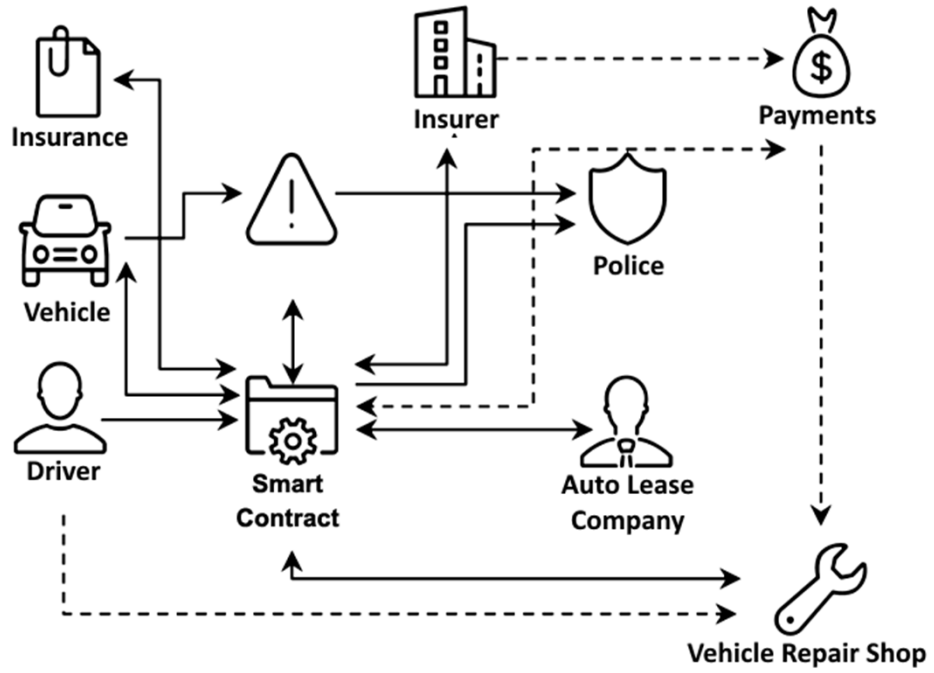


Traditional Solution

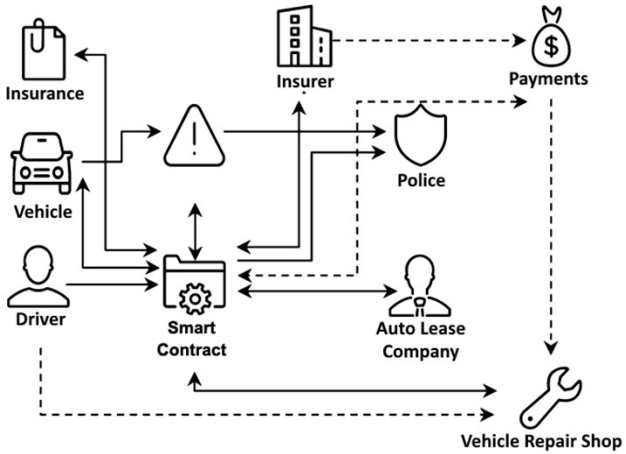


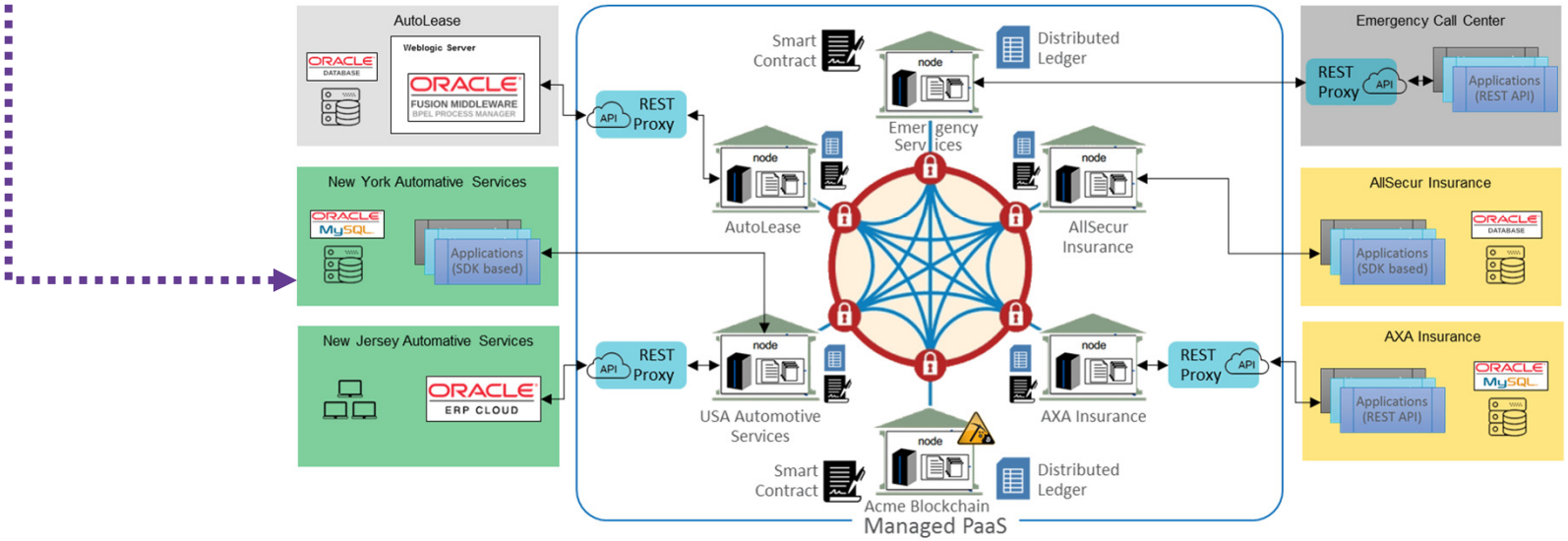


Blockchain Solution



Blockchain Solution





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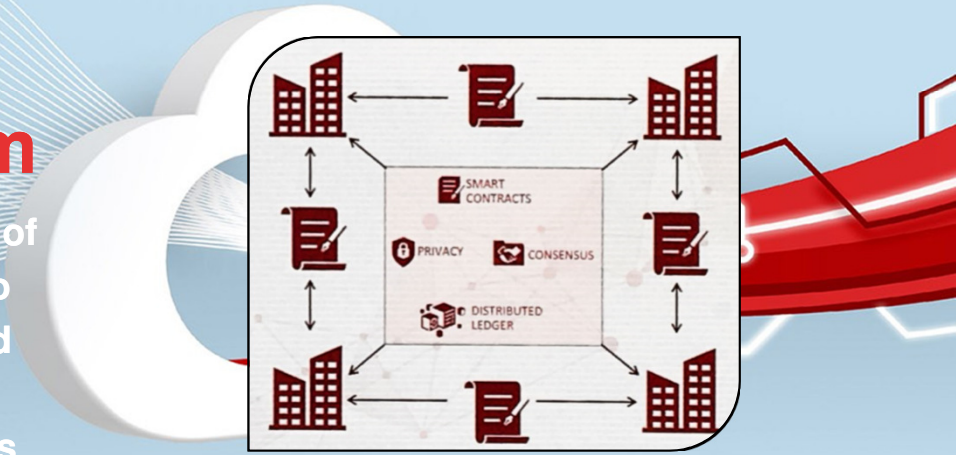
What do we need to run our solution?

Introducing the
Oracle Blockchain Platform

A fully pre-assembled managed service, build on top of Hyperledger Fabric, a distributed ledger framework to securely extend business applications/processes and accelerate transactions across partner ecosystem including smart contracts and permissioned channels



Preassembled, Managed Service

Open

Plug-and-Play Integrations

Enterprise Grade

Automated Operations

Expertise and Experience

Build on Hyperledger Fabric

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- Includes a ledger, allows for programmable smart contracts, and is a distributed system by which participants share transactional data.

- It is a **permissioned** blockchain
  - Does not require/use cryptocurrency too keep the network running
  - Different consensus model with better performance
  - Amount of nodes is generally very stable, due to fact they all transact
  - New members of network enroll through a **Membership Service Provider**

- Modular architecture, allowing several pluggable components
  - Store data in multiple formats, switchable consensus mechanisms

- Scalable implementation as it uses Docker containers

- Offers the ability to create (private) **channels**

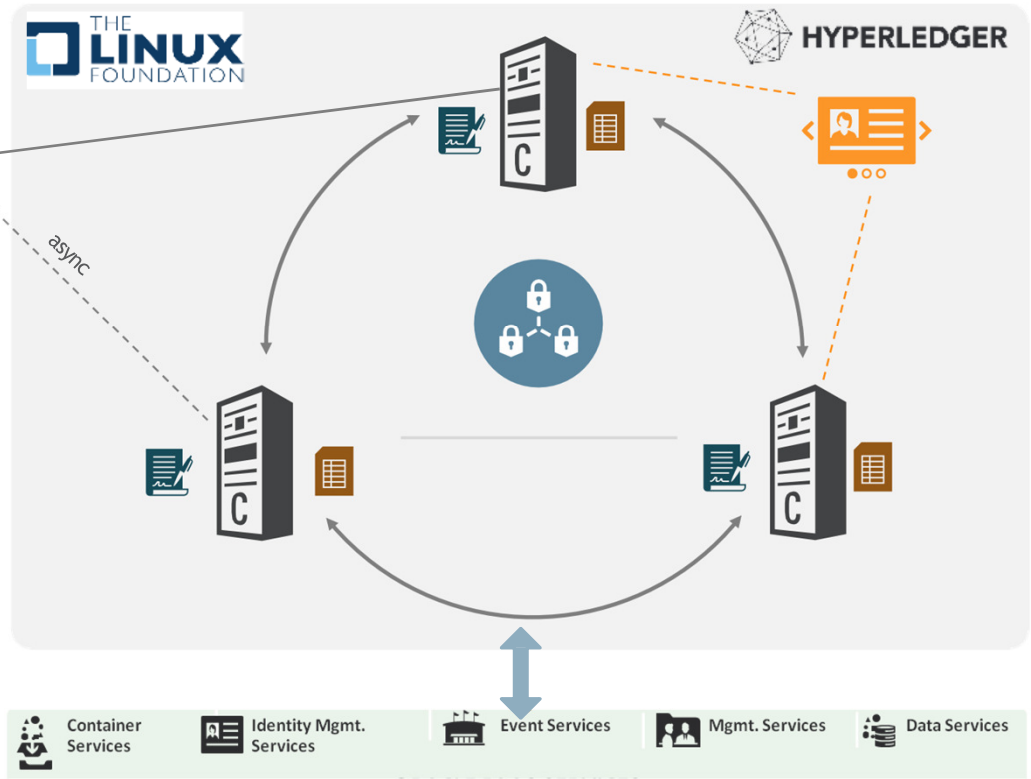
Components of Hyperledger Fabric

- Validating Nodes/ Peers
- Distributed Ledger (Single Version of Truth)
- Smart Contract (aka Chaincode)
- Ordering Service
- Membership Service

Applications (Client SDK)

Bring your own...

- Identity Management (for member enrollment)
- Fault Tolerant Event Hub (for ordering event mgmt.)
- Container Lifecycle Management (for system and chaincode containers)
- Configuration & Monitoring Tools
- Autonomous Recovery (when components fail)
- Managed Patching & Upgrades
- Elastic scaling on demand
- Multi-datacenter DR (with backup of ledger and config info)



Components of Oracle Blockchain Platform

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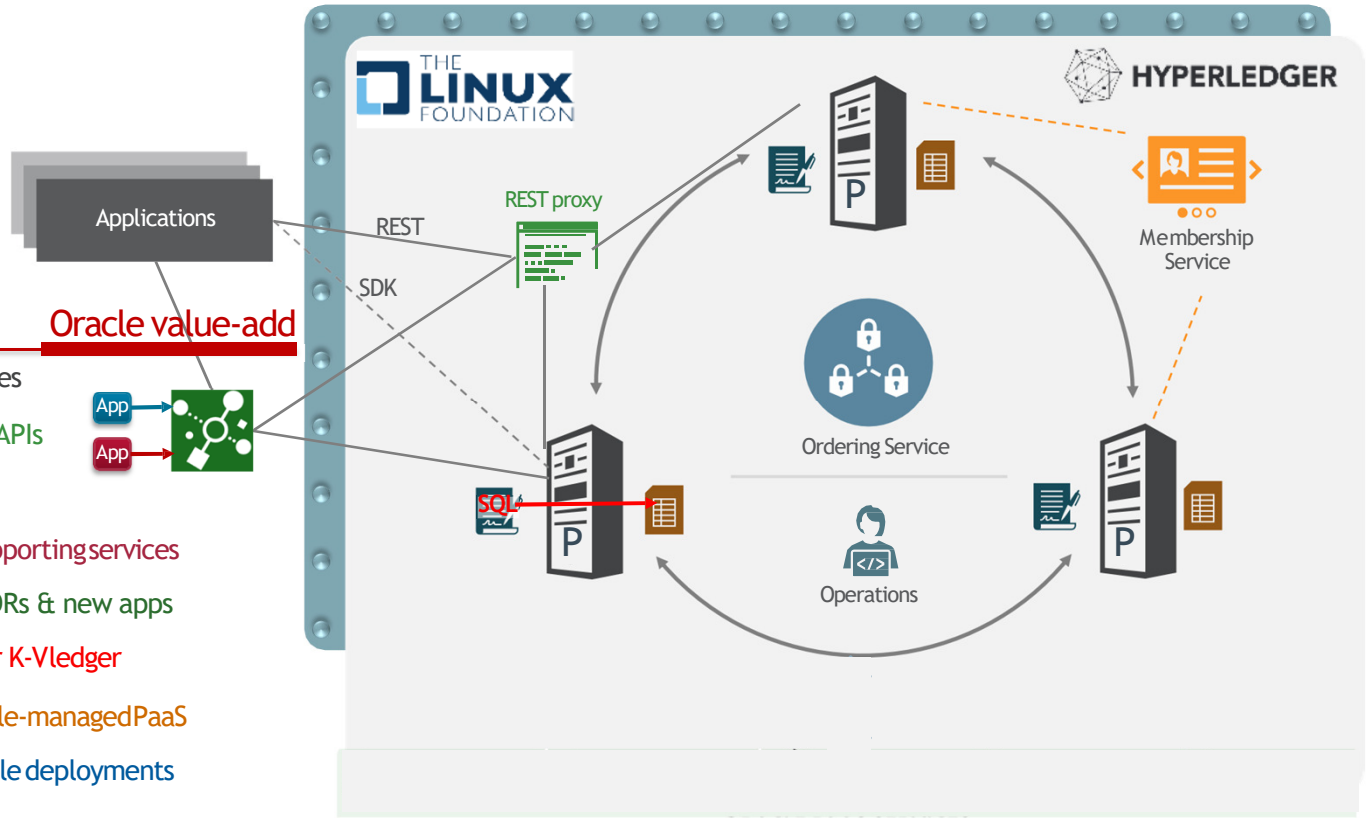
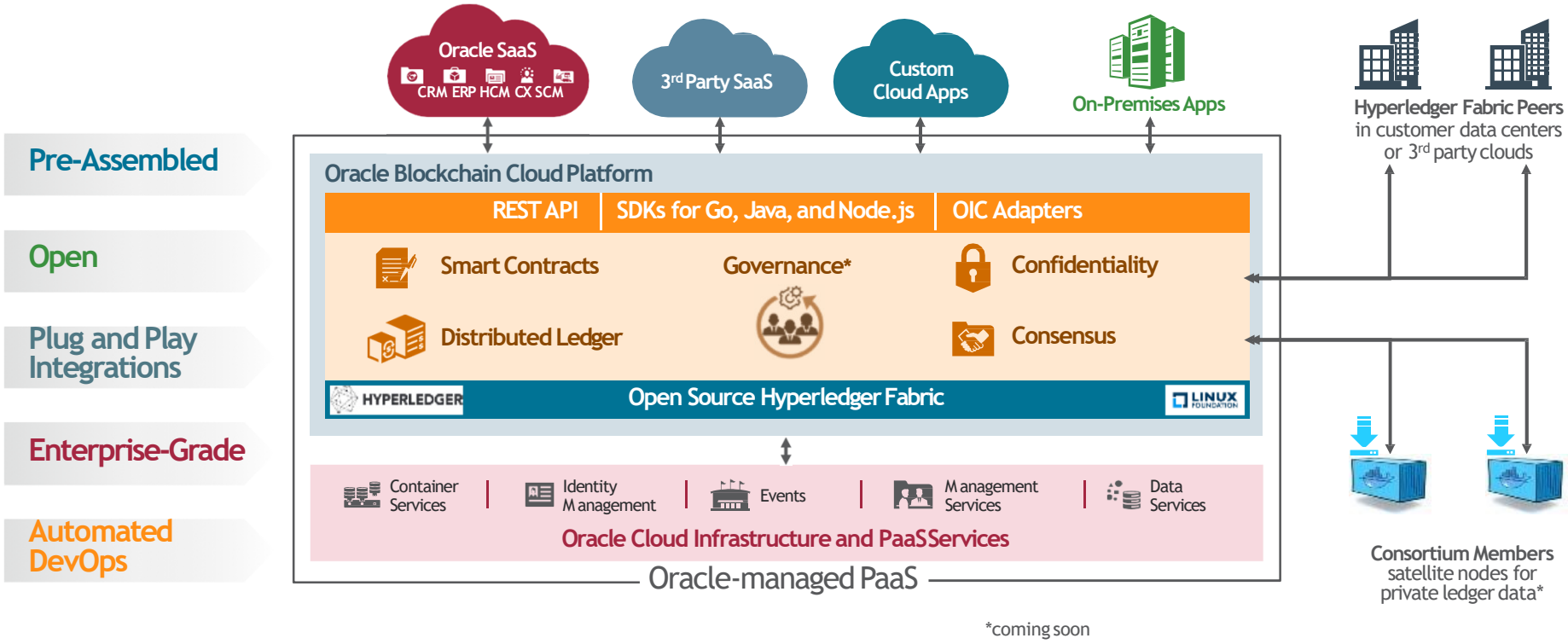
- Validating Nodes/ Peers
- Distributed Ledger (Single Version of Truth)
- Smart Contracts (aka Chaincode)
- Ordering Service
- Membership Service
- Pre-assembled Dependencies
- REST Proxy and Operations APIs
- Admin/Operations Console
- Integrated backplane of supporting services
- Rich integration tools for SORs & new apps
- SQL-based rich queries over K-V ledger
- Automated DevOps in Oracle-managed PaaS
- Flexible, global, interoperable deployments



Oracle Blockchain Platform Architecture



Sample Solution Architecture

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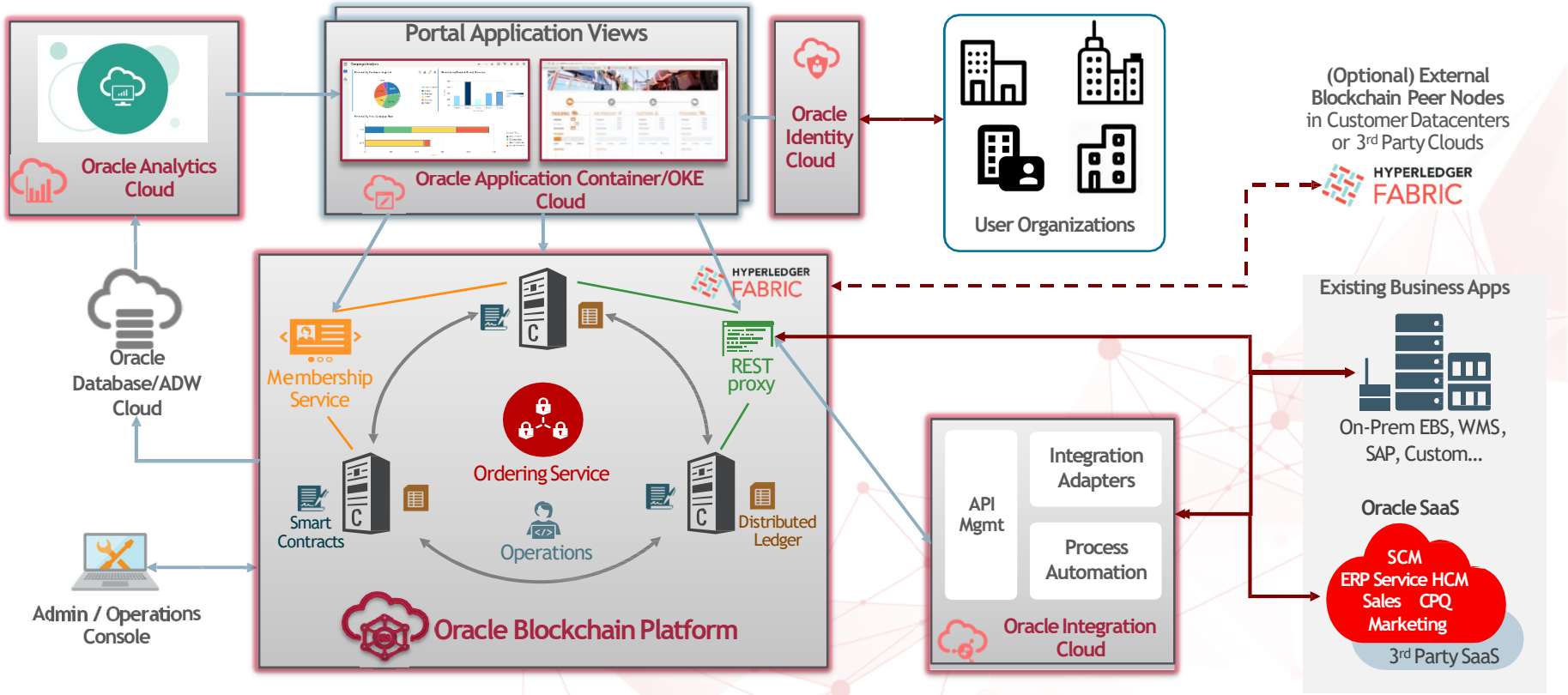

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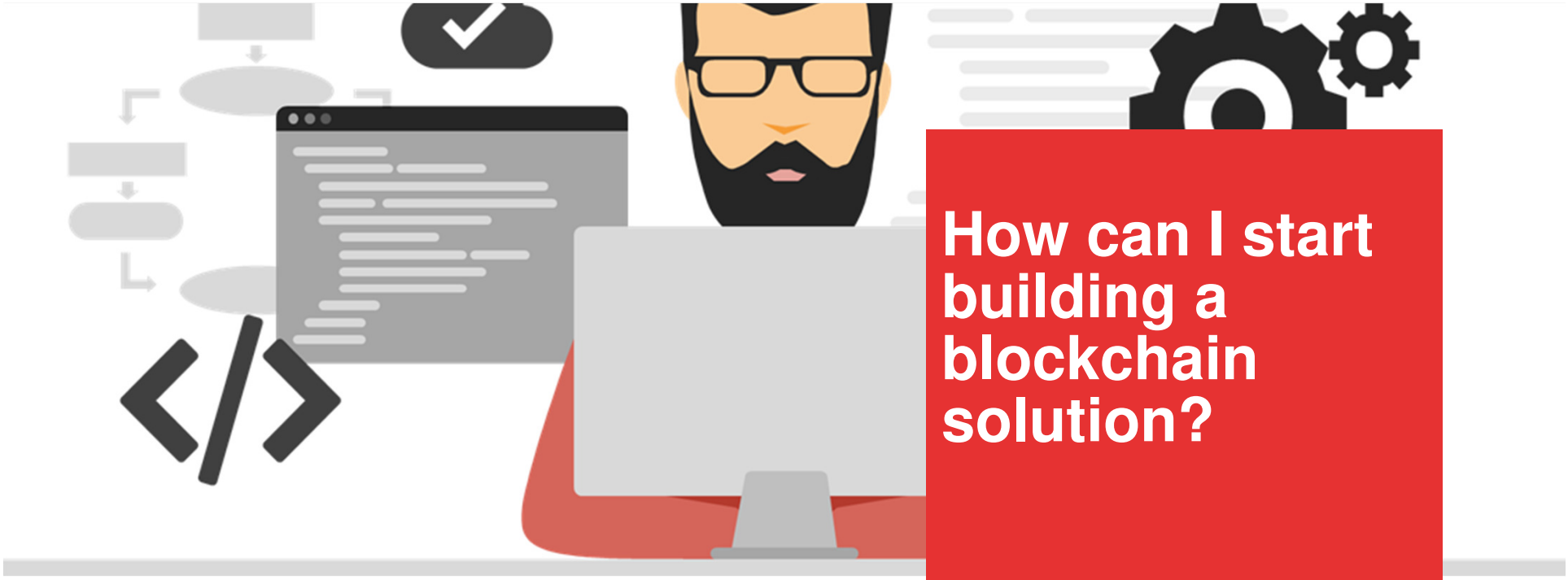
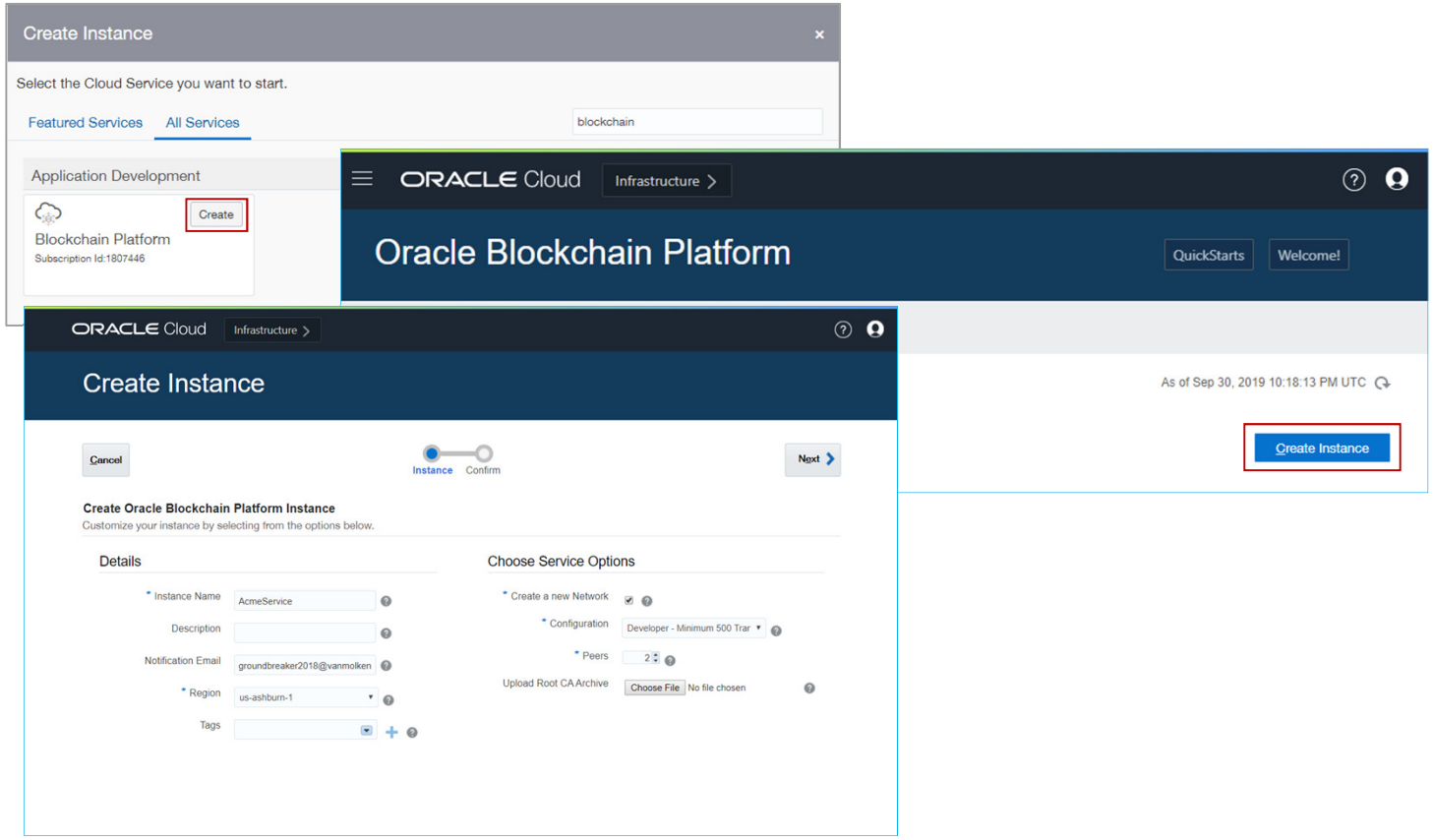
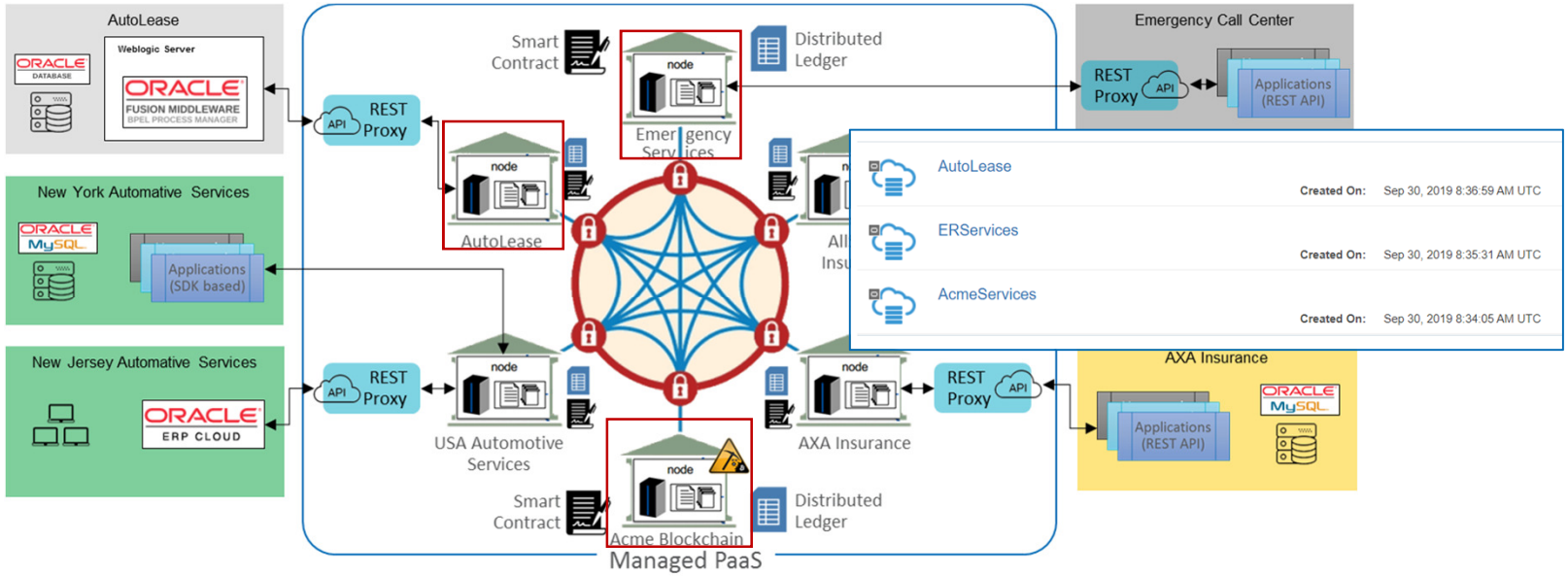


How can I start building a blockchain solution?

Creating an Instance of OABCS



Provisioned Environments



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