Blockchain-as-a-Service (BaaS) :: providers & trust

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4th Annual MCCRC Symposium: Blockchain
Overview & intuitions

Nature of BaaS

Architectural & trust considerations

Advances and directions

[ DEPENDS ]
BaaS & cloud

BaaS: the supporting infrastructure

A ‘cloud’ offering

Economies of scale

Elasticity

Expertise and experimentation

Main providers:

– IBM (Hyperledger)
– Microsoft (Coco Framework)
## Revolutionise business

### Focus: Established businesses & business networks

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<th>Financial</th>
<th>Public Sector</th>
<th>Retail</th>
<th>Insurance</th>
<th>Manufacturing</th>
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<td>Trade Finance</td>
<td>Asset Registration</td>
<td>Supply chain</td>
<td>Claims processing</td>
<td>Supply chain</td>
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<td>Cross currency</td>
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<td>Loyalty programs</td>
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<td>Medicine supply chain</td>
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<td>Claims file</td>
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Modes of uptake

Applications
  – Solution oriented
  – “Software-as-a-Service”

Platform-oriented
  – Select, customise, configure components
  – “Platform-as-a-Service”

Interfaces, integrations, configurations
The image is a diagram illustrating a blockchain solution architecture. It is divided into three main tiers: Base Platform Tier, Middleware Tier, and Industry Solutions.

**Base Platform Tier**:
- **UTXO-based or other**: Adapters, 3rd Party DL stack.

**Middleware Tier**:
- Distributed Ledger Gateway Services
- Identity & Key Services
- Crypto-Services
- ML & BI Services

**SmartContract Marketplace**

**Industry Solutions**
- Financial Services
- Manufacturing
- Retail & CPG
- Healthcare
- Public Sector
- Media

The diagram also mentions CryptoDelegate and Cryptlet architecture (secure containers, attestation, etc.).
Private & permissioned

Private: dedicated chain
Permissioned: restricted participants

Current BaaS focus
  — Established networks, data sensitivity
  — Safe experimentation

Why not just an application/database?
  — # parties, autonomy, competition
  — Ease of deployment?
BaaS-cloud business

Opportunities regardless

BaaS for open chains?
  – Comes with maturity...
  – B2B >> B2C (or C2C) [“Sharing economy”]

Consumer BaaS opportunities
TRUST

Blockchain: remove trust/reliance on third parties

BaaS...?
Tenancy: participant trust

Cloud *tenancy*

Provider $\leftrightarrow$ tenant contract

Tenants configure & control services; pays...

Blockchain – multi-party scenarios

Ledger mediates multiple parties

Tenancy in a BaaS context?

Depends: single org., consortium, federation
Govern the network with democratic management tools

**Accelerate the initiation and activation of new blockchain networks**

- Collectively manage rules and policies for network by preventing any one member exclusive control
- Grow elastically as new smart contracts, network members and transaction channels evolve
- Pre-built, native tools and policies enable faster onboarding, customization and activation

Integrated tools to enforce change management of the network with customizable democratic policies

Policy Editor

Define flexible, democratic policies to govern changes to the network

Multi-party workflow tool

Leverage member activities panel, integrated notifications and secure signature collection for policy voting
Provider trust

Trust those managing the infrastructure

General, ongoing issue:
  – Highly-regulated sectors; auditability

Depends:
  – Risk profile
  – Centralised v federated architecture
    • How much does a provider control?
    • How much can participants see?
Architectures

BaaS Provider

Organisation X

Organisation Y
Architectures

[ Myriad of possibilities ↔ trust ]
Emerging: silicon-based trust

Enclaves
- Hardware-based, trusted execution environs.
- Security: encryption, code isolation, attestation

Much promise for DLT
- Keys, smart contracts
- Hyperledger Sawtooth Lake & Coco Framework

But also cloud in general...

Trusted cloud: Preclude need for BaaS?
Threats/risks? Trust the tech? Supply chain?
Tusting the outside

Interactions with BaaS

(1) Parties
  – Access controls: identity, permissions
  – Right tenant; right chain

(2) Data
  – Oracles: event validity
    • Agreed; consensus; hardware-backed
    • Depends on application
DLT => new clouds?

DLT: distributed compute platform
Possibility to displace traditional cloud
– Storage and compute services ("grid")
– Enabled through tokens & smart contracts

Early days
– Much volatility ($)
– Much potential... IoT => federated clouds
Summary

BaaS still emerging
Offers benefits, similar to cloud
Considerations:
  – Specifics of the application and participants
  – Risk/threat profile
  – Nature of system architecture
Role in emerging systems... we shall see!