NoDB

A Database For Ships At Lightspeed

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About

- Klarna is an ecommerce payments service from Sweden trying to take over the world
- Heavy users of Erlang
- On second-generation purchase taking system

NoDB

- Eventually consistent key-value database overlay
- Favors write-availability
- Synchronizes data between multiple systems
- Allows for large latencies

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Eventual Consistency

- “guarantees that if no new updates are made to the object, eventually all accesses will return the last updated value” - Some ACM Article
- Popular EC DBs - Riak, Cassandra
- Generally quite different from what developers are used to

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Why would anyone want EC???

- Scalability
- Availability
- Geolocality
- Great for caching!

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Examples of EC Systems

- DNS
- Amazon
- Financial transactions

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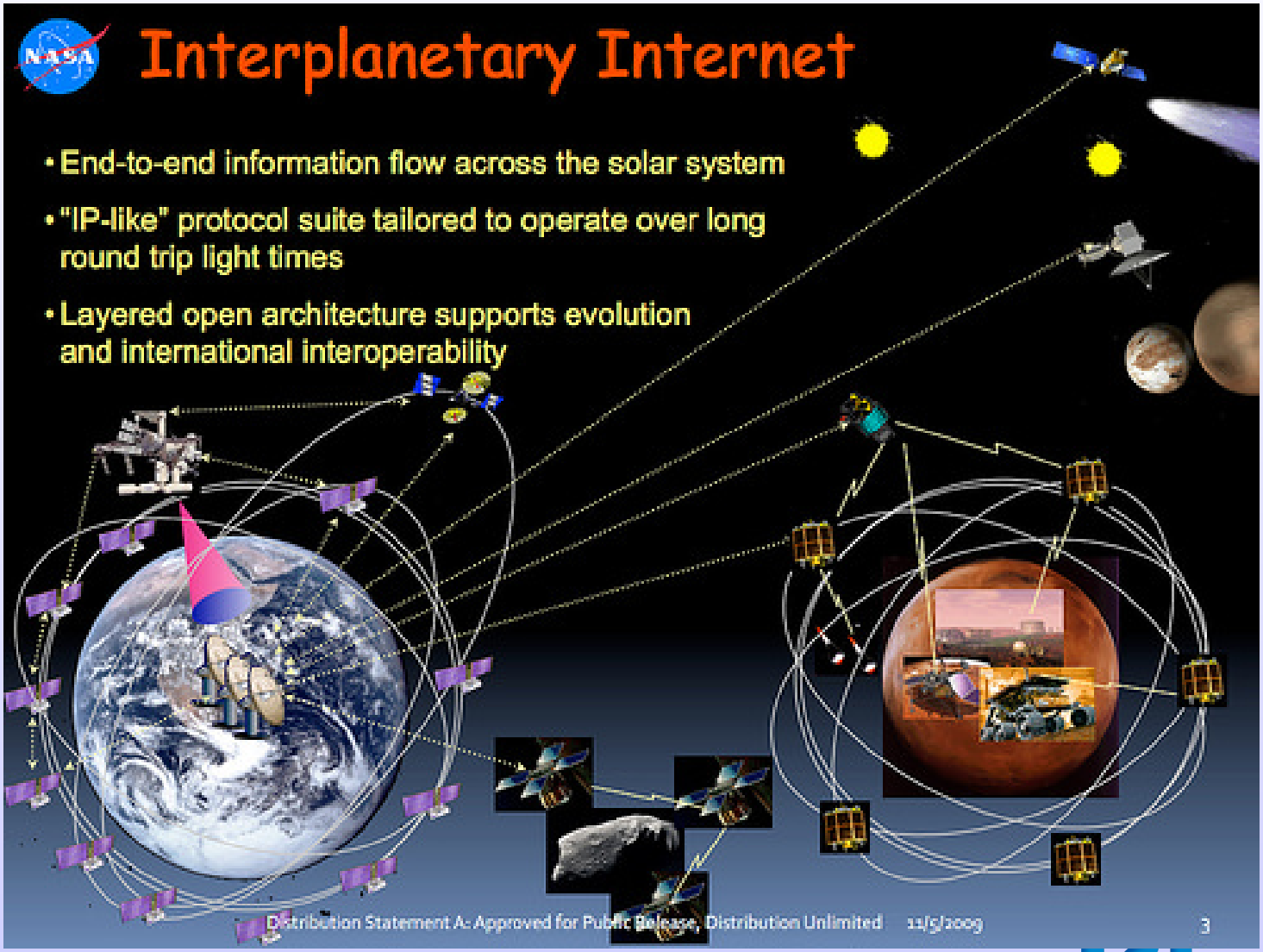
InterPlaNet



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Borg - That sounds Swedish

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First Contact

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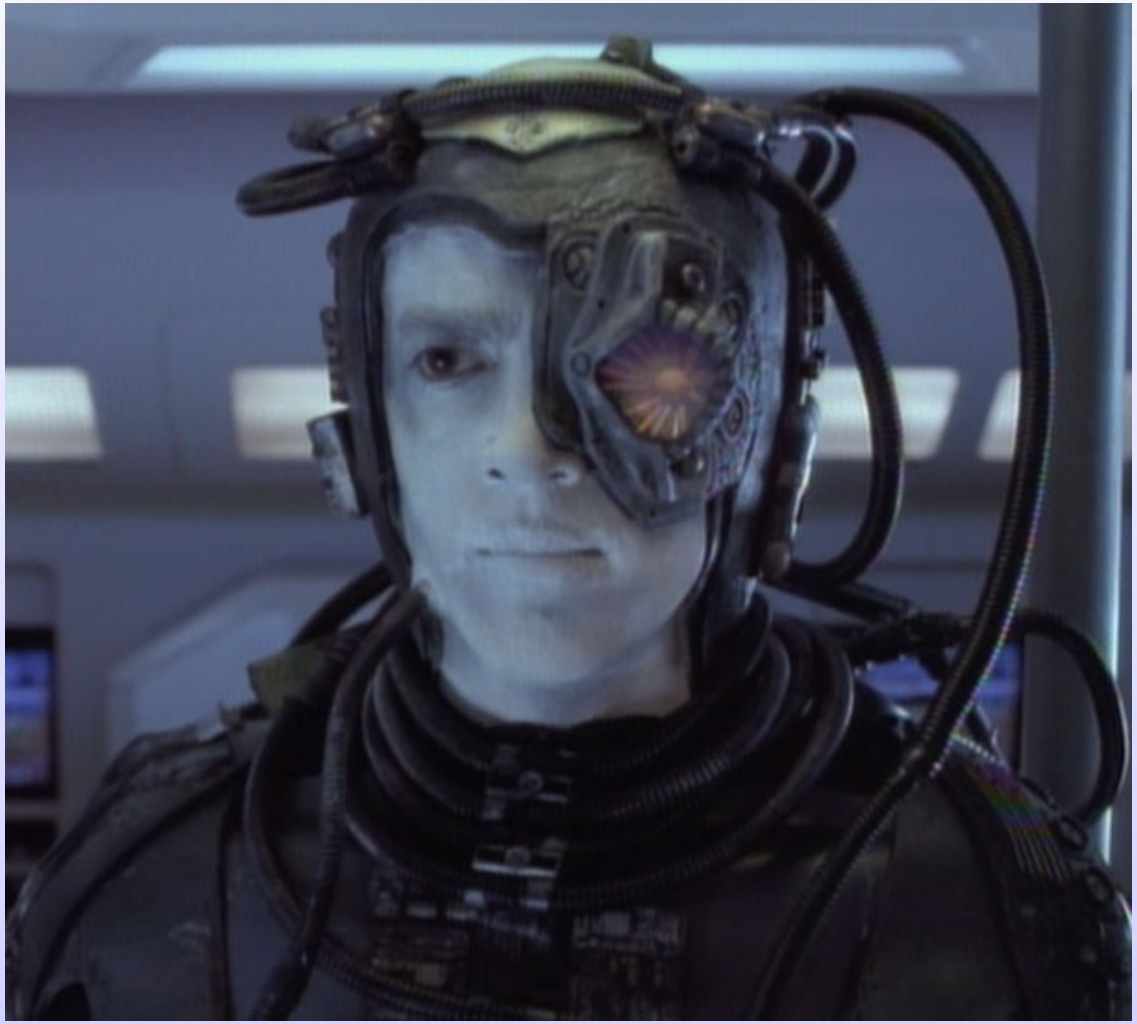
Write-availability



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Really, what is NoDB?

- More of a model than an implementation
- Allows separate systems to share data
- Works across transactional stores and EC stores (read the fine print)
- Not a database but a layer joining them
- Allows for out-of-order replication of data
- Inbetween step for going from monolith to SOA

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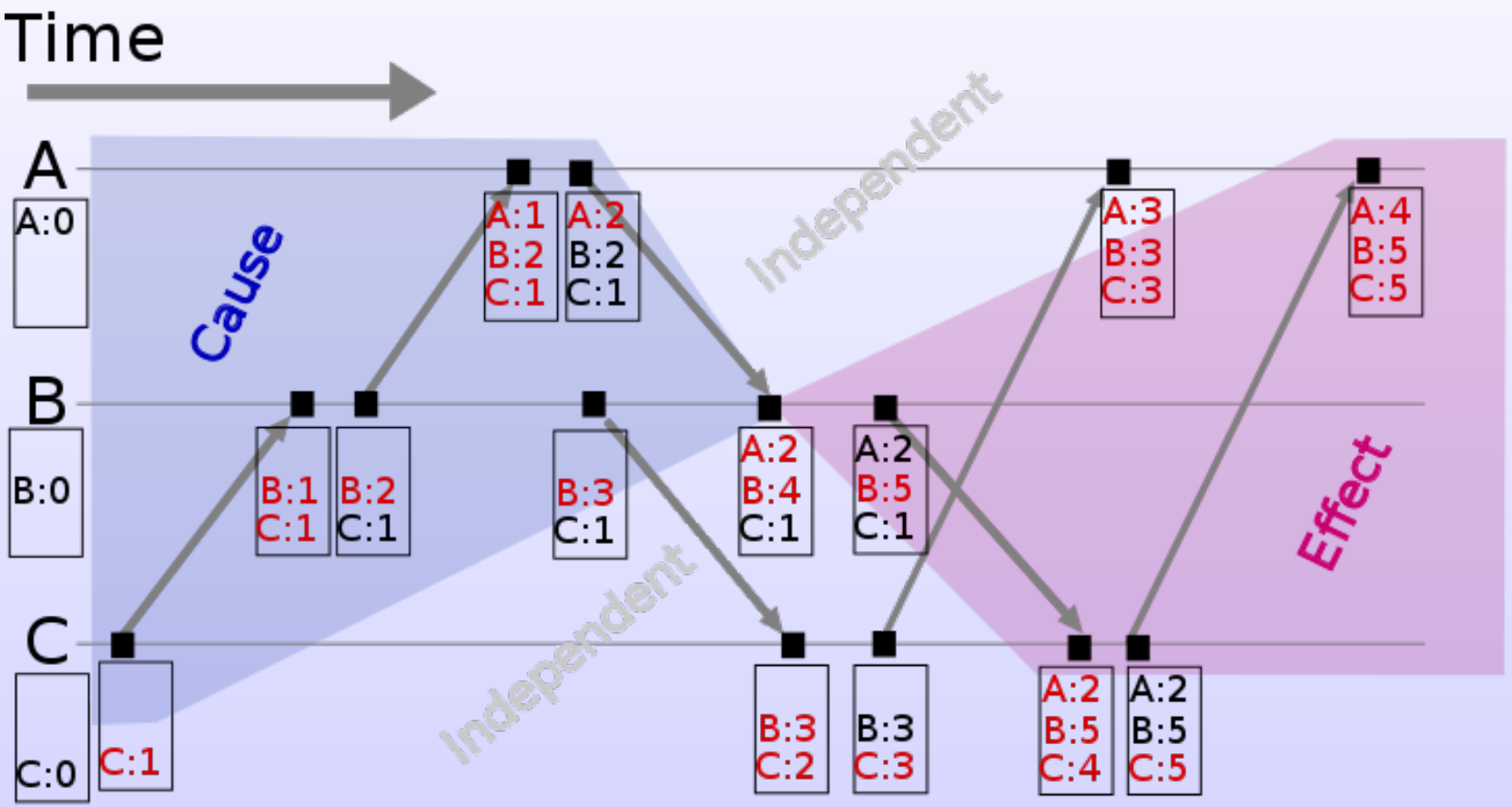
Vector Clocks!!!!!!



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NoDB: The Implementation

- Implemented in Erlang
- Riak $\leftrightarrows$ Mnesia
- Mnesia is system of record
- Uses RabbitMQ as transport
- Realtime replication and manual exports

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NoDB: Mnesia Side

- Have a layer on top with a transaction log
- Listen in on transaction log
- Can iterate all keys in a table for export
- System of record
- Can replay history, great for catching up during downtime
- Vector clocks in shadow table

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NoDB: Riak Side

- PUT/GET/DEL through a NoDB API, writes to Riak & replicates
- Importer pulls off Rabbit and pushes directly to Riak
- Layer to locally queue exports when Rabbit is down
- Vector clock stored with data

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What's an Update Look Like?

- Get your data
- Modify it and bump the vector clock
- Write to DB + replicate
- Mnesia wrapped up in an abstraction and we sneak the vector clock into the transaction for the user (so kind!)
- On Mnesia, handle resolving possible siblings on write
- On Riak, handle resolving siblings on next update

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Retrospective

- People hate using it. But they're wrong
- Out of order events are hard to handle
- Being able to replay writes is really awesome (saved us from losing money multiple times)

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Future Work

- Unify codebases, they were written in haste by different people
- Remove RabbitMQ, it's not actually doing anything for us here
- Make it easier for non-Erlang systems
- Postgres support??

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Questions?

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