What is Blockchain?
Blockchain establishes a secure, shared source of truth

- Data is stored in a ledger—a record of every transaction
- Everyone in the network has an individual, identical copy
- The ledger can only be updated by network consensus, and information can’t be altered or deleted without the knowledge of the whole network
Data is shared in a blockchain network

- Traditional ledgers are centralized and use 3rd parties and middlemen to approve and record transactions.
- Blockchain safely distributes ledgers across the entire network and does not require any middleman.

**Traditional System**

- Centralized system with stored ledger

**Blockchain System**

- Distributed system with distributed ledger
Blockchain’s Key Characteristics

1. Distributed ledger
2. Digital
3. Updated near real time
4. Chronologically and timestamped
5. Crypto-graphically sealed
6. Irreversible and auditable
7. Operates "trustless"
8. Fewer third parties
Where is Blockchain valuable?
Customers looking for similar set of outcomes

- **Reduce cost**: Remove friction and enable direct interaction between parties
- **Mitigate risk**: Reduce security threats from fraud, hacking, and data manipulation
- **Reimagine processes**: Digitize processes beyond the four walls of your own business to reshape market dynamics
When your project meets certain criteria

Answering a few questions can determine if blockchain is appropriate

- Is this a business process that crosses trust boundaries?
- Do multiple parties share data?
- Is there a requirement for verification?
- Can intermediaries be removed?
Blockchain shows tremendous potential across industries

**Manufacturing**
- Asset tracking
- Real time auction for supplier contracts
- Supply chain transparency

**Retail**
- Loyalty tracking
- Product provenance
- Logistics management

**Insurance**
- Claims Management
- MBS/Property Payments
- Fraud detection
- Automated underwriting

**Banking and Capital Markets**
- Bond Issuance
- Trade Finance
- Loan Syndication
- Post Trade Settlement
- Cross Border Payments
- Derivatives Trading
- KYC/AML

**Government**
- Licensing and ID
- Benefits distribution
- Aid tracking
- Military security

**Health**
- Personalized medicine
- Records sharing
- Compliance
Blockchain for Communication Service Providers (Telco)?
# Potential Use Cases for CSP

<table>
<thead>
<tr>
<th>Current Core and VAS Opportunities</th>
<th>Upcoming Telecom Trends Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focus area</strong></td>
<td></td>
</tr>
<tr>
<td>Fraud Management</td>
<td>Identity-as-a-Service</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>Implement blockchain for data and</td>
<td>Provide eSIM solution and identity</td>
</tr>
<tr>
<td>value exchange within and between</td>
<td>and authentication services based on</td>
</tr>
<tr>
<td>networks to reduce fraud</td>
<td>cryptographic identity</td>
</tr>
<tr>
<td><strong>Benefits</strong></td>
<td><strong>Benefits</strong></td>
</tr>
<tr>
<td>• Reduced losses due to fraud</td>
<td>• Decreased costs of implementing</td>
</tr>
<tr>
<td>• Reduced costs for fraud</td>
<td>Identity Management</td>
</tr>
<tr>
<td>detection applications</td>
<td>• Additional revenue stream</td>
</tr>
<tr>
<td><strong>Focus area</strong></td>
<td><strong>Focus area</strong></td>
</tr>
<tr>
<td>5G Enablement</td>
<td>IoT Connectivity</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>Platform to enable a new</td>
<td>Enable peer-to-peer connectivity for</td>
</tr>
<tr>
<td>generation of access technology</td>
<td>IoT devices to communicate</td>
</tr>
<tr>
<td>selection management, required for</td>
<td>• Common platform for IoT devices to</td>
</tr>
<tr>
<td>the realization of 5G network</td>
<td>communicate</td>
</tr>
<tr>
<td>potential</td>
<td>• Enable micropayments</td>
</tr>
<tr>
<td><strong>Benefits</strong></td>
<td></td>
</tr>
</tbody>
</table>
Use Case – Roaming Fraud Prevention

Current System

- HPMN
- User
- Home Tower
- Pay for Service
- Roaming Pact

Data Clearinghouse

Blockchain Alternative

- HPMN
- HPMN Node 2
- HPMN Node n
- VPMN
- VPMN Node n
- VPMN Node 2

- Pay for Service
- Roaming Pact
- Smart Contract
- Roaming Pact
- CDR broadcast on Blockchain
- Visitor Tower
Use Case – Identity-as-a-service and Data Management

ID Creation
1. CSP
2. New User
3. Private Key
   - Safety stored on eSM
4. Public Key
5. Virtual identity created
6. Telecom Virtual ID stored on the Blockchain

ID Authentication
1. User
2. CSP-provided ID app on phone
3. Encrypted challenge sent to verify authenticity
4. App is connected to Blockchain
5. Challenge solved using Private Key
   - Hence authenticated
6. Virtual identity info sent to Partner application

Data Management
1. Employer
2. Certificate sent for employee verification
3. Alumnus Employee Subscriber
4. Certificate assigned after ID Authentication
5. CSP
6. Blockchain
7. University
8. Uploads digital certificate to Blockchain

Figure 7: Identity-as-a-Service and Data Management, use case
Use Case – IoT Connectivity

AS-IS - Building of diverse managed Low Power Wide Area Networks (LPWAN) for IoT/M2M purposes

TO-BE - Blockchain (BC) self-managed peer-to-peer (P2P) networks connected for IoT/M2M
Microsoft’s Strategy for Blockchain
Microsoft’s Strategy for Blockchain

- **Open Marketplace** – Allow partners and customers to monetize and make available blockchain solutions through Azure marketplace.

- **Easy Network** – Make it as easy as possible to deploy a blockchain network within or across subscriptions.

- **Open Cloud** – Support as many blockchain stacks as possible.

- **Enterprise-Grade Services** – Allow blockchain developers to easily connect their blockchain applications to other core services, such as AAD.
Blockchain with Microsoft

Blockchain on your terms
- Open cloud
- The most regions
- True hybrid
- Deep partner bench

Integrated with your business
- Identity, key management with AAD and Key Vault
- Middleware support in Azure
- IaaS, PaaS, & SaaS

For the enterprise
- Secure off-chain integration
- Security, confidentiality, scalability
- Compliance
Connect to existing apps and workflows

Coordinate with relevant tools

Ledger agnostic platform

Azure & Azure Stack – Blockchain resource provider
Choose from open source DLT solutions

<table>
<thead>
<tr>
<th>Ledger Protocols</th>
<th>Chain</th>
<th>LTI Trade Finance</th>
<th>Moijx IoT Blockchain</th>
</tr>
</thead>
<tbody>
<tr>
<td>App Accelerators</td>
<td>Synechron</td>
<td>LTI</td>
<td>Mojix IoT Blockchain</td>
</tr>
<tr>
<td>Blockchain Dev Tools</td>
<td>BlockApps</td>
<td>blockstack</td>
<td>Consensus</td>
</tr>
<tr>
<td>Development Frameworks</td>
<td>.NET</td>
<td>node</td>
<td>python</td>
</tr>
<tr>
<td>Containers</td>
<td>Docker</td>
<td>DC/OS</td>
<td>CoreOS</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>DC/OS</td>
<td>Red Hat</td>
<td>Ubuntu</td>
</tr>
</tbody>
</table>
Blockchain – Detailed Use Cases for Telecom
**Detailed Use case – Reward Points Management**

**Telco Company**
Customers use different services on Verizon Fios and Wireless Services

**Awarded Points**
Each activity is worth a number of rewards points

**Digital wallet**
Reward points are stored in the customer’s digital wallet

**Partner retail location**
Customers are able to redeem loyalty points for goods and services from any retail location in the partner network

**Contract created**

**Contract updated**

**Update: Oct 2018: 700 points**
- Sept 2018: 600 points
- August 2018: 500 points
- July 2018: 400 points

**Contract updated**

**Awarded Points**
- 700 points
- 600 points
- 500 points
- 400 points

**Contract updated**

**SHARED LEDGER**

- **Update: Oct 2018: 700 points**
- **Sept 2018: 600 points**
- **August 2018: 500 points**
- **July 2018: 400 points**

- **Contract updated**

- **2,200 points redeemed for:**
  - Free stay at hotel A
  - Purchases on Amazon
  - Spa treatment at resort C

**Contract updated**
### Detailed Use Case - Supply Chain with IoT and Blockchain

- **Food Processor**: The Food product is sealed in an IoT enabled package for shipping.
- **Producer**: Milk producer supplies Milk to Food Processing Company.
- **Warehouse**: The package has to be maintained at:
  - Temperature < 10°C
  - Humidity < 65%
- **Smart Contract**: The terms of shipping are registered using a **smart contract** on the Blockchain.
- **Carrier 1**: 8°C 60%
- **Chair 2**: 9°C 64%
- **Carrier 3**: 11°C 66%
- **Retail Store**: 11°C 66%
- **At various points in the journey**, the IoT device from the package sends the Temperature & Humidity data which are recorded on the blockchain.

**Smart Contract Updated**: The conditions of the contract have been violated. Carrier 3 is liable for penalty as the temperature of the package when it reached the retail store was above the prescribed limit.
### Challenge

The Telecom Regulatory Authority of India (TRAI) seeks to curb the major nuisance of unsolicited commercial communication (spam calls), as unregistered telemarketers use fraudulent tactics to gain consent from customers.

### Solution

TRAI enlisted Tech Mahindra and Microsoft to create a solution using Microsoft Azure blockchain technology that provides a transparent and verifiable system to mitigate the spam calls.

### Benefits

- Provides a new way to monitor and enforce compliance throughout the telecom ecosystem.
- Ensures compliance with regulations.
- Mitigates loopholes used by fraudsters and spammers to reach customers.

---

“"This distributed ledger technology (DLT)-based solution will enable enterprises to stop financial frauds and perpetration of misleading financial information by unregistered telecom marketers."”

— Rajesh Dhuddu, Global Practice Leader, Blockchain, Tech Mahindra
Blockchain is far more than just Bitcoin or cryptocurrency. It’s transforming the way many companies conduct business.

— Andy Daudelin, Vice President, Alliances Business Development, AT&T Business
Thank You