SUSE CaaS Platform and TYMLEZ Blockchain

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Agenda

Why – Container as a Service (CaaS)

What Is SUSE CaaS Platform

Container Host OS – MicroOS

Why Tymlez Blockchain

Q&A
Why Container as a Service?
Container Applications Are Growing

Containers Market 5x in 5 years


$0.5B 2015

$2.7B 2020
1 in 10 Companies Are Using Containers for Application Deployment

“What deployment tools or frameworks do you typically use to release software?”

- Custom/in-house systems: 15%
- IBM UrbanCode uDeploy: 30%
- Chef: 17%
- Docker/Linux containers: 19%
- Electric Cloud Electric Deploy: 23%
- CFEngine: 18%
- Redgate: 9%
- BMC Release Lifecycle Management: 27%
- Puppet: 9%
- SaltStack: 9%
- Nolio: 7%
- Ansible: 12%

Source: Forrester Research - Vendor Landscape: Container Solutions For Cloud-Native Applications

“The reduction in duplication doesn't just free up resources on the server, it frees up other resources too. This is among the primary drivers of containers in enterprise IT – to reduce overhead and boost efficiency.”

Containers: Economically, they appear to be a better option than hardware virtualization. 451 Research.
Container Engine Is Not Sufficient

Microservices

Container Lifecycle

Scale

Provision
Manage
Automate
Host Services
Organizations Need Containers to be More Consumable

- Reduce Time to Market
- Host Services with Ease
- Support Modular Apps

Platform for containers enables easy deployment of containerized applications
What Is SUSE CaaS Platform?
What Is SUSE CaaS Platform?

SUSE CaaS Platform is an infrastructure platform for containers that enables customers to provision, manage, and scale container-based applications.

Goal:
Deliver a container application development and hosting platform that automates tedious management tasks, enabling customers to focus on development of applications and meet their business goals faster.
SUSE CaaS Platform Has Three Key Components

Orchestration

OS for Containers

Configuration

Kubernetes

MicroOS

Salt, Container Engines
SUSE CaaS Platform

- Orchestration (Kubernetes)
- Services (e.g., Deployment Dashboard)
- Persistent Storage (local disk, NFS, SES)
- Networking
- Registry
- Security
- Logging
- Automation (Salt + cloud-init)
  Configuration & Management of each node
- Container Runtime & Packaging
  SUSE Linux Enterprise MicroOS (Container Host OS)
- (Physical) Infrastructure
Orchestration with Kubernetes

- Complete solution for container-based workloads: Deploy, Scale, Manage
- Self-healing
- Avoid vendor-lock-in
- Dashboard + Command line capabilities

Open Source Project Kubernetes
A Financial Services company wants to launch a new Loan application.

**IT Operations** (Administrator)
- Set up IT Infrastructure for Containers

**DevOps & Developer**
- **Developer**
  - Create Microservice Apps for Containers
- **DevOps**
  - Manages the cluster
  - Run Loan App (High Availability, Load Balancer, Orchestrate nodes)

**End User**
- Access & Use Loan Application
SUSE CaaS Platform Deployment – Set up Infrastructure

1. **Install Admin node**
   - MicroOS one-step installation
   - Create AutoYaST profile
   - Set up Admin Dashboard

2. **Connect to Admin Dashboard**

3. **Deploy Nodes**
   - Uses AutoYaST profile

4. **Configure Cluster**
   - Set up kubernetes, etcd, flannel,...

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**SUSE CaaS Platform**

Admin node

Kubernetes

- node
- node
- node
- node
- node
- node
- node
- node
- Master

**PXE / DHCP / SMT**
- Portus
- External Logging System

**SUSE Registry**

**SCC**
SUSE CaaS Platform Deployment – Run Containers

1. Push code to git
2. Build container image(s)
3. Run app on Kubernetes cluster
4. Ready for production
CaaS Platform Deployment Scenario – End User View

End user accesses application via HA-proxy
SUSE CaaS Platform Deployment – Full Picture

- **CI**
- **Git**
- **Admin Dashboard**
- **SUSE Registry**
- **Private Registry**
- **Kubernetes**
  - Node
  - Node
  - Node
  - Node
  - Node
  - Node
  - Node
  - Master
- **HA Proxy**
- **Loan App**

- **Dev/DevOps**
- **IT Ops/DevOps**

**SUSE CaaS Platform**
SUSE Linux Enterprise MicroOS
What Is SUSE Linux Enterprise MicroOS?

SLE MicroOS is a modern Linux Operating System, designed for containers and optimized for large deployments.

MicroOS inherits the SLE knowledge while redefining the operating system into a small, efficient and reliable distribution.
What Problems Are We Trying to Solve with MicroOS?

Organizations using containers need:

- A small and easy-to-manage/upgrade OS
- Ability to quickly set up/manage a cluster of nodes
- Always up-to-date Operating System
- Transactional updates
SUSE Linux Enterprise MicroOS – Key Design Elements

- OS Designed for Containers
- Transactional Updates
- Minimal Images
- Minimal Configuration
- Designed for Cloud, Kubernetes, PaaS
- Large Deployments
- Ready to Run
Transaction Update – Definition

- **Is Atomic**
  The update does not influence the running system

- **Can be rolled back**
  Easily restore original state
Transactional Update – Rollback Is Easy with btrfs

1. ro-Clone  
2. Change rw  
3. Zypper up  
4. Change ro  
5. rw-Clone = Rollback

New rw
SUSE Linux Enterprise MicroOS – Key Features

**Transactional Updates**
- Atomic updates
- Automatic updates – Can be disabled
- Maintenance Window/Policy-defined updates

**Three System Roles**
- Admin Dashboard
- Worker (Kubernetes Admin + Node)
- Plain System (No Kubernetes)

**Use Core Technologies: btrfs**

**Easy-to-Use Installer**

**Scalability**
(up to 1000s of nodes)
SUSE CaaS Platform Summary
SUSE CaaS Platform Has Three Key Components

- **Orchestration**
  - Kubernetes

- **OS for Containers**
  - MicroOS

- **Configuration**
  - Salt, Container Engines
SUSE CaaS Platform – Key Benefits

Enable DevOps
Enable Microservices Apps
Enterprise-grade Security
Scalable
Run Everywhere
Accelerate Business Innovation

Enable DevOps
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TYMLEZ
Blockchain Designed for Enterprise
Introducing TYMLEZ

Imagine a growing, thriving software and technology lifecycle that evolves to meet the needs of business while embracing the pace of change in the digital age. One where digital transformation becomes an ongoing evolutionary process rather than a series of disruptive revolutions. That’s the TYMLEZ Blockchain Solution Platform also known as TBSP (“tablespoon”) — blockchain designed for business.

OUR VISION

TYMLEZ supports businesses with timeless software explicitly designed for continuous transformation. We offer a robust platform that enables enterprises to accelerate adoption of technologies, such as blockchain, while protecting and enhancing legacy systems.

We are Timeless
We designed a platform for continuous transformation and never let it become static or beholden to previous conventions that support your ongoing business goals, technology and growth.

Non-Disruptive Disruptors
We deliver our platform in a way that ensures seamless integration into your business, without disrupting your entire organization or ongoing operations.

We Move Fast
We explicitly designed for transformation. Our architecture supports continuous innovation, helping your business deliver operational efficiency, while enabling growth.

Forward Looking
We stay ahead of emerging technologies to ensure they are seamlessly and effectively integrated into our platform.

Value Beats Technology
We focus on the technologies that will add the most value to you, enabling you to succeed as technology evolves.
Today’s Business Reality

Why? All businesses are effected by Digital Disruption
- New competition and increasing
- Speed of change
- Technology innovation
- Changing end user/value shift

Impact? Driving constant need for change and innovation
- Disruption and losing business
- Requiring new business models
- Demanding more agility
- Constant re-invention, innovation

Challenges? Enterprises need to address the pace of change
- 2 Speed IT problem
- Maintaining legacy systems
- Existing investments
- Need distributed solutions
- Responsiveness, time to market
- In-house capability, knowledge

BUILD
PARTNER
BUY
Blockchain Types

Public
A public blockchain is a blockchain that anyone in the world can read, anyone in the world can send transactions to and expect to see them included if they are valid, and anyone in the world can participate in the consensus process – the process for determining what blocks get added to the chain and what the current state is.

Private
A fully private blockchain is a blockchain where write permissions are kept centralized to one organization. Read permissions may be public or restricted to an arbitrary extent.

Consortium
A consortium blockchain is a blockchain where the consensus process is controlled by a pre-selected set of nodes; for example, one might imagine a consortium of 15 financial institutions, each of which operates a node and of which 10 must sign every block in order for the block to be valid. The right to read the blockchain may be public, or restricted to the participants.

Source: Ethereum blog by Vitalik Buterin
Bringing Blockchain to the Enterprise

In order to bring the Blockchain to the Enterprise...Enterprises need a 360 view of what it takes to **productize** a highly scalable and secure **blockchain application**...and this is more than just having or using **blockchain technology**!

Just think about:

- User Management
- Identity Management/Authorizations
- Development Modelling and Support
- Application Lifecycle Management
- PKI
- Process/Data Integration
- Logging and Tracking
Bringing the Blockchain to the Enterprise

TYMLEZ enables enterprises to move faster and more agile through:

- Accelerated Deployment
- Accelerated Development
- Accelerated ROI
Accelerating Development

Complete enterprise development stack – native web stack:

- **Pre-configured** development environment
- **Highly extensible using** APIs and Plug-Ins, making it easy to build upon the use cases
- **Re-usable** components such as user and key management
- **Visual Modelling** with smart contract integration; drag, drop and deploy
- **Tools** such as Yeoman provide fast scaffolding to jumpstart with programming tasks
- **Standards-based** (JSON, Node.js, Javascript, web components)
- **Lifecycle management** tools built in, to enable continuous development
Accelerating Deployment

Complete enterprise blockchain runtime stack with Standard Solutions:

- **Containerized runtime** stack using Docker and Kubernetes, providing faster deployments
- Multiple deployment environments supported, such as Google Cloud, AWS, SUSE CaasP
- **Integration** with existing user management solutions such as LDAP, Active Directory
- **System management** utilities built in
- **Monitoring, logging and tracking** can be provided via dashboards
Modern application design based on cloud economics:

- Faster time to market from design to deployment
- Agile development of applications with end to end development stack
- Continuous Delivery of applications via standardized cloud solutions
- Infrastructure flexibility in scaling up and out to meet changing demands
- Cost-effective consensus algorithm with BFT instead of PoW
- Integration with legacy systems – 2 Speed IT leveraging more from existing systems such as SAP, Oracle, Salesforce, etc., using third-party components

Accelerated ROI
High Level Platform Architecture

Architecture: TBSP 2.0

Web Client
- Digital Asset SDK
- Smart contract CLI
- Dev Tools CLI

Javascript Client
- Web Client

Command line
- Web Client

Other clients
- Web Client

TBSP Platform

Container
- Applications
  - App 1
  - App 2
  - App 3
- Service Plugins
  - Lifecycle Management
  - Configuration Management
  - Key Management
  - User Management

Core Runtime
- Plugin Manager
- Storage Provider
- Smart Contract Engine

Monitoring
- Time Series Dataset

Messaging
- Messaging System

Blockchain
- Blockchain Cluster

Datastore
- NoSQL/SQL Dataset
Development Tool Workflow Example
Supported Use Cases

- **Record Keeping**: Such as data logging, but in an immutable manner from HR to sensor information.
- **Smart Contracts**: Automation of frontend – back office processes, cross-system landscapes.
- **Digital Asset Management**: Ownership handling through tokens as digital assets.

Diagram showing the integration of record keeping, digital asset management, and smart contracts with blockchain technology.
Case Studies

Grant Thornton

**BUSINESS CASE**
Grant Thornton wanted to automate and have immutable records of their audit process to meet regulatory compliance. They needed a secure document transfer and tracking solution.

**TYMLEZ BLOCKCHAIN PLATFORM**
TYMLEZ developed a secure document sharing blockchain solution enabling smart contract rules to be applied to document approvals, multiple sign offs and authorizations.

**BUSINESS BENEFITS**
- Automation reduced timelines, overhead and processing costs
- Secure and encrypted document exchange between individuals
- Improves operating efficiencies and customer experience
- Increased trust due to an immutable proof of compliance

Save the Children

**BUSINESS CASE**
Nico.lab StrokeViewer® supports the complex process of clinical decision-making. Within 3 minutes, StrokeViewer® informs the physician with a detailed biomarker report and allows remote image viewing on any device, therefore enabling direct transfer of imaging data between stroke care centers within seconds.

**TYMLEZ BLOCKCHAIN PLATFORM**
Blockchain technology used to guarantee patient data confidentiality

**BUSINESS BENEFITS**
- Secure transportation of data, where access and encryption of data is governed by the blockchain and full GDPR compliant data exchange between parties in the consortium
- The brain scans are uniquely fingerprinted and the integrity of the dataset is governed by the blockchain
- High-speed processing and logging of data to ensure it always stays within the 3-minute time limit.

Leondrino Exchange

**BUSINESS CASE**
Leondrino chose the TYMLEZ Blockchain Enterprise Architecture to enable the fast paced development of exchange functionality and to use its application lifecycle management.

**TYMLEZ BLOCKCHAIN PLATFORM**
TYMLEZ provided the Digital Asset Management (tokenization) tools using blockchain technology to meet the requirements for scalability, security, privacy, governance and interoperability

**BUSINESS BENEFITS**
- TYMLEZ Blockchain Enterprise Architecture enables the fast paced development of exchange functionality and application lifecycle management
- This exchange makes it possible to do trading of company branded currencies

The Dutch Ministry of Transportation (ILT) is responsible for the safe transportation of hazardous goods. Its current process is a time-consuming and costly paper-based process shared between transporters, countries and processors.

**TYMLEZ BLOCKCHAIN PLATFORM**
ILT chose TYMLEZ to leverage the secure document sharing application combined with smart contracts capability.

**BUSINESS BENEFITS**
- Replaced paper-based process
- Reduced overhead costs and processing timelines
- Improved tracking and safety in transportation
Case Study | Better Treatment of Stroke Using Blockchain

Business Case
Nico.lab StrokeViewer® supports the complex process of clinical decision-making in a world where every minute counts. Within 3 minutes, StrokeViewer® informs the physician with a detailed biomarker report and allows remote image viewing on any device, therefore enabling direct transfer of imaging data between stroke care centers within seconds.

Why Blockchain?
• Compliance: This is a transfer of ownership of sensitive information between two external parties, in a critical time window (minutes, life or death); extreme transparency and verifiability is needed.
• Speed: Automation of the transfer of data, and the check of accuracy and completeness can be facilitated and recorded via blockchain. This could be recorded by both parties and eventually reconciled with redundant systems, but a blockchain gives a shared ledger where this information is settled real-time.

TYMLEZ Blockchain Platform
Blockchain technology used to guarantee patient data confidentiality

Business Benefits
Secure transportation of data, where access and encryption of data is governed by the blockchain and full GDPR compliant data exchange between parties in the consortium

The brain scans are uniquely fingerprinted and the integrity of the dataset is governed by the blockchain, so that the stroke experts can always trust the data.

High-speed processing and logging of data to ensure it always stays within the 3-minute time limit.
Case Study | Humanitarian Passport

Business Case
To create a digital GDPR compliant and secure recruitment and onboarding process which would provide:

- Better collaboration of skills with other charities
- Reductions in overhead costs and process timelines
- Improvements in risk assessment and operational efficiencies
- Each applicant with a “Digital Passport” for ID and security clearance in crisis areas
- Improved children safeguarding checking and compliance
- Integration with HR and Crisis Roster systems

Why Blockchain?

- The Employee and Volunteer is given ownership of personal data outside control of SCUK and supportive of GDPR requirements
- Data is insulated from tampering by SCUK (transparency) or outside (governmental and 3rd party tampering (immutability)
- Digitization and automation of manual processed are driven by smart contracts.
- TRUST - The main reason the blockchain is used over say a traditional HR system, is one of data sovereignty. SCUK doesn’t own or want to own all the data about an individual; a blockchain allows some level of shared ownership. It also provides transparency to where the data went and what it was used for, independent of our trust of SCUK or the agencies’ governments they are working with.

TYMLEZ Blockchain Platform
TYMLEZ’s blockchain solution meets all these requirements utilizing the visual modelling and smart contract capabilities plus API integration with HR systems and biometric devices

Business Benefits

- User permission-driven process for data collection and sharing
- Secure and transparent data protected by private keys
- Secure online credentials checking onboarding to capture details
- Secure communication between Governments and outside agencies
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