



Monetization in the Age of AI

Standards Organization Special Session #8

Presenters:

14 September 2026 (8:00 AM - 10:00 AM PDT)

Session Organizers

- [Leonard Daly](#)
- [Alfred Tom](#)

We have at least **39** registrations



Session Logistics



Metaverse
STANDARDS FORUM™

- Please mute yourself and name yourself 'Your Company: Your Name'
 - Mouse over your name in the Zoom participant list, and select 'More / Rename'
 - Optional to mention your company, but interesting to know who is here
- This meeting is open for everyone
 - All material presented is considered public information
- The Forum is not an SDO - and in compliance with antitrust and competition laws
 - No discussion of *detailed* specification designs, patents, pricing or litigation
- This meeting is recorded and will be published on the [Metaverse Standard Forum YouTube channel](#)
 - The slide deck will be made available together with the video recording
- Keep the discussion professional, friendly, and civil
 - [Forum code of conduct](#)
- Questions will be addressed during the Q&A session after the presentation
 - We are using Zoom chat to collect questions during
 - We are also using [Discord](#) to collect questions and keep discussion going after the session is closed
 - Or raise your hand in Zoom during the dedicated Q&A session to ask your comment in person



Metaverse Standards Forum

The Metaverse will be an **OPEN, GLOBAL** platform that will require a **CONSTELLATION** of interoperability standards

Forum launched in 2022
2,600 Forum members *assisting* standards organizations in their mission to create interoperability standards for an open metaverse

Pre-standardization Activities

- Standards gap analysis
- Discovering 'cross-silo' cooperation opportunities
- Draft specification feedback
- Driving broad industry visibility and consensus

Use case and requirement insights

Standards Developing Organizations

SDOs gain insights, visibility, adoption, cross-silo cooperation, additional members

Testing, tooling and feedback

Post-standardization Activities

- Interoperability testbeds and plugfests
- Educational materials, reports, best practices & guidelines etc.
- Open source tools development



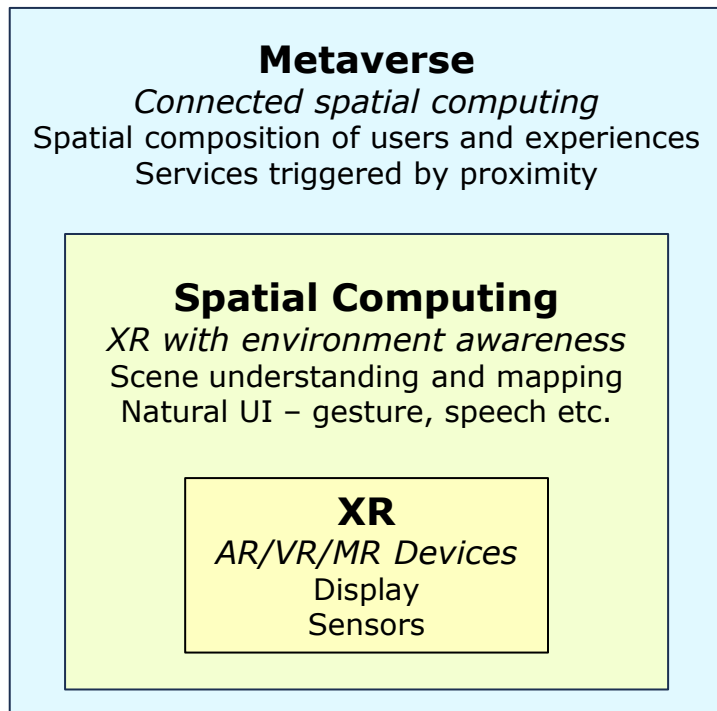
Metaverse
STANDARDS FORUM™

A unique, neutral, and welcoming venue for pragmatic cooperation between the standards community and industry

NOT another standards organization!



What is the Metaverse?



The metaverse will provide infrastructure for:

- Multi-user, multi-agent interactions
- Persistent placement and interactions with 3D content in virtual AND real spaces
- Composited scenes AND services delivered in a location and environment aware browser

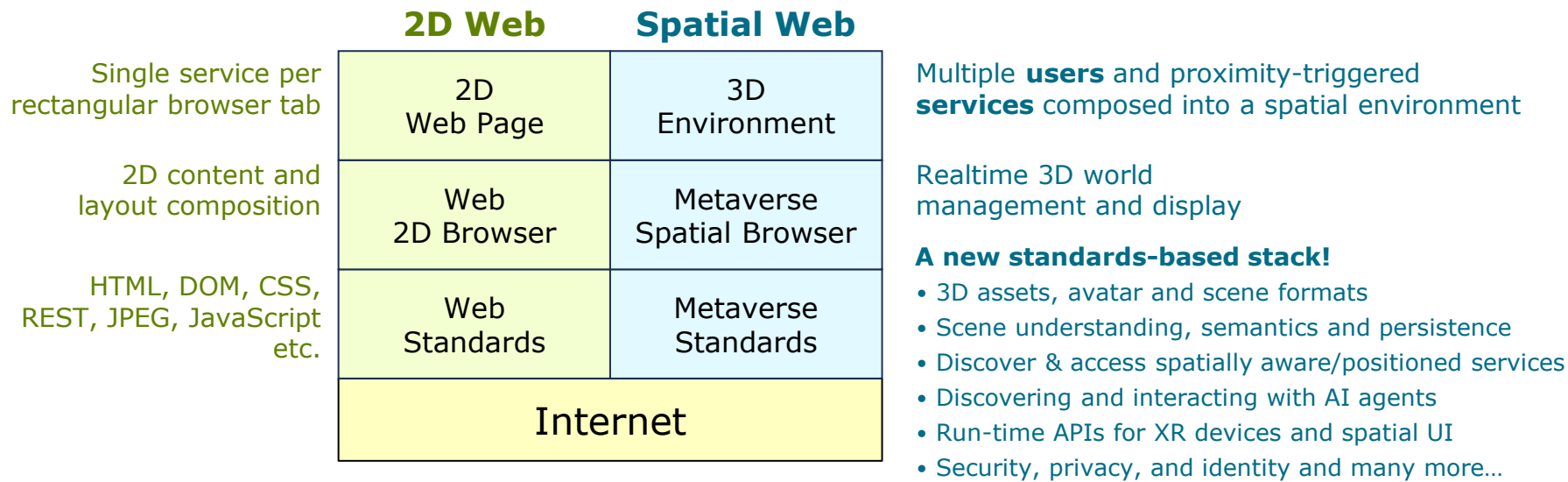
The metaverse is the
spatial evolution of the web
A global standards-based platform



Evolving the Spatial Web

Interoperability will enable a spatial browser to connect to and deliver ANY spatial services and experiences that conform to metaverse standards

Leveraging the same openness and accessibility that underpins today's 2D Web



Adoption of XR – Enabling Spatial Interactions



Challenges

Significant optics and power consumption
'Laws of physics' challenges to 'socially acceptable, 'use-all-day' devices.
Audio AR devices could be a beachhead

Need see-through, cordless HoloLens replacement for safety and usability.
Split rendering to deliver graphics from edge server reduces device processing load

VR is socially isolating

Consumer AR

Enterprise AR

VR

2D Displays and Devices

We are here

Benefits

AR smart glasses replace/augment mobile phones – bringing users INTO their physical and social surroundings

Proven efficiency and cost-saving benefits. Enterprise use has lower cost / social acceptance barriers

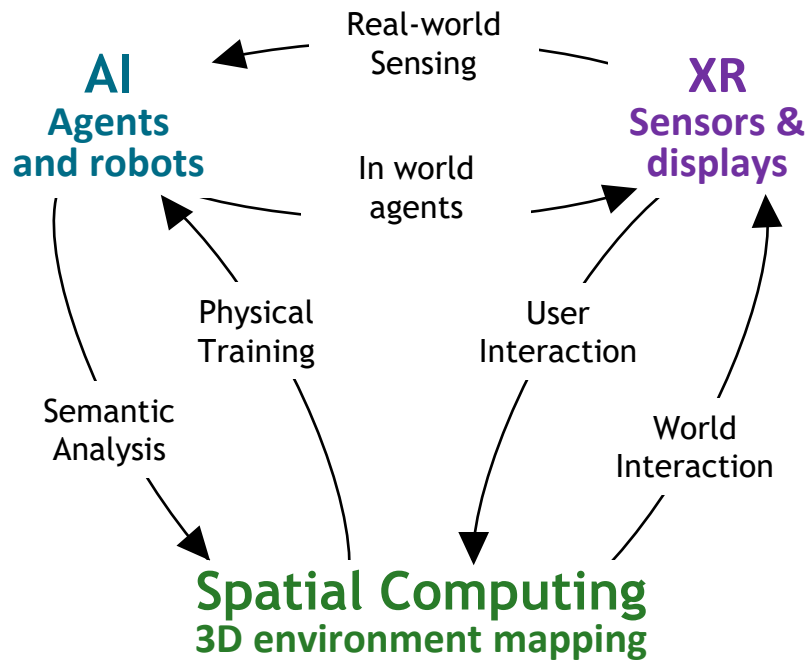
Proven value for specialized use cases e.g., training, simulation, collaboration and gaming

Most proto-metaverse applications and games today do not use XR

Time



Convergence of AI, XR, and Spatial Computing



Some say the “metaverse is dead”
and replaced by the excitement around AI

BUT AI, XR and Spatial Computing are being
combined to revolutionize how we will interact with
our computing resources

**The Metaverse will be the primary
user interface to AI in the real world**

XR will enable entities (users, robots) to
sense their environment and interact with users

AI will enable entities to semantically
understand their environments

3D environments will be essential to
train physical AI to interact with the real world

Spatial computing through XR devices enable users
to *interact* with real & virtual worlds

**‘Metaverse’ is (just) the term we are using
(so far) for this revolution (EU uses ‘Web 4.0’)**

Consolidated Face of MSF

New Groups	Current Groups	
3D Assets	• USD & glTF Interoperability • Characters/Avatars • Digital Fashion / Wearables • Volumetric Media	AI is part of all groups
Ecosystem	• Standards Register (inc. Use Cases TSG) • Education • Ethical Principles • Privacy, Cybersecurity & Identity	
Spatial Computing	• Real/Virtual World Integration • Networking Requirements & Capabilities • Industrial Metaverse • XR Device Interoperability • 3D Web Interoperability	
Infrastructure	• Digital Asset Management • Decentralized Web3 Services • Accessibility • End-User Troubleshooting	



Get Involved!

**Forum Membership is a unique opportunity for leadership
in driving meaningful interoperability cooperation
to help create the spatial evolution of the web**

Effective Standardization Engagement

Gain visibility and insights
into a wide diversity of
standardization activities
Opportunity to interact and
influence the global
standardization community

Results Driven Organization

Venue for fostering industry-
driven
standardization cooperation
Impactful projects and
activities to create a wavefront
of short-term benefits on the
road to an open metaverse

Broad Global Networking

Wide participation enabled by
inclusive and accessible
membership terms - no NDA or
patent licensing
Join a gathering of diverse
insights, perspectives
and expertise

<https://metaverse-standards.org/>

<https://metaverse-standards.org/#contact>



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Upcoming Events



Monetization in the Age of AI

 Date 2025-09-14



MetaTr@versal – Immersive Identity Summit

 Date 2025-09-22
 Venue Online



MetaTr@versal – Immersive Media Summit

 Date 2025-09-29
 Venue Online



XWorlds '26

 Date 2024-10-05 - 2024-10-06



Forum SDO Special Sessions



Metaverse
STANDARDS FORUM™

- Session series for SDOs to present their Metaverse interoperability initiatives
 - Open to ANY SDO that wishes to gain visibility and feedback
 - Sessions open to Forum members and non-members
- Goals:
 - Visibility for metaverse-related standardization developments
 - Assist and accelerate SDO efforts to get the standards we need - faster
 - Explore and discover opportunities for collaboration BETWEEN SDOs
- Previous Sessions
 - 27 November 2024: Introduction to OMA3's Inter World Portaling System ([Slides](#), [Recording](#))
 - 26 February 2025: Avatar Standards | Communication ([Slides](#), [Recording](#))
 - 30 April 2025: Towards Interoperable Anchoring for XR ([Slides](#), [Recording](#))
 - 28 May 2025: Audio for the Metaverse ([Slides](#), [Recording](#))
 - 28 May 2025: Low-Latency Delivery of Metaverse Applications ([Slides](#), [Recording](#))
 - 28 January 2026: Introducing the Responsible Data Governance (RDG) Standard for Immersive and AI-Integrated Systems (Slides, Recording)
 - 3 March 2026: Geospatial Standards to Address the Requirements of Real World Use Cases (Slides, Recording)
- Next Session currently not scheduled
- Suggest a topic or SDO for a future session by completing [this form](#).



Q&A with Zoom and Discord

- Please use the Zoom Chat for questions - limited time for Q&A
- We use [Discord](#) to provide on this topic after meeting



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Main Presentation

Monetization in the Age of AI



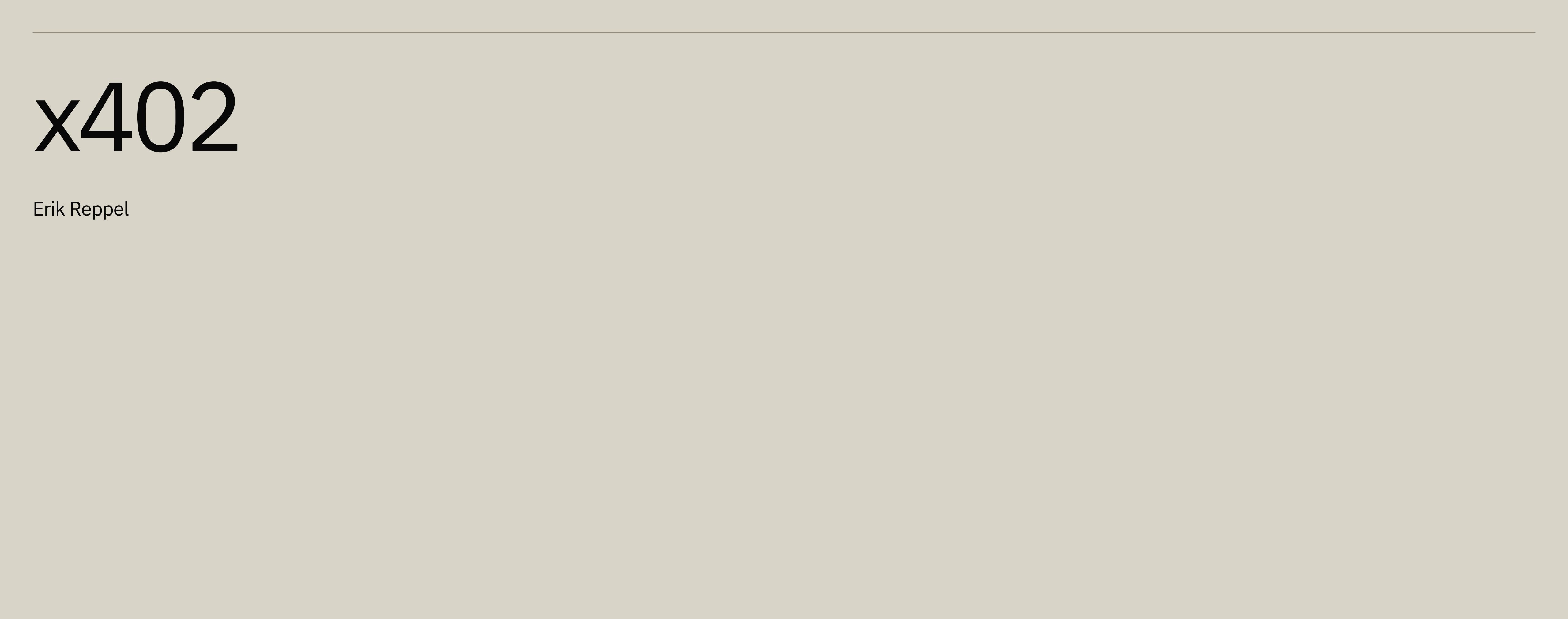
[Alfred Tom](#)

Executive Director, OMA3.org |
Infrastructure Working Group, MSF |
CEO, Wivity.com and SignerSet.com



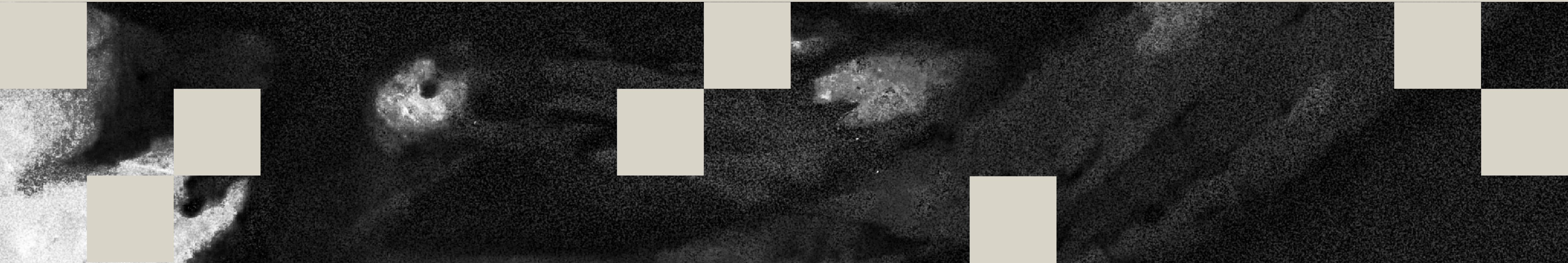
[Erik Reppel](#)

Chair Tehnical Steering
Committee, x402 Foundation |
Creator of x402



x402

Erik Reppel



whoami

- Currently:
 - Creator of x402, Chair of the x402 Foundation Technical Steering committee
 - Founder / CEO of new stealth company
- Previously,
 - Head of Engineering - Coinbase Developer Platform
 - Head of Engineering - Zora
 - Staff ML Platform Eng - Clubhouse
- Always
 - Internet person
 - Fan of open standards, decentralization, and cool tech

What is x402

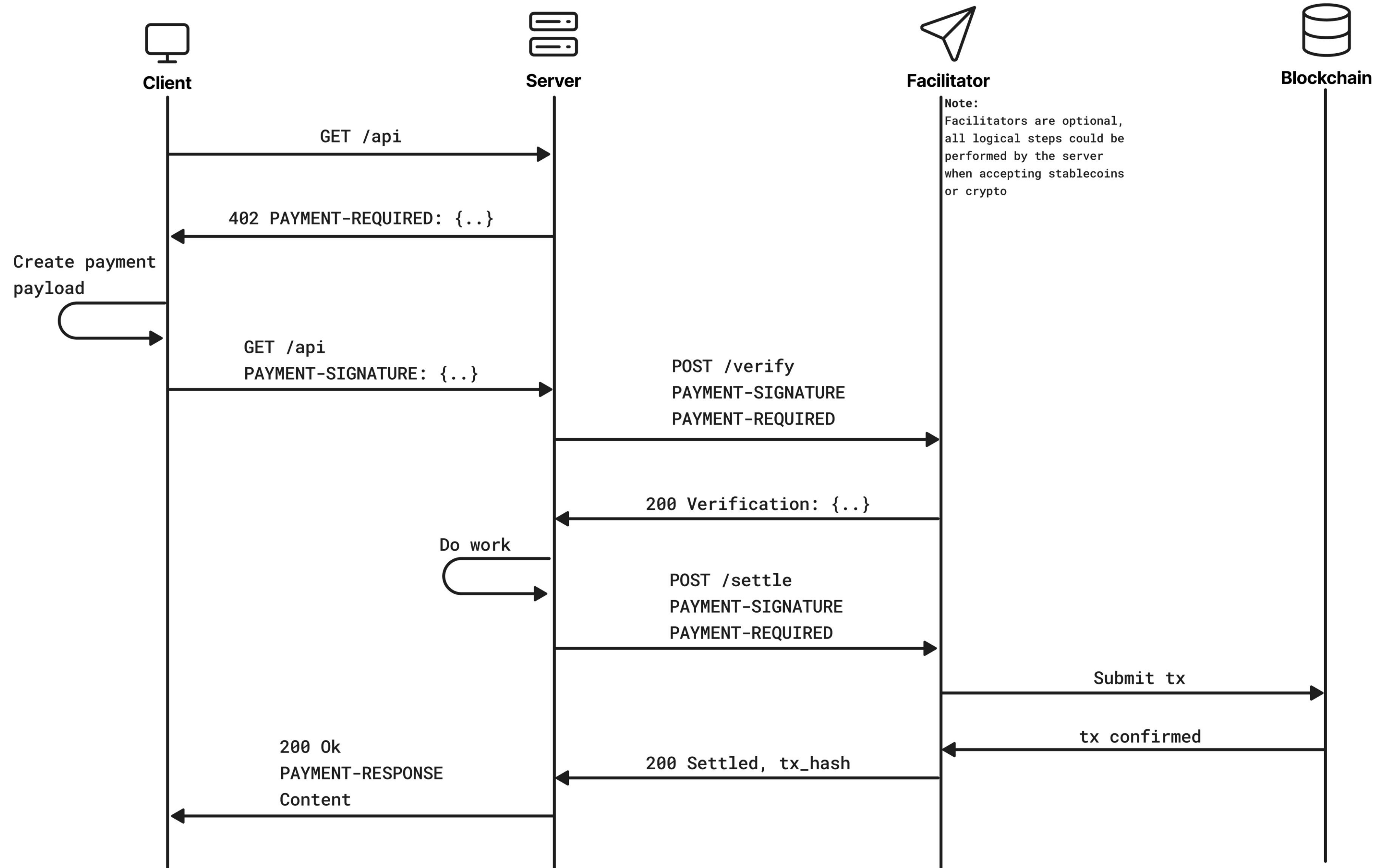
- Open standard for internet native payments
- Incubated by Coinbase, now run by the Linux Foundation
- Since inception:
 - ~600 million transactions, >\$120 million in volume

How does x402 work?

x402’s modular design allows for composition across transport, logical payment mechanism, payment network, and currency.

An extension system allows x402 to include additional requirements to transact (identity, discovery, etc)

Layers of x402		
Concept	Description	Example
Application	Buyers and sellers exchanging x402 data	Client paying a server for access to content
Declaration	The representations of information needed to perform an x402 transaction	x402 v1 type spec
Transport	The way x402 information is shared between buyer and seller	HTTP, MCP, A2A
Scheme	The logical way money should move	exact, upto, deferred
Network	The payment ledger used to move money	Solana, Base, Polygon, AVAX...
Asset	The form of money moved between buyer and seller	USDC, USDT, SOL, ETH...
Mechanism	The agreed upon way of transferring funds for a specific transaction	EIP-3009, Permit2, Solana Fee payer



Example:

```
HTTP/1.1 402 Payment Required
Content-Type: application/json
PAYMENT-REQUIRED: eyJ4NDAYVmVyc2lvbiI6MiwiZXJyb3IiOiJQVlNRU5ULVNJR05BVFVSRSBoZWZkZXIgaXMgcVxdWlyZWQiLCJyZXNvdXJjZS:

{}
```

The base64 header decodes to:

```
{
  "x402Version": 2,
  "error": "PAYMENT-SIGNATURE header is required",
  "resource": {
    "url": "https://api.example.com/premium-data",
    "description": "Access to premium market data",
    "mimeType": "application/json"
  },
  "accepts": [
    {
      "scheme": "exact",
      "network": "eip155:84532",
      "amount": "10000",
      "asset": "0x036CbD53842c5426634e7929541eC2318f3dCF7e",
      "payTo": "0x209693Bc6afc0C5328bA36FaF03C514EF312287C",
      "maxTimeoutSeconds": 60,
      "extra": {
        "name": "USDC",
        "version": "2"
      }
    }
  ]
}
```

```
POST /premium-data HTTP/1.1
Host: api.example.com
PAYMENT-SIGNATURE: eyJ4NDAYmVyc2lvbiI6MiwicmVzb3VyY2Ui0nsidXJsIjoiaHR0cHM6Ly9hcGkuZXhhbXBsZS5jb20vcHJlbWl1bS1kYXRhI:
Content-Type: application/json

{
  "query": "latest market data"
}
```

The base64 payload decodes to:

```
{
  "x402Version": 2,
  "resource": {
    "url": "https://api.example.com/premium-data",
    "description": "Access to premium market data",
    "mimeType": "application/json"
  },
  "accepted": {
    "scheme": "exact",
    "network": "eip155:84532",
    "amount": "10000",
    "asset": "0x036CbD53842c5426634e7929541eC2318f3dCF7e",
    "payTo": "0x209693Bc6afc0C5328bA36FaF03C514EF312287C",
    "maxTimeoutSeconds": 60,
    "extra": {
      "name": "USDC",
      "version": "2"
    }
  },
  "payload": {
    "signature": "0x2d6a7588d6acca505cbf0d9a4a227e0c52c6c34008c8e8986a1283259764173608a2ce6496642e377d6da8dbbf5836e9l",
    "authorization": {
      "from": "0x857b06519E91e3A54538791bDbb0E22373e36b66",
      "to": "0x209693Bc6afc0C5328bA36FaF03C514EF312287C",
      "value": "10000",
      "validAfter": "1740672089",
      "validBefore": "1740672154",
      "nonce": "0xf3746613c2d920b5fdabc0856f2aeb2d4f88ee6037b8cc5d04a71a4462f13480"
    }
  }
}
```

How does x402 work?

Server

```
import express from "express";
import { paymentMiddleware, x402ResourceServer } from "@x402/express";
import { ExactEvmScheme } from "@x402/evm/exact/server";
import { HTTPFacilitatorClient } from "@x402/core/server";

const app = express();

app.use(
  paymentMiddleware(
    {
      "GET /weather": {
        accepts: { scheme: "exact", price: "$0.001", network: "eip155:84532", payTo: evmAddress },
        description: "Weather data",
        mimeType: "application/json",
      },
    },
    new x402ResourceServer(new HTTPFacilitatorClient({ url: facilitatorUrl }))
      .register("eip155:84532", new ExactEvmScheme()),
  ),
);

app.get("/weather", (req, res) => res.json({ weather: "sunny", temperature: 70 }));
```

How does x402 work?

Client

```
const client = new x402Client();
client.register("eip155:*", new ExactEvmScheme(evmSigner, rpcOptions));
client.register("eip155:*", new UptoEvmScheme(evmSigner, rpcOptions));
client.register("solana:*", new ExactSvmScheme(svmSigner));

const fetchWithPayment = wrapFetchWithPayment(fetch, client);
```

Some Observations on Agentic Commerce

1. Conversational vs Autonomous Commerce
2. AI breaks the economic model of the internet
3. The Agentic Premium



Why does this matter?

Why does this matter?

When a platform shift occurs, the rules of the road are set by the people building the technology, whether they realize it or not.

AI is the 3rd platform of our life time, we are all actively writing its rules right now.

The beauty of the internet is its openness, we should work to make sure the agentic web is the same.





METaverse STANDARDS FORUM · SDO SPECIAL SESSION

OMATrust

A reputation system for the spatial web

Alfred Tom · Executive Director, OMA3

A basic x402 transaction tells you two things about its counterparties:

BUYER

0x96fa5ab5E519641bD8A840A6b26D17DB7497618b

SELLER

rpc.omachain.org/x402

This lack of information exists everywhere on the open internet, not just x402

PORTALING



Your world model portals into a game it has never seen.

Can you trust this game with your identity and assets?

CONTENT



Your agent trades for a glTF skin.

Who published it, and is anyone accountable for it?

The lack of information on internet identities such as a URL is a trust problem

Internet trust and reputation is currently supplied by middlemen

Marketplaces

- Verified purchase
- Seller rating
- Dispute history

Walled garden for goods

App stores

- Reviews tied to installs
- Developer identity
- Takedown authority

Walled garden for binaries

Social networks

- Account age and history
- Fraud scoring
- Moderation

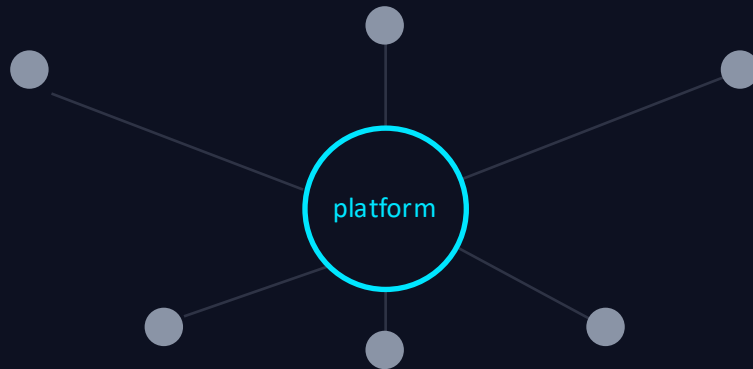
Walled garden for people

We rely on these middlemen to be the source of truth on participants and transactions

THE GAP

Agents and APIs are peer-to-peer- there is no middleman that knows about every transaction

MARKETPLACE

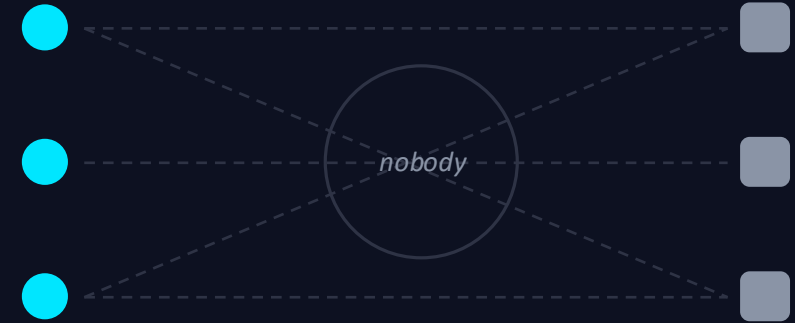


Every exchange passes through one party, which keeps the record

AGENTS AND APIS

Agents

APIs



Calls go direct, and no one is left holding the record

There is no single entity at the center of peer-to-peer transactions, so there is no one to rely on

A peer-to-peer trust layer needs information associated with an identity without a middleman



INFORMATION

Transactions, user reviews, audits, certifications, etc.

Slide 7

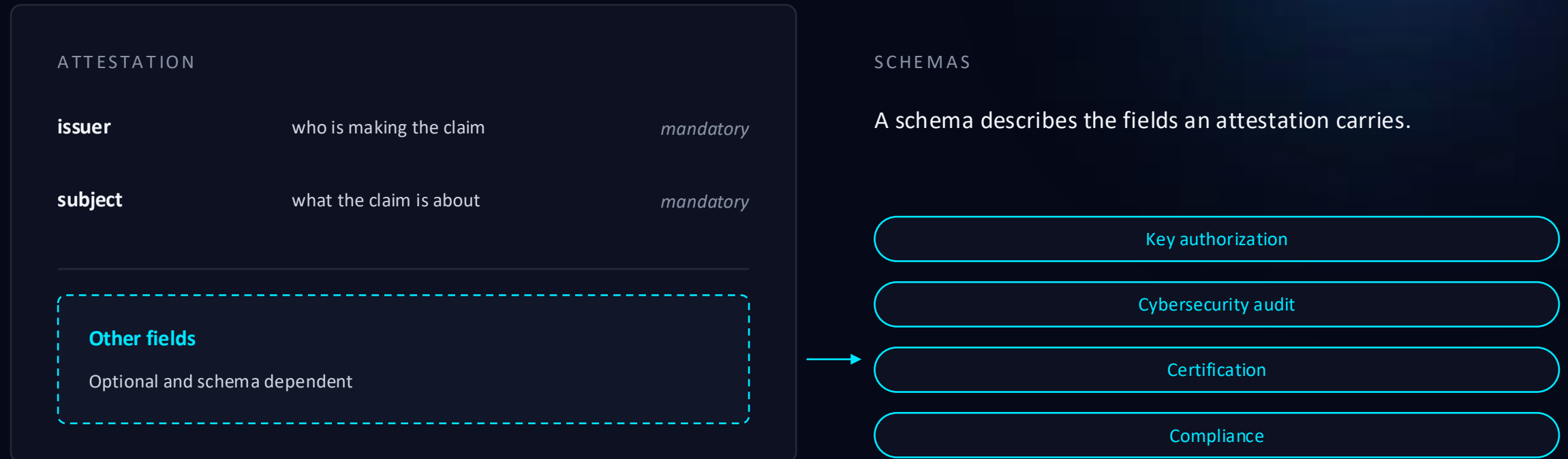


IDENTITY

Representation of what you want information on - the “subject”

Slide 8

OMATrust uses W3C “attestations” or “credentials” to associate information with an identity



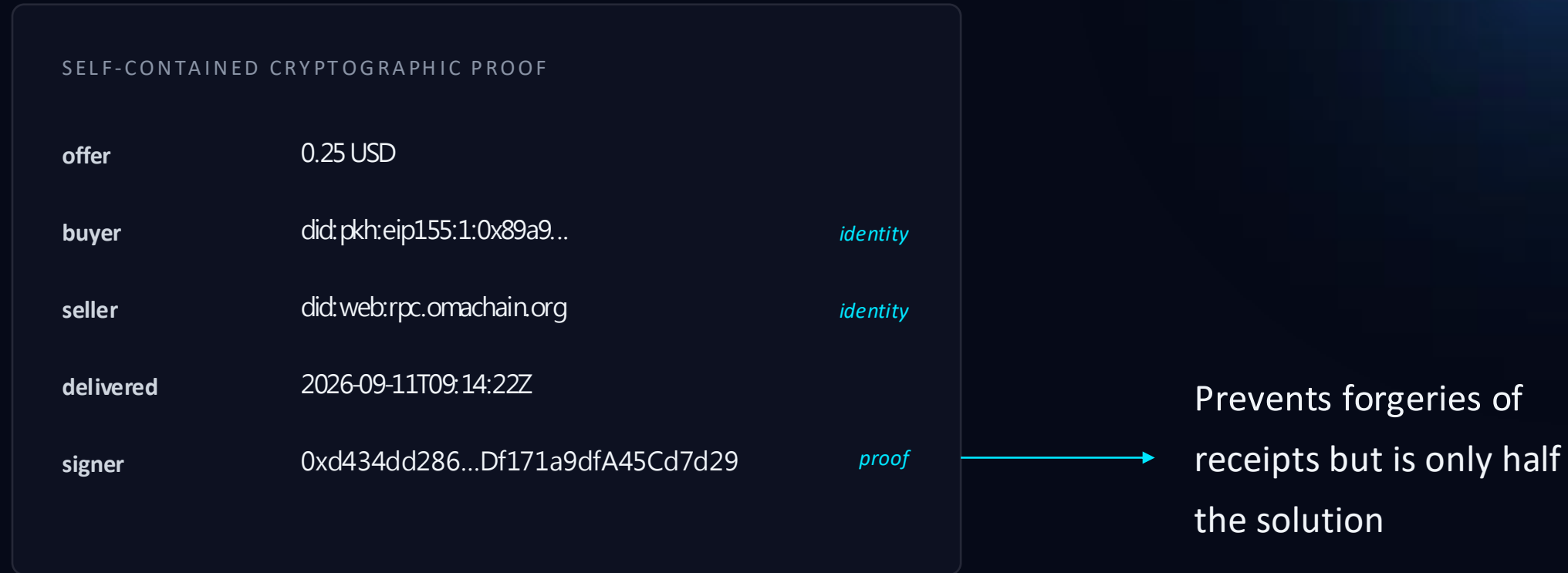
Attestations are standardized by the W3C- OMATrust standardizes the schemas

IDENTITY

The W3C DID standard is the most prevalent identity system that doesn't require a middleman

IDENTITY	SUBJECT	EXAMPLES
did:web	URLs	x402 sellers, APIs, websites
did:pkh did:jwk	Public key material	x402 buyers, blockchain accounts, signing keys
did:artifact	Content and files	SKILL.md, binaries, JSON objects, glTF files

OMA3's "Signed Offers and Receipts" extension to x402 is a seller attestation



Signatures prove a receipt came from a unique key, but who owns the key?

How to prove a signature is authorized by a seller



This is the current method to prove key authorization, but the seller can remove it unilaterally in a dispute

Independent verification needs more durable key authorizations



A receipt cannot rely on the seller alone to prove authorization of the receipt's signature key

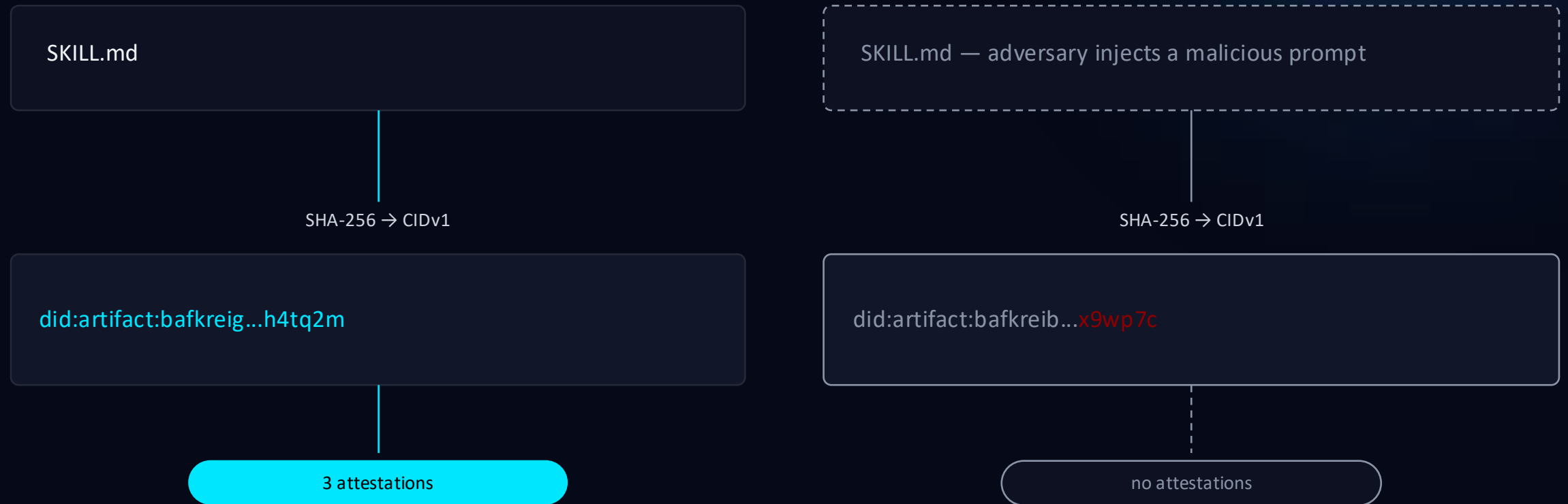
OMATrust provides a “witness” attestation to enable “non-repudiation”



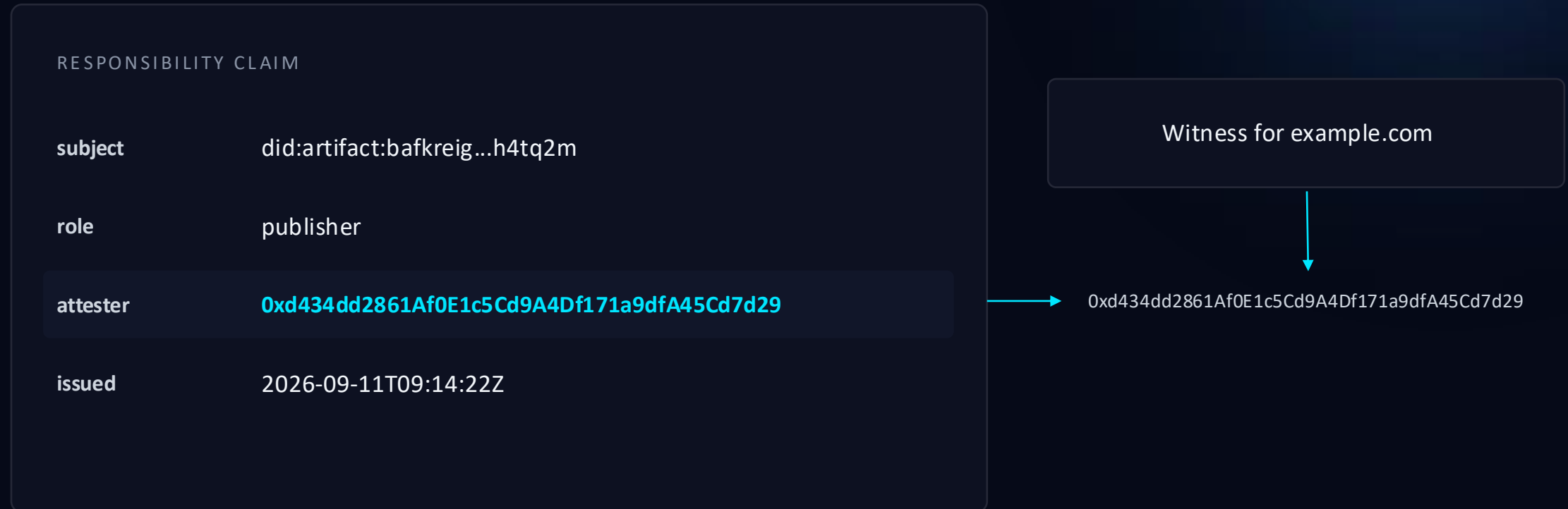
Verifiers can still establish that the authorization existed when the receipts were signed.

- Not cryptographic- still requires trust of issuer.
- Only an observation at a certain point in time.

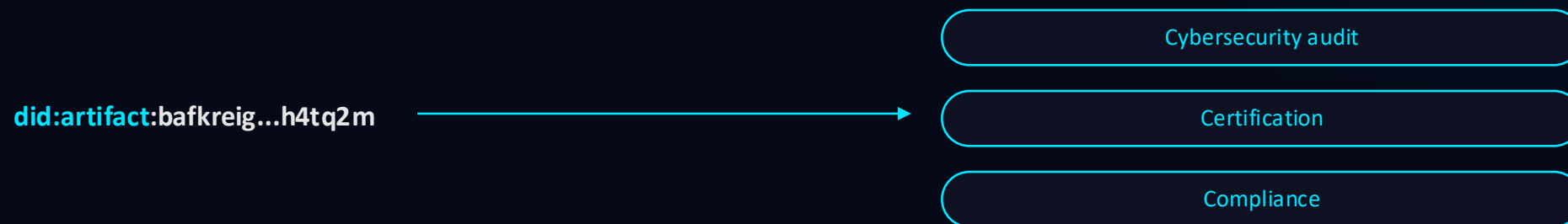
OMATrust works with content and files also



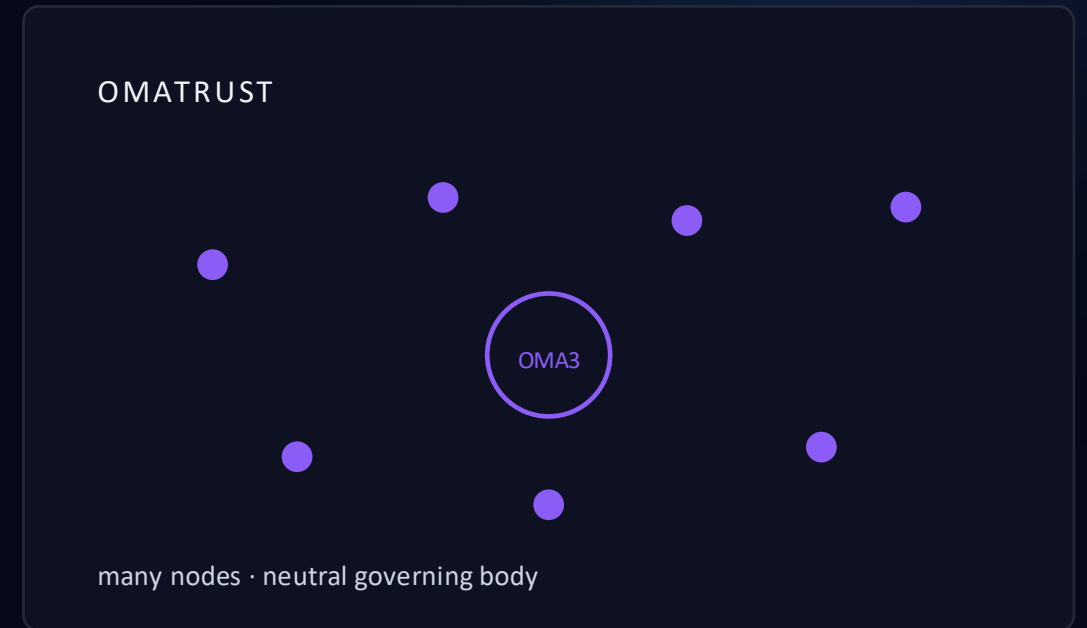
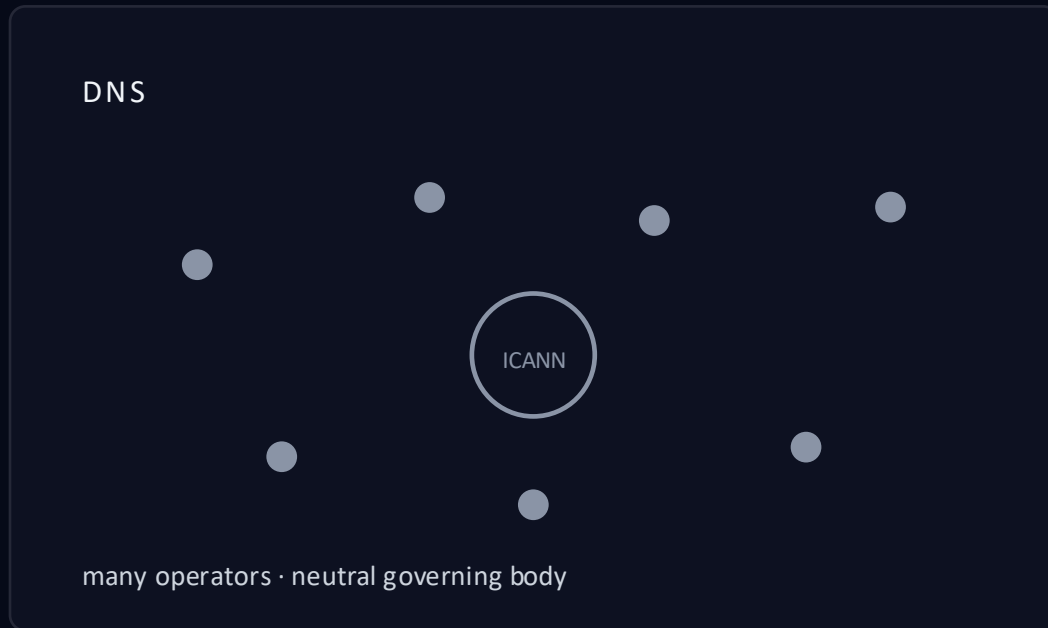
A responsibility claim attestation connects a URL with any piece of content content



did:artifact enables any kind of attestation on any content



OMATrust uses blockchain for the same reason ICANN uses a network of DNS servers



Same durable, timestamped, multi-operator substrate except more resilient and without the 24 hr propagation

You can take the schemas without taking the blockchain

SCHEMAS AND SPECIFICATIONS

Store agnostic. Works with anything.

MODULAR INTERFACE

BLOCKCHAIN IMPLEMENTATION

Durable, timestamped, multi-operator with instant propagation.

WHAT'S NEXT

Stress test the OMATrust specifications

A FEW SAMPLE AREAS

- 1 How do we improve the witness trust model?
- 2 Is did:artifact useful for glTF provenance?
- 3 Can we improve the schemas and verification methodology?
- 4 Are there other schemas we need to standardize?
- 5 Is there a better durable store than blockchain?
- 6 Are there other existing standards for OMATrust interoperability?

WHERE TO START

Read and comment on the OMATrust specs

github.com/oma3dao/omatrust-docs

Join x402

x402.org/members

Join OMA3

oma3.org/join

Participate in MSF

The specification is on the roadmap in multiple working groups

Propose a liaison agreement

This allows your SDO to cooperate with OMA3 on OMATrust

OMATrust will be proposed to x402. Can it work for in other SDOs?