

The State of x402: AI Agent Payments at Scale

@bc1beat

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Abstract

This report analyzes the x402 protocol ecosystem based on on-chain transaction data and service discovery APIs. In December 2025, x402 processed ~63 million transactions totaling ~\$7.5M USDC across 1,100+ independent projects offering 4,800+ mainnet endpoints. The average transaction of \$0.12 demonstrates viable micropayment economics that traditional payment rails cannot support. Key findings include: (1) 64,000+ unique buyers have transacted with 10,000+ sellers; (2) Data services represent 31% and AI services represent 25% of the ecosystem; (3) 76% of services are priced in the micropayment range (\$0.01-\$0.10); (4) Base commands ~53% and Solana ~37% of network share; (5) the market is highly competitive (HHI of 168.5) with no dominant players. Data sourced from x402scan.com on-chain indexer and blockrun.ai.

Introduction

ChatGPT proved LLMs were ready for the real world. **x402 is doing the same for AI agent payments.**

The x402 protocol revives HTTP status code 402—“Payment Required”—which was defined in 1997 but never implemented. The original vision was simple: a web where any resource could require payment before access. That vision failed because the payment infrastructure didn’t exist. Credit cards couldn’t handle micropayments. The economics never worked.

Three decades later, the economics finally work. Stablecoins settle in seconds for fractions of a cent. AI agents don’t get tired of metering. And the demand is real: autonomous systems need to pay for APIs, data feeds, compute resources, and specialized services—not through subscriptions or human-mediated purchases, but through direct, programmatic, pay-per-use transactions.

Protocol Evolution

This report analyzes the x402 ecosystem as of December 2025. x402 V2 has launched with significant architectural improvements that address earlier limitations.¹

What V2 Changes: - **Multi-chain by default:** Standardized payment formats work across Ethereum L2s and Solana without protocol-level updates - **Plugin architecture:** Extensions move out of core protocol, enabling automatic service discovery and machine-readable metadata - **Session support:** Reusable access after purchase, eliminating repeated on-chain calls for subscriptions and repeated usage

¹Ward, D. (2025). “x402 V2 is Now Live — and Production-Ready.” Bankless analysis. <https://x.com/Bankless/status/2003104079485014073>

The December 2025 data presented here demonstrates that the fundamental economics work. V2 removes friction that limited earlier adoption. x402 is transitioning from proof-of-concept to production infrastructure.

Based on on-chain transaction data from x402scan.com and blockrun.ai, combined with service discovery data from 6 facilitator APIs:

~63 million transactions. ~\$7.5M USDC total volume in December 2025.²

This is AI agents paying for services, at scale, with real money. The infrastructure works. The unit economics work. The question is no longer *if*—it’s *what to build on top*.

Key Metrics

Metric	Value
Transactions	~63M
Total Value	~\$7.5M USDC
Unique Buyers	~64K
Unique Sellers	~10K
Total Origins	1,397
Total Resources	4,889
Avg Transaction	\$0.12

Over 63 million transactions at \$0.12 average in December 2025—true micropayments at scale that traditional rails cannot match.

Analysis

Ecosystem Maturity

The ecosystem has grown to **1,100+ independent projects** offering **4,800+ mainnet endpoints** across six discovery platforms.³ Most providers are small, experimentation is high, and there’s no dominant player yet. If you’re building, now is the time to establish position.

Ecosystem Snapshot (December 29, 2025)

Metric	Value
Total Origins	1,397
Independent Domains	1,100+
Cloud Subdomains	290+
Total Resources	4,889
Payment Options	5,050

²Transaction figures from x402scan.com on-chain indexer (December 2025, 30-day data). x402scan tracks USDC transfers to/from known facilitator addresses on Base and Solana networks. Discovery data (origins, resources) tracked via blockrun.ai from 6 facilitator APIs.

³Abdul, F. (2025). “x402 Ecosystem Market Map.” Decasonic. <https://x.com/fundbrah/status/1983591121734529096>

Metric	Value
Origins with Transactions	721 (54.2%)

The ecosystem continues to grow with hourly data syncs from 6 facilitators. Data completeness verified: 99.4% of GCS raw discovery data is captured in the production database.

Price Distribution

~76% of services are priced at \$0.10 or below. This has become the de facto standard for micropayments. At this price point, you need volume to make money—which brings us back to the demand side being healthy.

Price Point	% of Services
<\$0.01	6.6%
\$0.01-\$0.10	69.2%
\$0.10-\$1.00	12.4%
\$1.00-\$10.00	9.5%
>\$10.00	2.2%

The median price is \$0.01, while the mean is \$1.04—indicating a long tail of premium services alongside the micropayment majority.

Category Distribution

The distribution of services across categories reveals what the market is actually building:

	Category	% of Ecosystem	Observations
Data	30.9%	On-chain analytics, APIs, market data	
AI	25.4%	LLM inference, agents, automation	
Blockchain	15.2%	DeFi intelligence, contract interactions	
Utility	11.7%	General-purpose tools and services	
Trading	6.2%	Trading signals, execution, analytics	
Search	5.3%	Query and discovery services	
Other	5.3%	Developer tools, payments, NFTs, content	

The dominance of Data services (31%) followed by AI (25%) is significant. It validates that the x402 ecosystem is being used for real infrastructure—data feeds, analytics, and AI inference—not just experiments.

Network Distribution

Base and Solana together command over 90% of the ecosystem. Base leads with 53.3%, while Solana holds 36.6%.

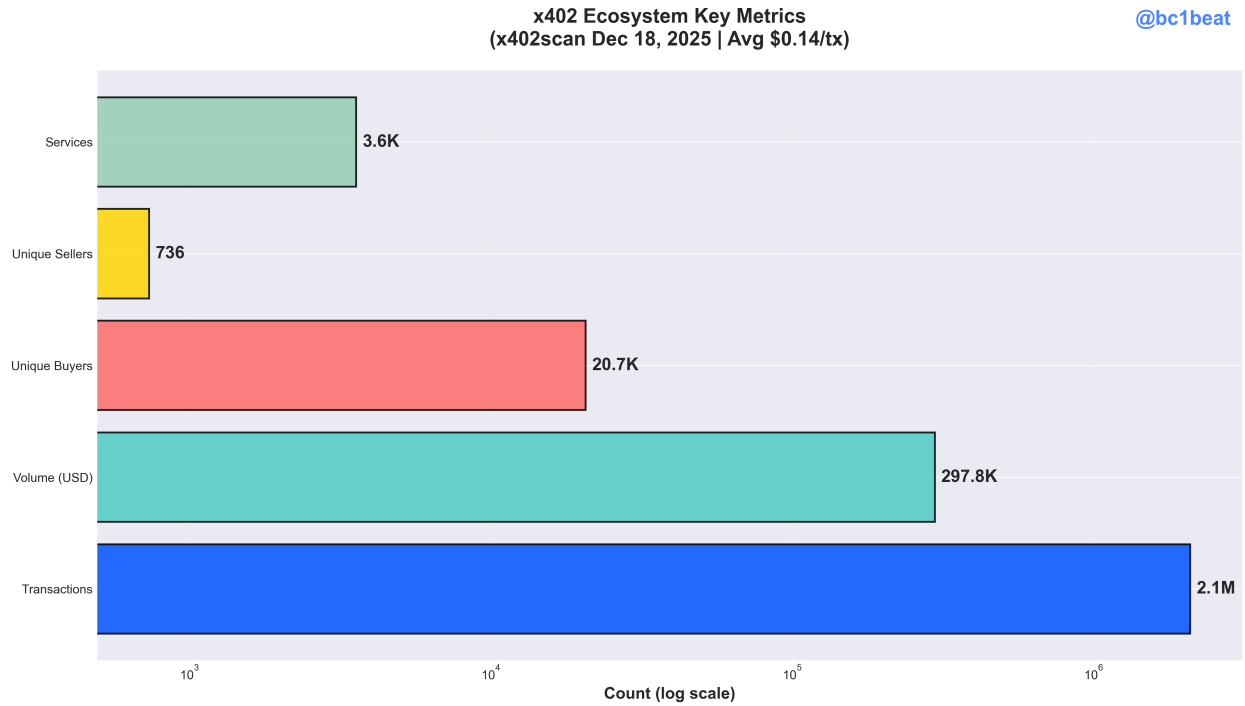


Figure 1: x402 Ecosystem Growth

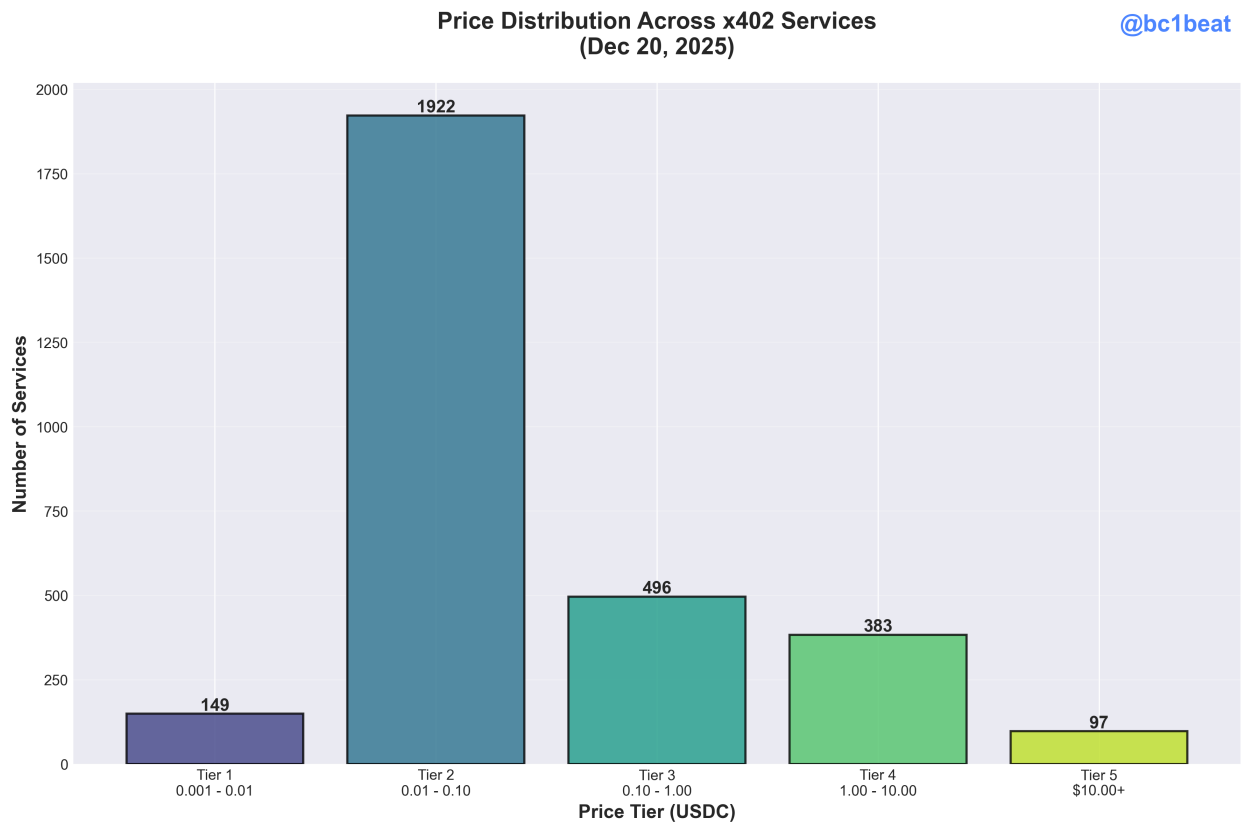


Figure 2: Price Distribution Across x402 Services

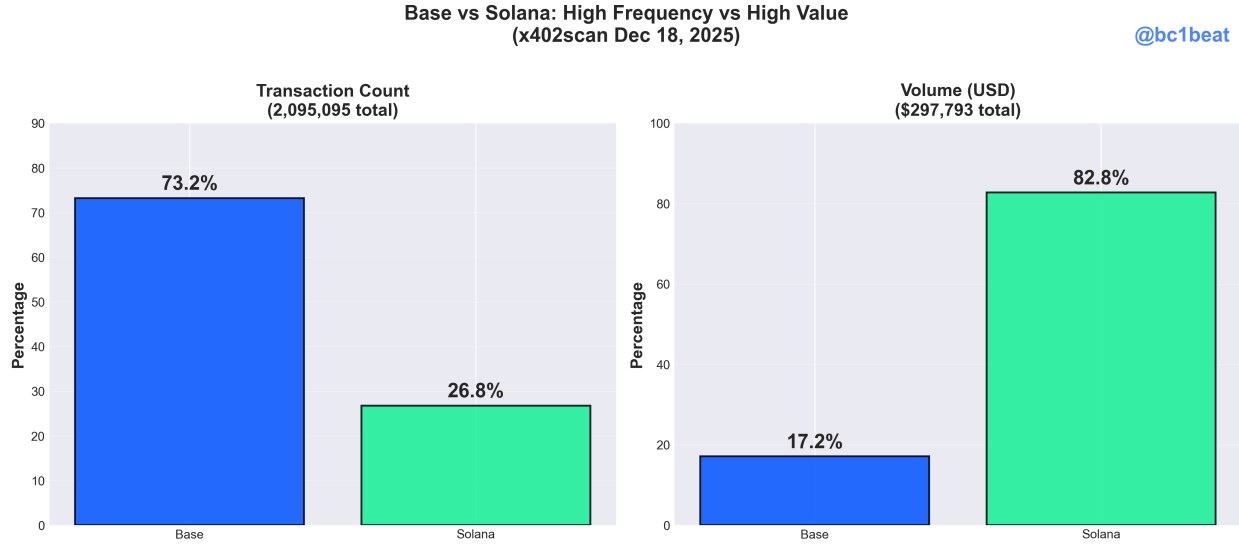


Figure 3: Base vs Solana Comparison

Network	% of Endpoints	
	Base (mainnet)	53.3%
	Solana	36.6%
	Arbitrum	5.2%
	Ethereum L1	2.8%
	Other (Polygon, etc.)	2.1%

This bifurcation is strategic, not accidental: - **Base = Developer Platform:** Where services get registered, documented, and discovered - **Solana = Production Runtime:** Where high-frequency, latency-sensitive transactions actually execute

The pattern mirrors broader infrastructure trends: developers prototype on Ethereum L2s for tooling and ecosystem support, then deploy to Solana for performance-critical workloads. For DeFi, trading, and agent coordination, Solana's sub-second finality matters more than Base's Coinbase integration.

The practical implication: choose the network that matches your use case. Base for general-purpose agents and Coinbase ecosystem integration. Solana for trading, DeFi, and applications requiring sub-second execution.

Market Structure

Competition Analysis

To understand market concentration, we calculated the Herfindahl-Hirschman Index (HHI) across all service providers. The result: **168.5**.

For context, the U.S. Department of Justice considers any market with HHI below 1,500 to be competitive. The x402 ecosystem scores an order of magnitude below that threshold. This is an

extremely fragmented market with no dominant players, significant experimentation, and substantial room for new entrants.

Provider Distribution

Category	% of Ecosystem	
	Independent domains	78.8%
	Cloud subdomains	21.2%

The high proportion of independent domains (79%) indicates serious projects, not just experiments on temporary hosting platforms.

Top Providers by Service Count

Domain	Services	
	mesh.heurist.xyz	41
	api.portalsprotocol.com	29
	x402factory.ai	22
	gateway.grapevine.fyi	22
	pay.x402labs.dev	20
	api.agnichub.xyz	20
	agent1-gateway.aurracloud.com	19
	padelmaps.org	19

This fragmentation is both a feature and a bug. On one hand, it means no gatekeeper controls access to the ecosystem. On the other, it means discovery is challenging and quality varies widely. For builders, this represents an opportunity: establish yourself now, before the market consolidates.

Findings

Traction Analysis

The on-chain data reveals healthy adoption patterns:

Metric	Value (December 2025)	
	Total transactions	~63M
	Total volume	~\$7.5M
	Unique buyers	~64K
	Unique sellers	~10K
	Average transaction	\$0.12

Over 63 million transactions and 64,000+ unique buyers in December alone. Real money is flowing through the system at true micropayment scale.

Top Origins by Volume

Domain	Volume	Transactions
api.ethyai.app	\$219,781	399
f676fdb38201.ngrok-free.app	\$142,140	1,000
x721.dev	\$39,598	1,000
api.x721.dev	\$39,598	985
api.luckyx402.com	\$20,000	1,000
www.qrbase.xyz	\$17,001	803
api.bonksmash.xyz	\$12,327	1,000
api.retry402.com	\$11,726	1,173
nut402.codenut.xyz	\$10,086	1,000
pong.ink	\$9,028	1,999

The top origin (api.ethyai.app) has processed nearly \$220K in volume, demonstrating that significant economic activity is possible within the ecosystem.

Micropayment Viability

Average transaction: \$0.12. Median listed price: \$0.01. This is the micropayment sweet spot that traditional payment rails fundamentally cannot touch.

Consider the economics: a \$0.01 transaction on credit card rails would cost \$0.30+ in interchange fees alone—a 3,000% overhead that makes the transaction economically impossible. Stablecoin rails reduce this to fractions of a cent, unlocking entirely new business models.

This matters because AI agents optimize for efficiency. They will naturally gravitate toward the smallest viable payment unit. If paying per API call or per data query makes a workflow cheaper, an agent will do it continuously, at whatever granularity the infrastructure allows.

Infrastructure Maturity

The infrastructure layer shows signs of production readiness:

- **12+ active facilitators** processing transactions across Base and Solana
- **79% independent domains** (21% are cloud/dev environments)
- **Hourly sync cadence** with automated discovery pipeline
- **99.4% data completeness** between GCS raw data and production database
- **Multi-chain support** with Base and Solana as primary networks

The facilitator ecosystem is diversifying. Coinbase CDP provides institutional credibility and developer tooling. PayAI, Questflow, and others offer specialized capabilities. This competition benefits builders—no single gatekeeper controls access to the x402 economy.

Limitations and Challenges

Discovery Fragmentation

There's no unified search across facilitators. Agents using CDP can't easily find services on PayAI. This creates friction—and opportunity for whoever solves it.

Provider Concentration

Some facilitators show high concentration around a few key providers:

Facilitator	Buyers	Services	Usage Pattern
Heurist	3,050	3	AI/ML infrastructure
CodeNut	2,275	3	Developer tools
Daydreams	4,218	8	Agent platform

This is normal for infrastructure—a few well-built services can serve thousands of users. It’s how platforms scale.

Transaction Quality and Legitimate Volume

Let’s be real: ~\$298K total transacted value is still small compared to traditional payment networks. But understanding what portion represents genuine economic activity is critical.

The Spam Question: On-chain analysis by Artemis (via @OnchainLu) estimates that **47% of x402 transactions to date are non-organic**—primarily teams gaming leaderboards to climb x402scan rankings for visibility.⁴ This sounds damning, but the breakdown reveals a more nuanced picture:

- **47% of transactions** are classified as gamed/artificial
- **14% of dollar volume** comes from gamed activity
- Gamed activity correlates with legitimate usage (teams testing infrastructure before production)

The remaining **53% of transactions** represent legitimate activity, concentrated in high-frequency, low-value services where micropayments are economically necessary: API calls, data lookups, and agent-to-agent coordination. Artemis highlights AISA, x402secure, LucyOS, AgentLISA, and Heurist as exemplars—processing millions of micropayments with near-zero artificial activity.

Why This Matters: The pattern validates x402’s core thesis. Smaller transactions (\$0.01-\$0.10) correlate with cleaner volume. This is exactly where traditional payment rails fail and stablecoin micropayments win. The infrastructure works—the unit economics work—and as services transition from testing to production, the spam ratio should decline.

This isn’t a red flag. It’s how crypto bootstraps new infrastructure. Memes and speculation drive initial attention. Legitimate use cases emerge from the experimentation.

The Trust Gap

x402 has solved “how do agents pay?” but not yet “what happens when they pay wrong?”⁵ Stablecoin transactions are fast and cheap, but irreversible—there’s no dispute button.

⁴Lu, L. (2025). “x402: Early Signs of Agentic Commerce?” Artemis analysis cited in Ward, D. (2025). <https://x.com/onchainlu/status/2000971905310834780>

⁵Jaros, O. & Saurabh, D. (2025). “Agentic Payments: The Trust Gap.” https://x.com/OliverJaros_/status/2002112634854785255

Traditional commerce is built on error handling. Card networks spend billions on fraud detection and dispute resolution, justified by interchange fees of 1.5-3%. Stablecoin rails cost fractions of a cent but lack this infrastructure.

Two layers are missing:

- **Before the transaction:** Know Your Agent (KYA) identity, reputation scores, and fraud detection that works across services
- **After the transaction:** Escrow and dispute resolution mechanisms that match instant settlement

This represents both a limitation and an opportunity. Whoever builds the trust infrastructure for agentic payments—agent credentials, recourse mechanisms, and attribution systems—captures the next layer of value in this ecosystem.

The Broader Machine Economy

x402 is one piece of a larger convergence. The fusion of Robotics \times AI \times Web3 is building toward a decentralized machine economy where robots, sensors, and AI agents gain on-chain identity, transact autonomously, and share proceeds.⁶

Traditional payment rails weren't built for this future—credit card fees don't make sense for micropayments, and subscription models force rigid pricing. x402 provides the payment primitive: machines pay only for the precise service or data they consume, enabling pay-per-use economics at scale.

As embodied AI systems become more capable—agents hiring other agents, robots coordinating swarm logistics, autonomous systems negotiating in real-time—they'll need infrastructure for millions of micropayments per day. x402 is positioning itself as that infrastructure layer.

Discussion

The data tells a clear story: x402 has achieved technical validation at impressive scale. Over 63 million transactions in December 2025 prove the protocol works. The \$0.12 average transaction size proves true micropayment economics are viable—transactions that would be impossible on traditional payment rails. The 1,100+ independent projects prove builders are paying attention.

What does this mean for those looking to participate?

For service providers, the opportunity is straightforward. Demand exists—the transaction volume proves it. If you have a useful API, data feed, or specialized compute resource, you can monetize it through x402 with minimal friction. Implement the protocol, register with a facilitator, and you're live. The barrier to entry is low, which explains the experimentation we're seeing across the ecosystem.

Pricing strategy matters more than many realize. The \$0.01-\$0.10 range has become the de facto standard (69% of services), and most builders are racing toward the bottom. But the data reveals an interesting counter-trend: data and blockchain services command higher prices than generic AI

⁶Zhao, J. (2025). "The Convergent Evolution of Automation, AI, and Web3 in the Robotics Industry." <https://paragraph.com/@0xjacobzhao/the-convergent-evolution-of-automation-ai-and-web3-in-the-robotics-industry>

agents. The lesson is simple—valuable data should be priced accordingly. Don’t compete on price when you can compete on value.

Network selection is another strategic decision. Base dominates service registration with 57% of endpoints, reflecting its origin as a Coinbase initiative. But Solana is growing rapidly (42%), particularly for DeFi and trading applications. The right choice depends on your target users: Base for the broader Coinbase ecosystem, Solana for trading-focused applications. Spreading across multiple chains dilutes focus without clear benefit at this stage.

For builders and investors, the trust layer represents the most significant untapped opportunity. The current infrastructure handles payments but lacks the surrounding systems that enable commerce at scale: identity verification, reputation scoring, fraud detection, and dispute resolution. These are solved problems in traditional finance—Visa and Mastercard have spent decades building them. Stablecoin rails need equivalent infrastructure, and whoever builds it captures significant value.

The data layer is also worth watching. Among all the directions in the Web3 × Robotics convergence, data crowdsourcing and attribution are closest to commercial viability. Projects that solve the dual challenge of quality control and buyer demand matching will win.

Discovery tools like x402scan.com and blockrun.ai are essential for tracking ecosystem activity. They provide visibility into which services are gaining traction, what prices the market will bear, and where opportunities are emerging.

Looking ahead, the next twelve months will be telling. Key indicators to watch include transaction quality (the ratio of organic to gamed activity should improve as the ecosystem matures), average transaction size (declining averages indicate genuine micropayment adoption), service diversity (growth beyond AI agents into new verticals signals ecosystem health), and the emergence of trust infrastructure (identity, reputation, and dispute resolution protocols).

Methodology

Data Sources

This report combines two complementary data sources:

Discovery Data: Service metadata aggregated from six facilitator APIs (CDP/Coinbase, PayAI, Questflow, AnySpend, AurraCloud, Thirdweb) via blockrun.ai. Collection period: December 2025. Testnet/devnet resources filtered out for mainnet-only analysis.

On-Chain Transaction Data: USDC transfer data from x402scan.com, which indexes known facilitator payment processor addresses on Base and Solana. December 2025 (30-day) transaction data.

Verification: Cross-referenced facilitator self-reported volumes with on-chain calculations (variance <1%).

Tracked Facilitator Addresses (Base)

Facilitator	Address
Coinbase	0xdbdf3d8ed80f84c35d01c6c9f9271761bad90ba6
PayAI	0xc6699d2aada6c36dfea5c248dd70f9cb0235cb63

Facilitator	Address
Questflow	0x724efafb051f17ae824afcdf3c0368ae312da264
Thirdweb	0x80c08de1a05df2bd633cf520754e40fde3c794d3
AurraCloud	0x222c4367a2950f3b53af260e111fc3060b0983ff
AnySpend	0x179761d9eed0f0d1599330cc94b0926e68ae87f1
Virtuals Protocol	0x80735b3f7808e2e229ace880dbe85e80115631ca
Daydreams	0x279e08f711182c79ba6d09669127a426228a4653
Heurist	0xb578b7db22581507d62bdbbeb85e06acd1be09e11
CodeNut	0x8d8fa42584a727488eeb0e29405ad794a105bb9b
OpenX402	0x97316fa4730bc7d3b295234f8e4d04a0a4c093e8

Note: Some facilitators have not yet published discovery API endpoints, so their registered services are not included in the ecosystem analysis. If you are a facilitator with discovery data to share, please reach out to [@bc1beat](#).

Data Limitations

1. **Discovery APIs are opt-in:** Services that don't register with facilitators are not captured
2. **Transaction data is cumulative:** Not a specific time window; reflects all-time activity
3. **Price outliers excluded:** Services priced >\$1,000 excluded from price analysis (likely test/placeholder values)
4. **GCS raw data restored:** Pipeline fixed Dec 29 to preserve raw unfiltered data in GCS alongside filtered Supabase sync

Appendix

Top Providers by Service Count

	Domain	Services	Category
mesh.heurist.xyz		41	AI Agent
api.portalsprotocol.com		29	AI Agent
x402factory.ai		22	Data
gateway.grapevine.fyi		22	Payment
pay.x402labs.dev		20	AI Agent
api.agnichub.xyz		20	Developer Tools
agent1-gateway.aurracloud.com		19	AI Agent
padelmaps.org		19	Trading

Facilitator Transaction Breakdown

Facilitator	Transactions	Total Value	Avg/Tx
Coinbase	926,531	\$37,670	\$0.04
Dexter	561,113	\$246,610	\$0.44
PayAI	317,637	\$5,740	\$0.02

Facilitator	Transactions	Total Value	Avg/Tx
Daydreams	212,381	\$536	\$0.003
Heurist	40,344	\$4.10	\$0.0001
Virtuals Protocol	10,460	\$3,750	\$0.36
Questflow	5,604	\$126	\$0.02
OpenX402	4,402	\$426	\$0.10
AnySpend	3,059	\$2,780	\$0.91
CodeNut	13,020	\$130	\$0.01
Thirdweb	141	\$15.49	\$0.11
Corbits	367	\$4.44	\$0.01

Asset Distribution

Platform Coverage

Base Network Facilitator Addresses

Facilitator	Address
Coinbase	0xdbdf3d8ed80f84c35d01c6c9f9271761bad90ba6
PayAI	0xc6699d2aada6c36dfea5c248dd70f9cb0235cb63
Questflow	0x724efafb051f17ae824afcdf3c0368ae312da264
Thirdweb	0x80c08de1a05df2bd633cf520754e40fde3c794d3
AurraCloud	0x222c4367a2950f3b53af260e111fc3060b0983ff
AnySpend	0x179761d9eed0f0d1599330cc94b0926e68ae87f1
Heurist	0xb578b7db22581507d62bdbeb85e06acd1be09e11

Solana Network Facilitator Addresses

Facilitator	Address
Coinbase	L54zkaPQFeTn1UsEqieEXBqWrPShiaZEPD7mS5WXfQg
PayAI	2wKupLR9q6wXYppw8Gr2NvWxKBUqm4PPJKkQfoxHDBg4
Dexter	DEXVS3su4dZQWTvvPnLDJLRK1CeeKG6K3QqdzthgAkNV
Daydreams	DuQ4jFMmVABWGXabYHfkgzdyeJgS1hp4wrRuCtsJgT9a
AnySpend	34DmdeSbEnng2bmbSj9ActckY49km2HdhiyAwyXZucqP
OpenX402	5xvht4fYDs99yprfm4UeuHSLxMBRpotfBtUCQqM3oDNG

Asset Distribution in x402 Ecosystem
(Dec 20, 2025)

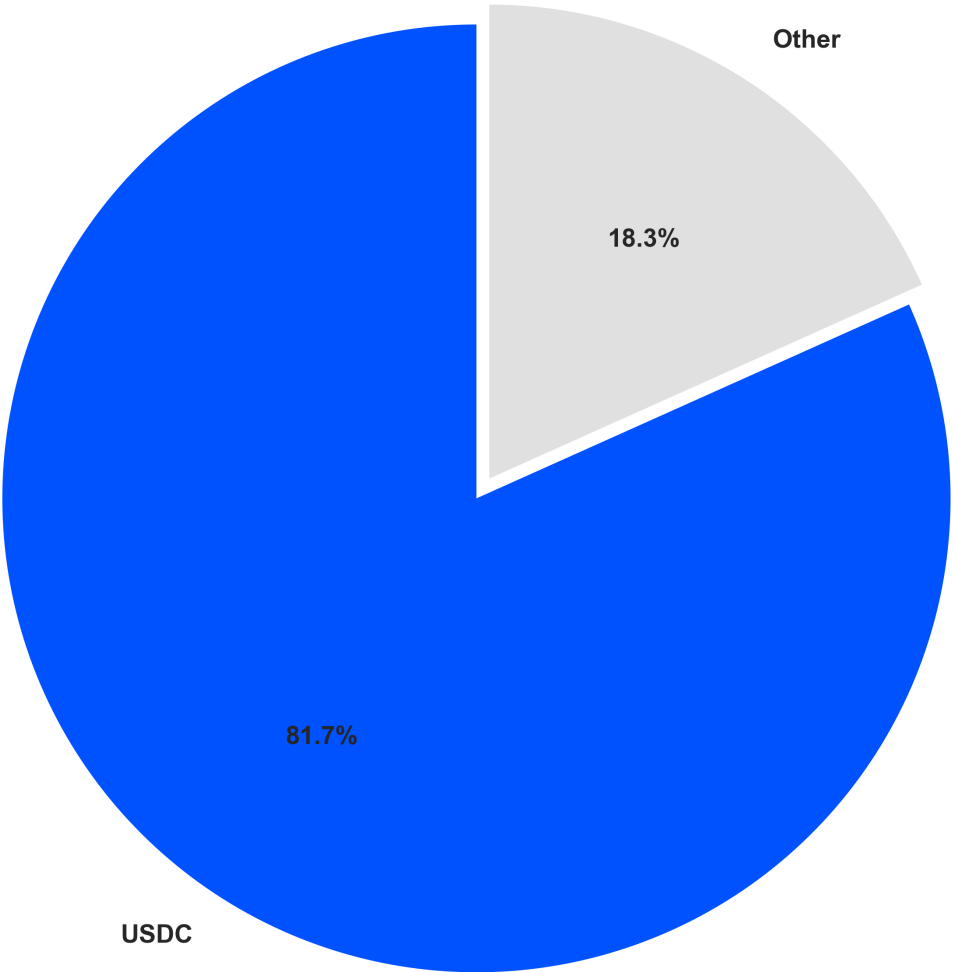


Figure 4: Asset Distribution in x402 Ecosystem

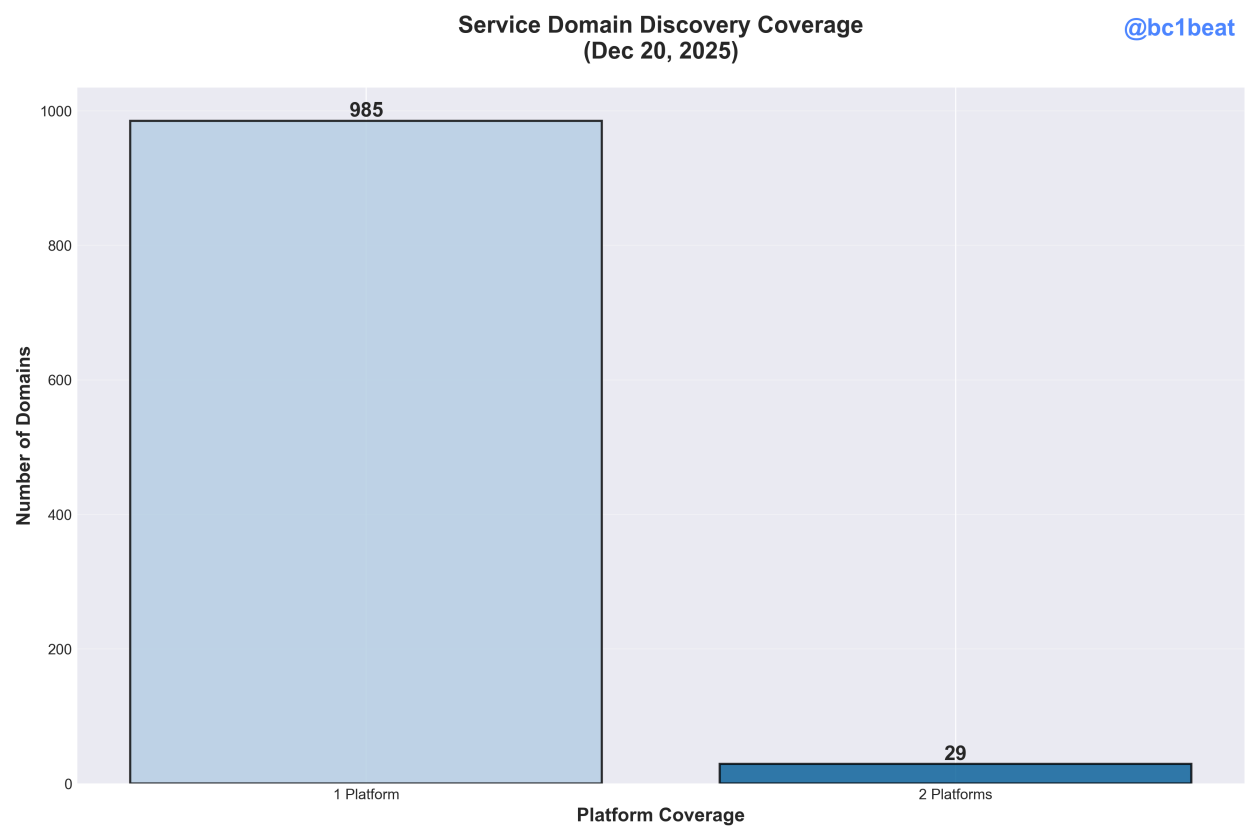


Figure 5: Service Domain Discovery Coverage