Polkadot

Projects and Tech Infrastructure in Polkadot Ecosystem

Polkadot

Speaker

Lipai Zhu

Blockchain Developer

2017~2018

Research Blockchain: Bitcoin, Ethereum

2019~2020

Consortium Blockchain: HyperLedger Fabric and FISCO BCOS, Solidity

2021~2023

Polkadot Parachain: Substrate and Rust

2024～

Research Polkadot

Catalogue

These are some of the most important takeaway for this sharing:

- Intro of Polkadot Technical Architecture
- Projects of Polkadot Parachain
- Perspectives of Polkadot Ecosystem
- Tech Infrastructures in Polkadot

Catalogue

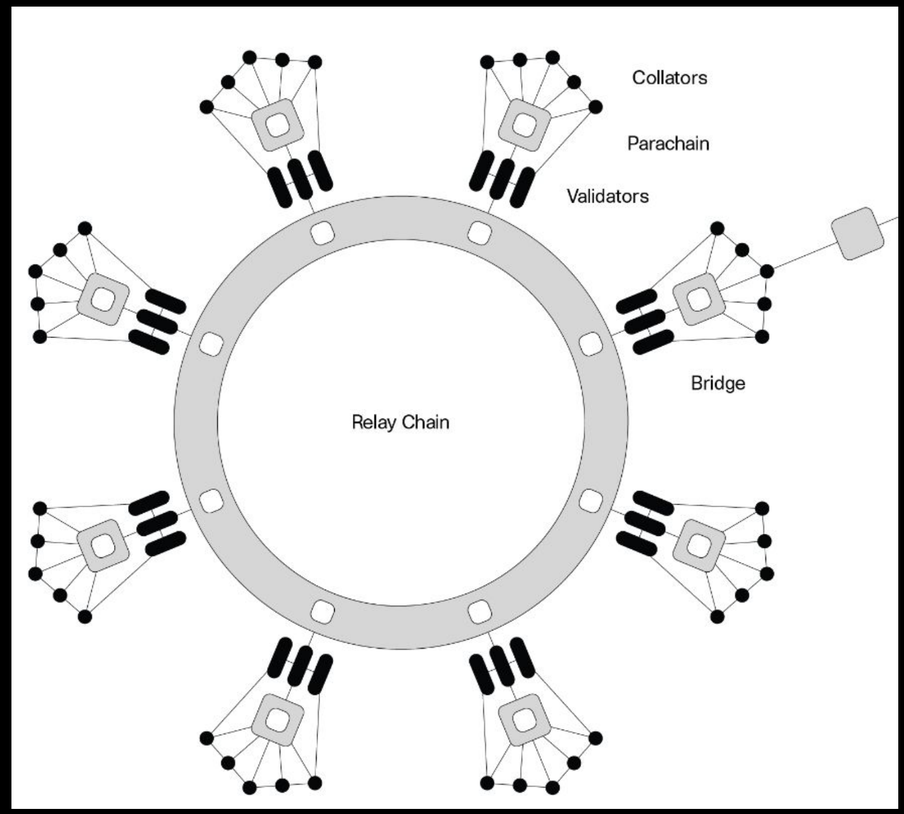
These are some of the most important takeaway for this sharing:

- Intro of Polkadot Technical Architecture
- Projects of Polkadot Parachain
- Perspectives of Polkadot Ecosystem
- Tech Infrastructures in Polkadot

Key Concepts

- Relaychain
- Parachain
- Validators
- Collators
- Nominators

- Shared Security
- Cross chain message (XCM)



Key differences

POLKADOT	KUSAMA
High security	Low barriers to entry for parachain deployment
High stability	Low bond requirements for validators and parachains
More conservative governance and upgrade	Latest technology
High validator rewards	Low slashing penalties
	Fast iteration
Existential deposit: 1 DOT	Existential deposit: 0.000333333 KSM
Staking	
Minimum stake: 250 DOT	Minimum stake: 0.1 KSM
Unbonding and slash defer: 28 days	Unbonding and slash defer: 7 days
Fast-unstaking: Deposit 1 DOT	Fast-unstaking: Deposit 0.33333 KSM
Era: 24 hours, Epoch: 4 hours	Era: 6 hours, Epoch: 1 hour

Polkadot vs. Kusama

Catalogue

These are some of the most important takeaway for this sharing:

- Intro of Polkadot Technical Architecture
- Projects of Polkadot Parachain
- Perspectives of Polkadot Ecosystem
- Tech Infrastructures in Polkadot

Polkadot

Projects Overview

Chains and Pallets

Components	Existing projects	Potentially interesting projects
Scalable Transactions	Perun channels ⚪, CLI demo of Perun ⚪, Astar 🟢, Celer ⚪, Gunclear ⚪, TPScore ⚪, proof-of-contract-stake 🟢	roll-ups, DAG-based consensus mechanisms, side chains
Bridges	interBTC 🟢, DKG Substrate 🟡, Sygma 🟢, EOS by Bifrost ⚪, POA - Substrate ⚪, Substrate - Ethereum DAI Bridge ⚪, Substrate - Substrate Bridge ⚪, BTC by ChainX 🟢, Cosmos-Substrate bridge ⚪, Substrate IBC Pallet 🟢, Polkadot Ethereum Bridge 🟢, Darwinia 🟢, Spacewalk: a Stellar bridge 🟢, Filecoindot ⚪, Axelar-Substrate ⚪	ZCash
Privacy	ZeroChain ⚪, xx network ⚪, pLibra (Phala Network) 🟢, Automata Network ⚪, Zero Network 🟢, Silent Data ⚪	Multi-Asset Shielded Pool (MASP) , Zkay, Zexe
ZKP	ZeroPool ⚪, Megaclite ⚪, zkMega ⚪, PLONK for Substrate ⚪, Webb Anchor Protocol ⚪, zk-SNARKs tutorial ⚪, substrate-zk ⚪	
TEE	Acurast 🟢, Integritee 🟢, substraTEE ⚪, WeTEE 🟢	Keysafe Protocol ⚪
DeFi	PrivaDEX ⚪, Fusotao ⚪, Reef ⚪, Diora ⚪, Pendulum Chain 🟢, Compound Gateway ⚪, Parallel Finance 🟡, PINT ⚪, Laminar Chain ⚪, Acala 🟢, Centrifuge 🟢, Stafi ⚪, Definex ⚪, OAX Foundation ⚪, Cybex ⚪, Zenlink ⚪, Swaps Pallet ⚪, Polkadex 🟢, SubDEX ⚪, HydraDX 🟢, Substrate Stablecoin ⚪, Standard protocol ⚪, Polkaswap 🟢, Curve AMM ⚪, Konomi Network ⚪, Stable Asset 🟡, Libra Payment ⚪, Mangata 🟡, Tidechain 🟡, Basilisk 🟢, Polymesh 🟢	DEX with privacy and confidentiality features such as those found in a dark pool
Smart contract chains	moonbeam 🟢, Magnet 🟢, Aleph-node 🟢, Edgeware ⚪, ParaState ⚪, gear 🟢, CENNZnet ⚪, SkyeKiwi ⚪, OAK-blockchain 🟢, ICE Blockchain ⚪, Polkadot Smart Chain ⚪, Madara - Cairo/Starknet 🟢	smart contract chains with novel security approaches, smart contract chains based on existing

https://wiki.polkadot.network/docs/build-open-source

Two major directions

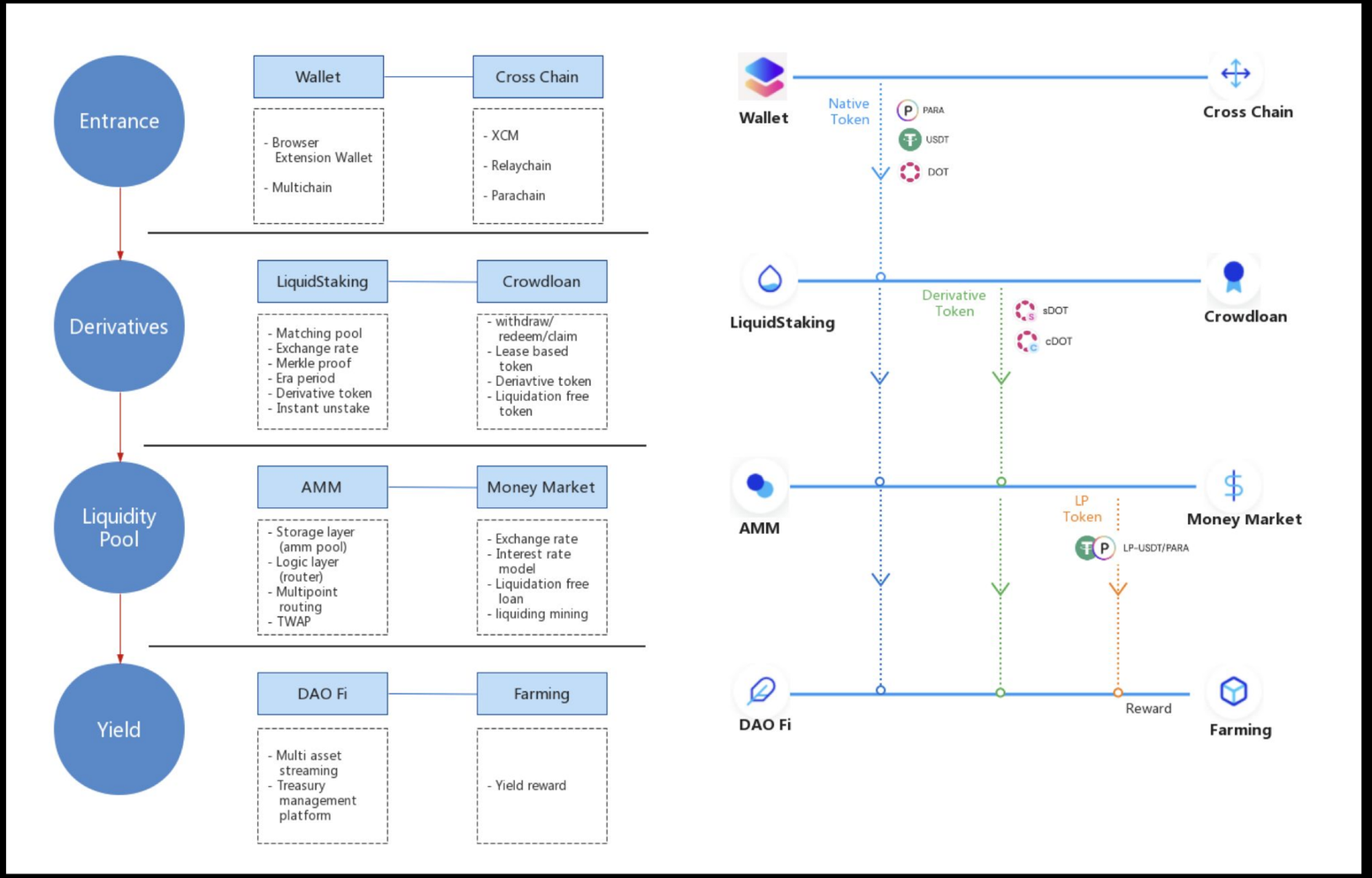
Business-centric

- Acala
- Bifrost
- Parallel

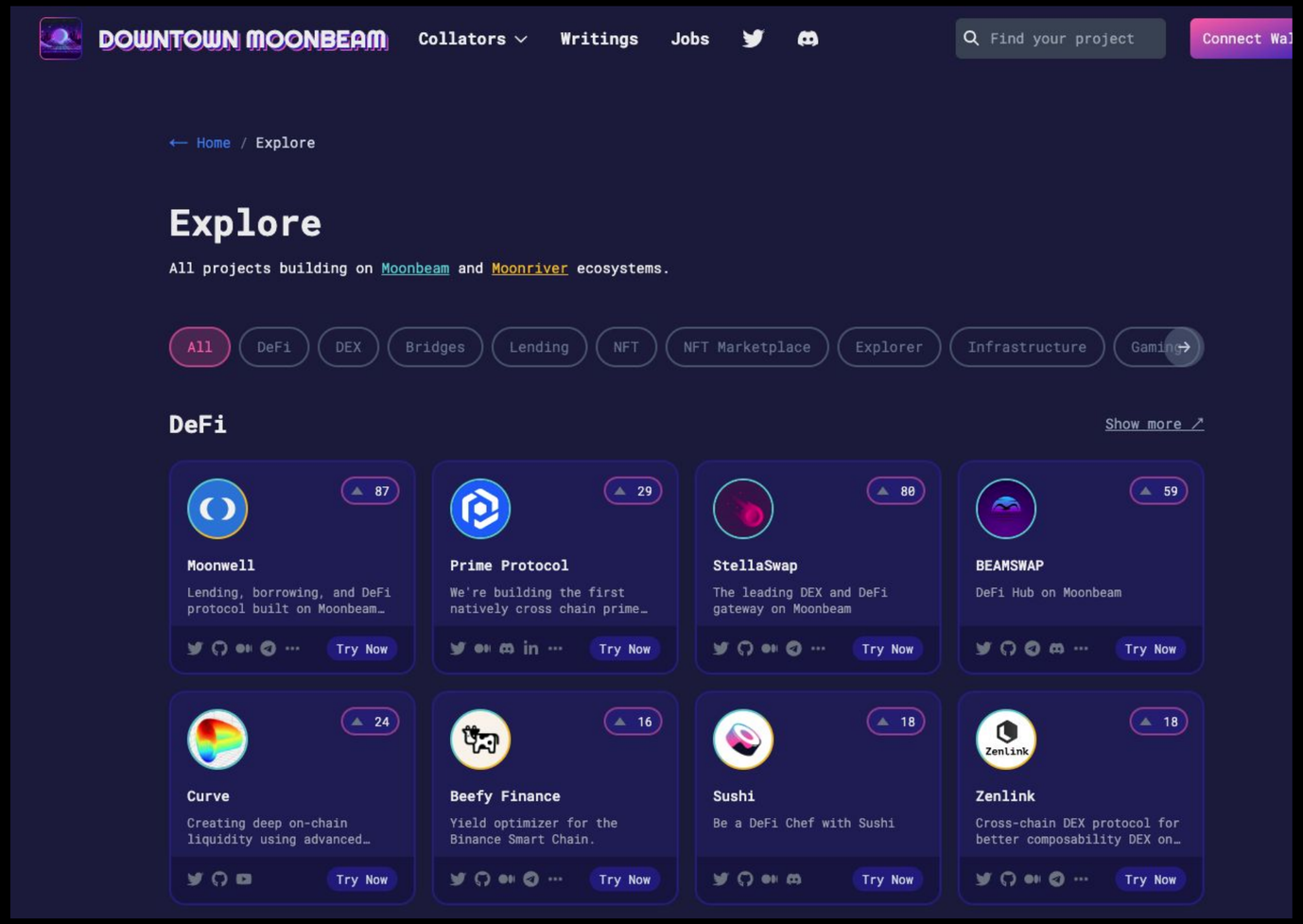
Platform-centric

- Astar
- Moonbeam

Business-centric



Platform-centric



https://www.dtmb.xyz/explore

Catalogue

These are some of the most important takeaway for this sharing:

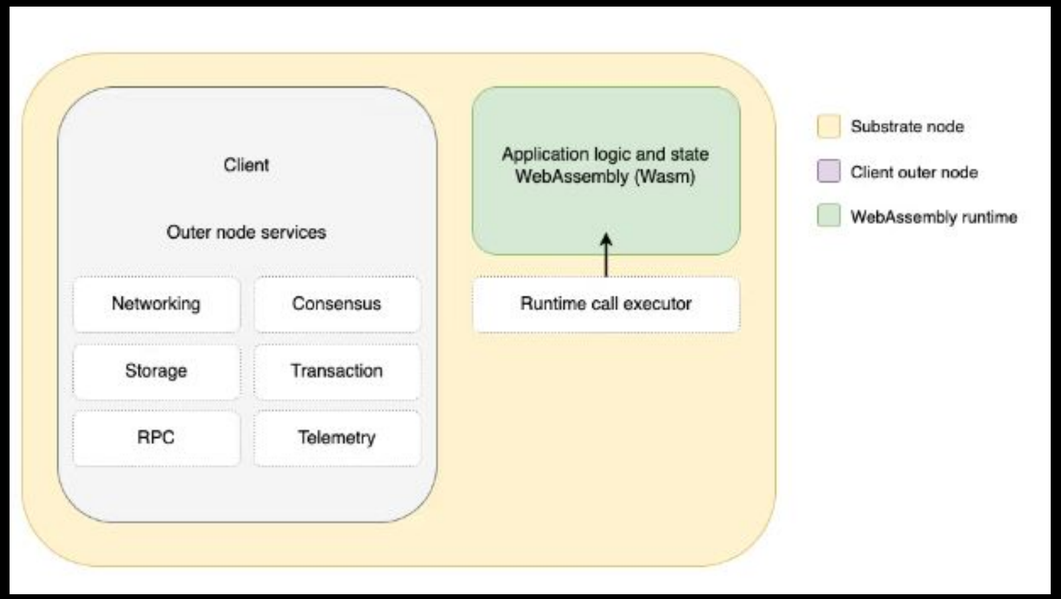
- Intro of Polkadot Technical Architecture
- Projects of Polkadot Parachain
- Perspectives of Polkadot Ecosystem
- Tech Infrastructures in Polkadot

Perspectives of Polkadot Ecosystem

- Underlying technology
- Parachain and smart contract projects
- Blockchain infrastructure
- On-chain data analytics

Underlying technology

Substrate



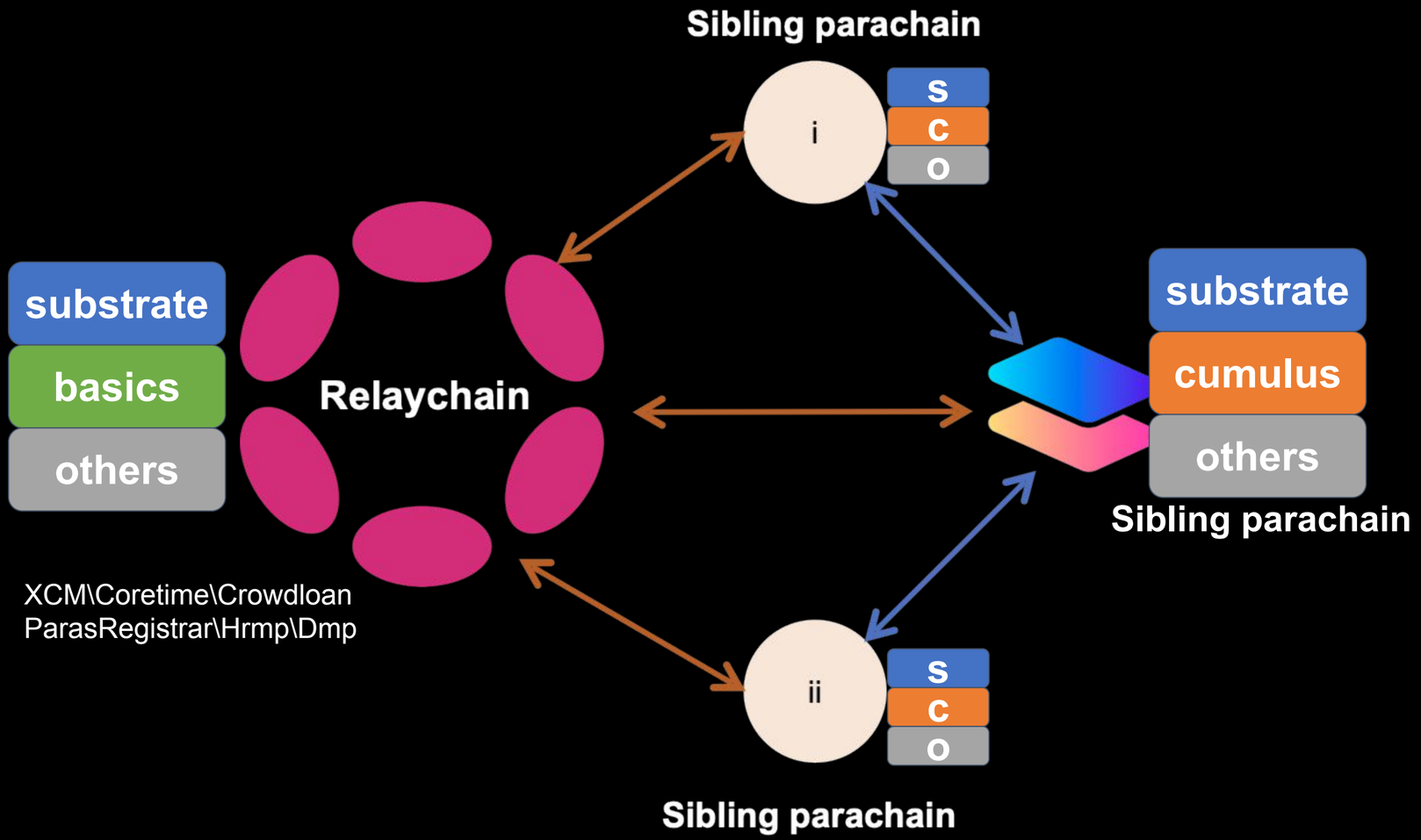
Basics of Blockchain

Cumulus

- dmp-queue
- collator-consensus
- relaychain-interface
- other utilities

Basics of Parachain

Underlying technology



Blockchain infrastructure

- Wallets:
  - https://wiki.polkadot.network/docs/wallets-and-extensions
- Explorer:
  - https://polkadot.js.org/apps/#/explorer
  - https://www.subscan.io/
  - https://moonbeam.moonscan.io/
- DataIndex:
  - https://explorer.subquery.network/
- Node Services:
  - https://onfinality.io/
  - https://www.dwellir.com/
- Telemetry:
  - https://telemetry.polkadot.io/
- ...

On-chain data analytics

Polkadot Key Metrics Overview

	Metric	Q4 2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023	YoY Change
Financial	Circulating Market Cap	$5.1B (30.9%)	$7.4B 45.0%	$6.2B (16.2%)	$5.2B (16.3%)	$11.0B 110.7%	114.3%
	Revenue (USD)	$117.9K 0.8%	$120.4K 2.1%	$97.5K (19.0%)	$94.2K (3.3%)	$2.8M 2,876.8%	2,279.5%
	Percentage of Supply Staked	44.4% (14.5%)	47.3% 6.7%	43.5% (8.1%)	48.7% 12.0%	51.8% 6.4%	16.8%
Newtork	Avg Daily Active Addresses	6.5K 29.5%	6.9K 5.8%	5.8K (16.1%)	5.2K (10.2%)	10.1K 93.7%	54.4%
	Avg Daily Extrinsics	9.0K 13.1%	9.6K 7.2%	7.7K (19.8%)	7.2K (6.8%)	202.2K 2,714.5%	2,157.4%
	Validators	297 0.0%	297 0.0%	297 0.0%	297 0.0%	297 0.0%	0.0%
Ecosystem	Avg Daily XCM Messages	707 (2.6%)	750 6.1%	572 (23.7%)	618 8.0%	1,451 134.8%	105.2%
	XCM Channels	70 59.1%	111 58.6%	155 39.6%	188 21.3%	203 8.0%	190.0%
	Parachain Slot Auctions Bonds	692.4K (25.5%)	325.5K (53.0%)	466.8K 43.4%	873.1K 87.0%	670.7K (23.2%)	(3.1%)

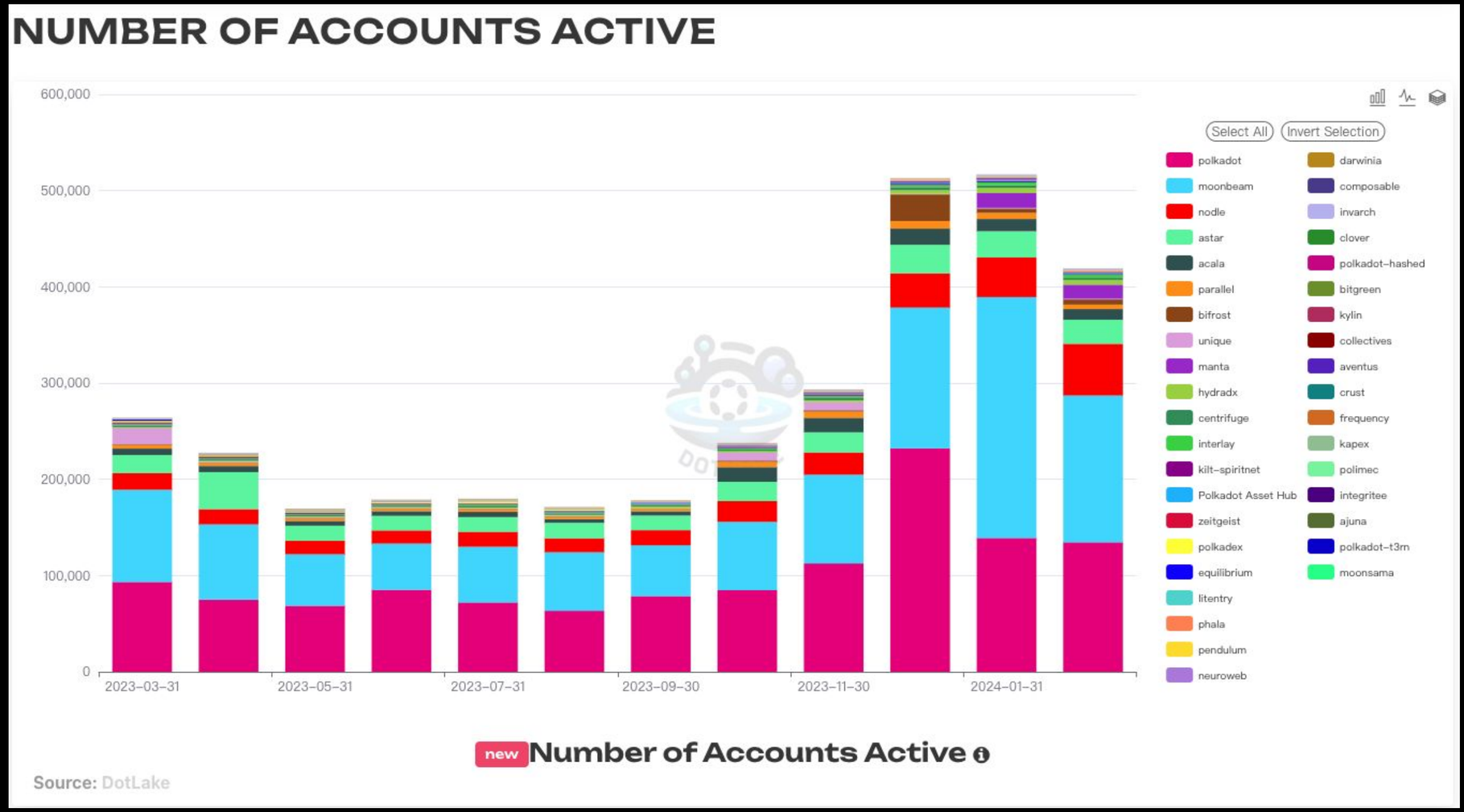
Data as of: December 31, 2023

Source: CoinGecko, Messari, Parity (Dotlake), Subscan, Token Terminal

Messari

https://messari.io/report/state-of-polkadot-q4-2023

On-chain data analytics



https://dashboards.data.paritytech.io/parachains.html

Catalogue

These are some of the most important takeaway for this sharing:

- Intro of Polkadot Technical Architecture
- Projects of Polkadot Parachain
- Perspectives of Polkadot Ecosystem
- Tech Infrastructures in Polkadot

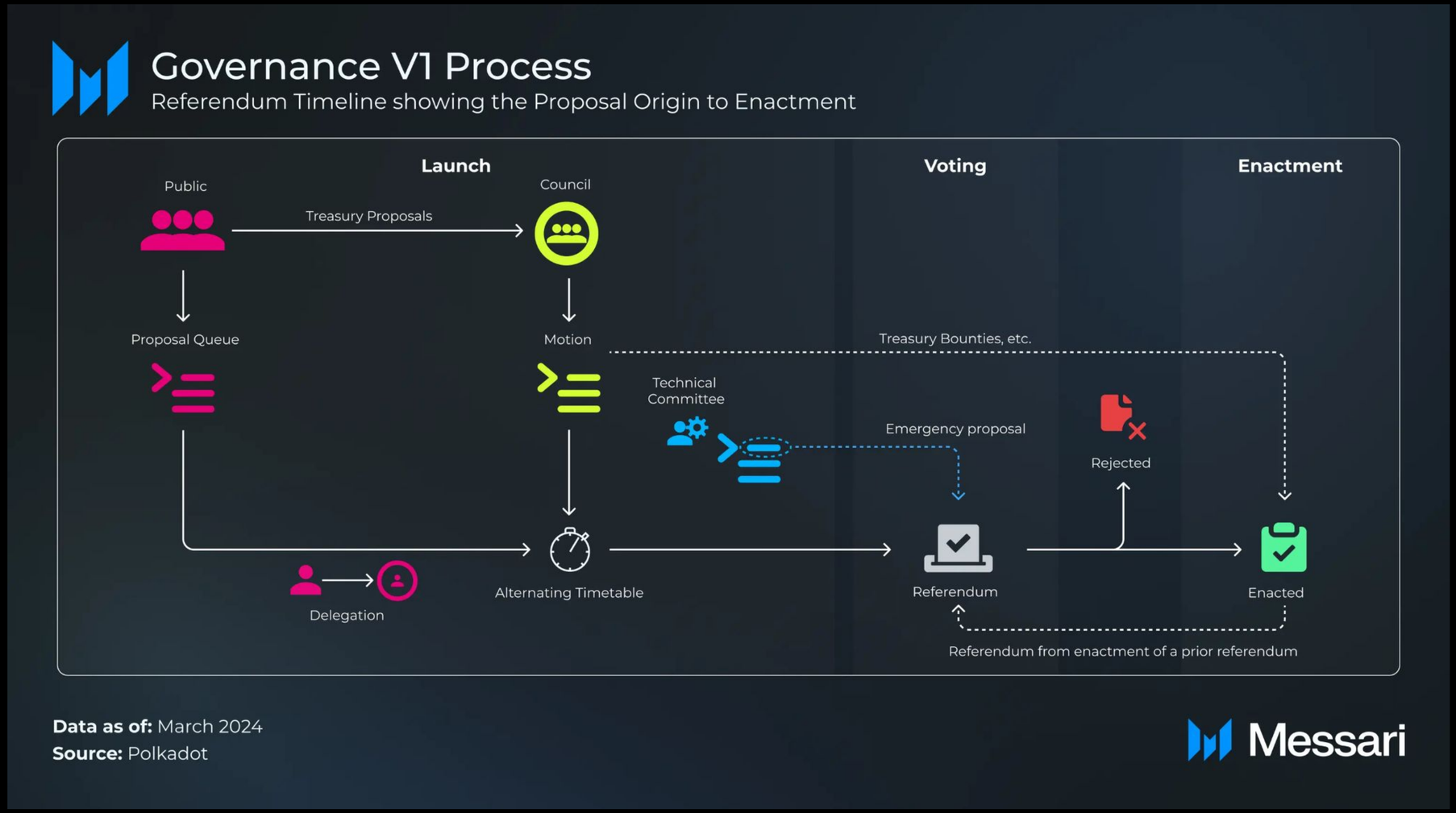
Tech Infrastructures in Polkadot

- OpenGov
- Agile Coretime
- XCM
- ...

OpenGov Vs. Gov V1

Gov V1

- Public
- Council
- Tech Committee
- Alternating Timetable
- 28 days

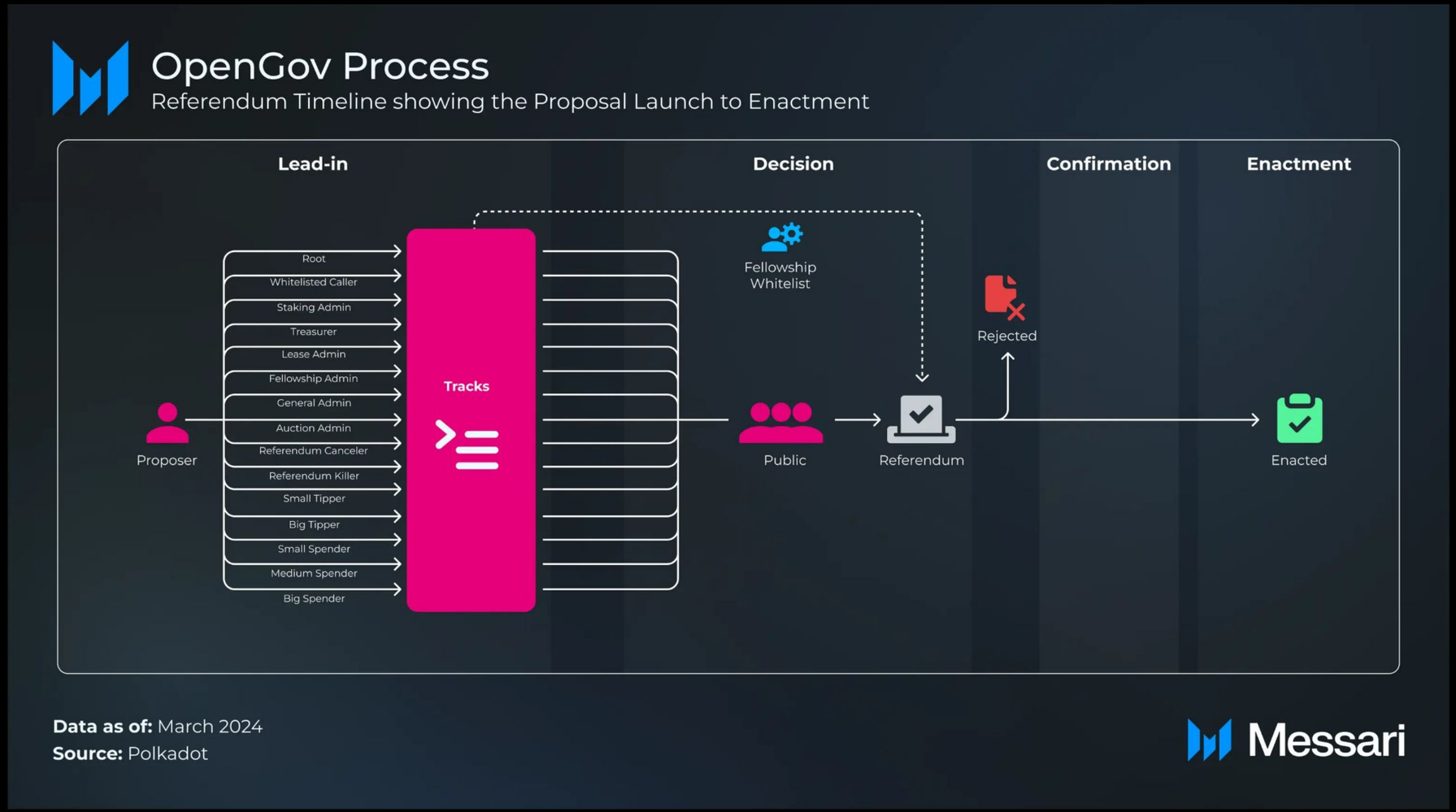


https://messari.io/report/polkadot-opengov-report

OpenGov Vs. Gov V1

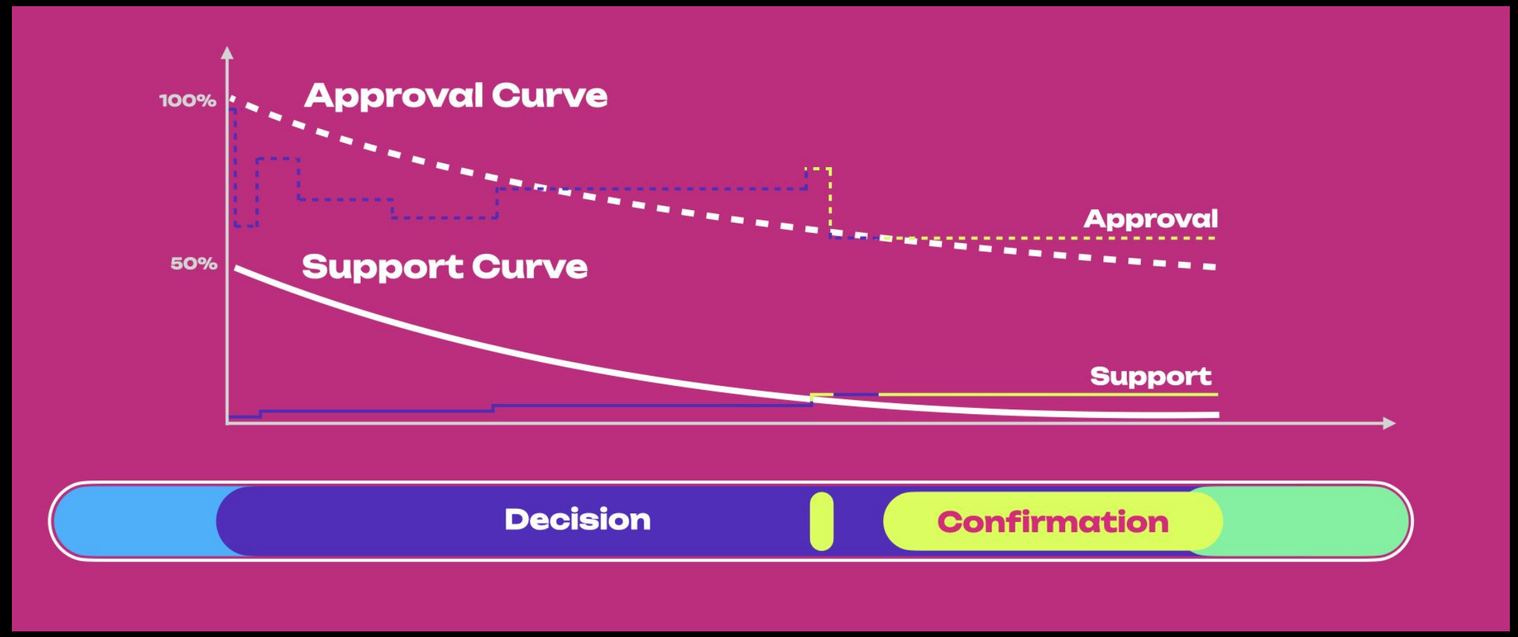
OpenGov

- Public
- Tech Fellowship
- 15 tracks



Approval & Support

- Total active issuance is 100 DOT
- Account A votes "Aye" with 10 DOT with 4x conviction
- Account B votes "Nay" with 5 DOT with 2x conviction
- Account C votes "Abstain" with 20 DOT.



- Approval = (10 × 4) / (10 × 4 + 5 × 2) = 40/50 which is 80%
- Support = (10 + 20) / 100 which is 30%

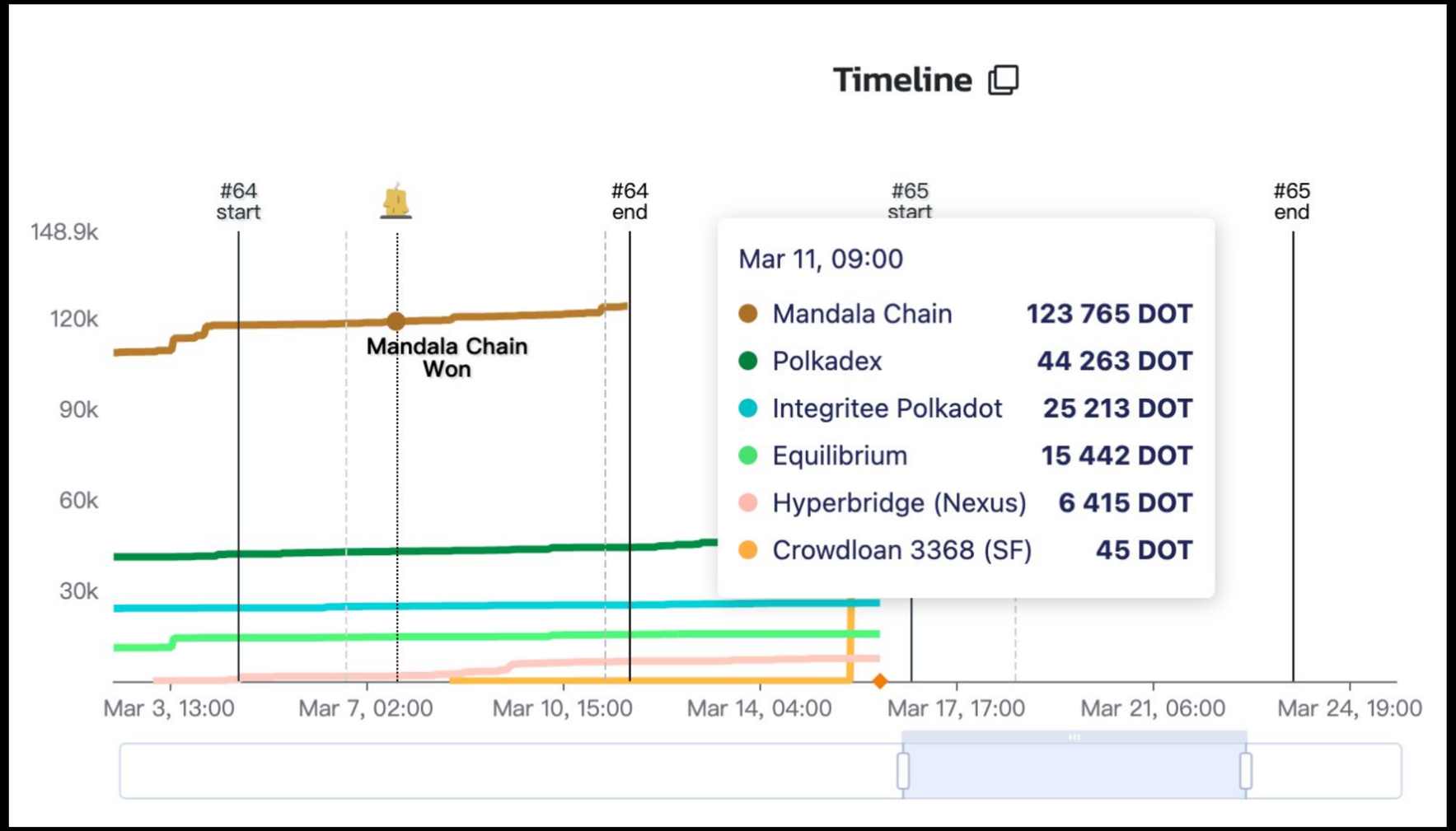
Tech Infrastructures in Polkadot

- OpenGov
- Agile Coretime
- XCM

Coretime Vs. Auction

Auction

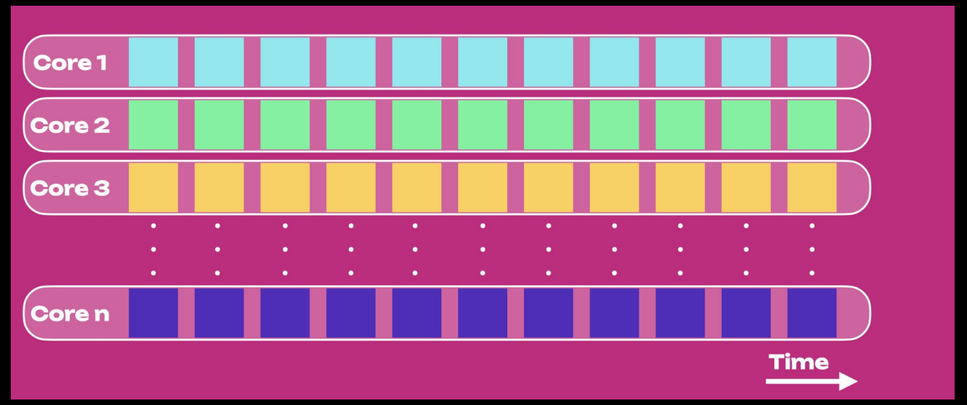
- High barrier to entry
- Low allocation efficiency



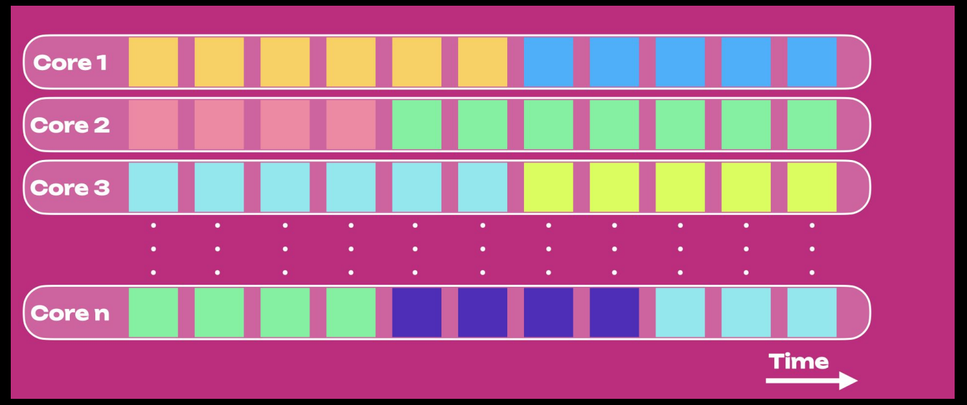
Coretime Vs. Auction

Coretime

- Timeslice (80 blocks)
- Region (28 days)
  - 403200 blocks
  - 5040 timeslices
- Bulk coretime (28 days)
  - split/shared/resold
- On-demand coretime pool
  - instantaneous coretime purchase
  - market-feedback mechanism
- Coretime Chain



Core Usage in Polkadot 1.0



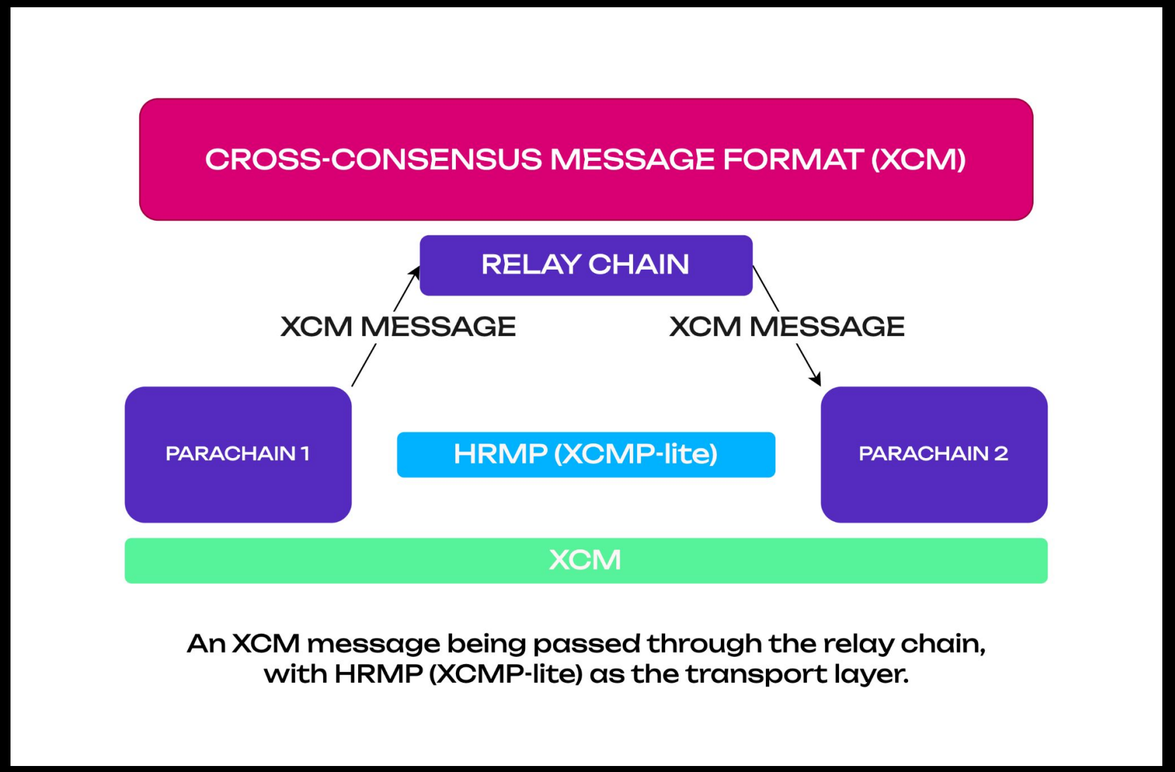
Split Coretime

Tech Infrastructures in Polkadot

- OpenGov
- Agile Coretime
- XCM

Cross-Consensus Message Format

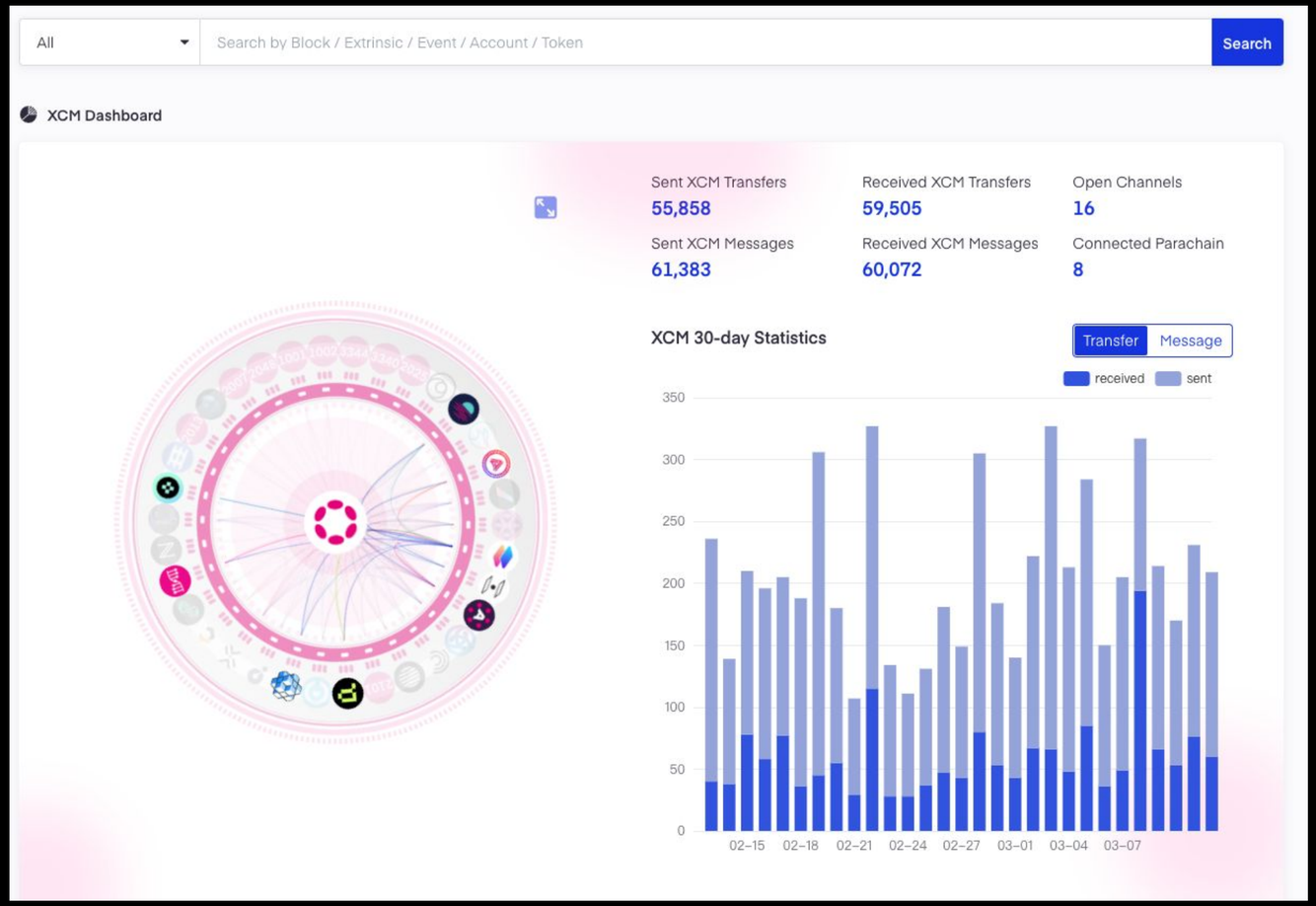
- XCM:
  - messaging format, not a protocol
- Transport layer protocols
  - XCMP (Cross Chain Message Passing)
    - Msg between parachains
    - Direct
    - Relayed
  - VMP (Vertical Message Passing)
    - Msg between relaychain and parachain
    - UMP
    - DMP
  - HRMP (XCMP-Lite)
    - Horizontal Relay-routed Message Passing
    - Hrmp channels between parachains
- XCM is related to XCMP in the same way that REST is related to RESTful.
- Instruction Set



An XCM message being passed through the relay chain, with HRMP (XCMP-lite) as the transport layer.

XCM between parachains

- Hrmp channels
- XCM assets transfer
- XCM message deliver



https://polkadot.subscan.io/xcm_dashboard

Thank You