

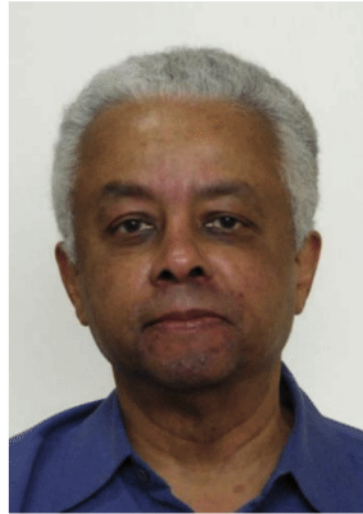
Track, Trace & Verify

Practical Uses for Blockchain in Retail

Introducing the Panel



Chuck Young
Impact 21



Allen Brown
Deixis, PBC



Liz Sertl
GS1 US

Is Blockchain real, or “hype”?

Blockchain – Real or Hype?

- **A blockchain is essentially just a record, or ledger, of digital events — one that’s “distributed,” or shared between many different parties.**
- It can only be updated by consensus of a majority of participants in the system. Once entered, information can never be erased
- It’s promise is a future where no one has absolute power online and no one can lie about past or current events
- It records the fact that the event happened, and even that it happened correctly; does not expose confidential details about the subject matter or the parties involved



Marc Andreessen, the doyen of Silicon Valley’s venture capitalists, listed the blockchain’s distributed consensus model as the most important invention since the Internet

Why are standards important?

Basically “why are we here talking?”

Importance of Standards

The only way businesses big or small can move forward is to work together.

They need to be able to understand each other, anywhere in the world.

Business requires a common language, and we make that possible.



Importance of Standards

International Standards Organization

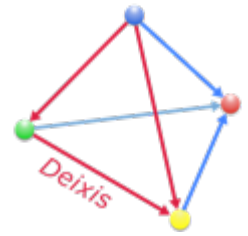
- TC 307 -- Distributed Ledger Technology
where to publish?
- PC 308 – Chain of Custody
who has what?

World Wide Web Consortium

- Verifiable Claims Working Group
what is what and who says so?
- Distributed Identity Working Group
who is who?

What is “provenance?”

Provenance



A tamper-proof cumulative record for a particular asset, documenting:

- What agent had custody of the asset
- Agent that received asset from documented custodian
- Agent that gave asset to documented custodian
- Changes made to the asset while in custody of a particular agent

Provenance

provenance noun

prov·e·nance | \ 'präv-nən(t)s ˌ, 'prä-və-,nän(t)s\

Definition of provenance

The **original** source of the product within the supply chain.

Examples of provenance

// Has anyone traced the *provenances* of these paintings?

// The artifact is of unknown *provenance*.

What are the compelling
business problems?

Business use cases

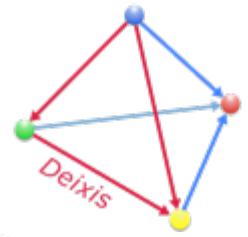


in Maintenance / Features
Fake parts a real threat
Posted 10 September 2018 - [Add Comment](#)
Counterfeit parts are a threat to safety, reliability and profitability of operators and MROs alike. Chuck Grieve has been looking at the problem.

They're called suspected unapproved parts – SUPs for short. When an industry gives something like that its own acronym, you know there's a problem. The Federal Aviation Administration (FAA) says 3,000 SUPs have been discovered since 2011, when they were simply called bogus parts.


-Arabian Aerospace Online News Service

Business use cases



In Maintenance / Features
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-Arabian Aerospace Online News Service



Example...



Type	Key Data Element Name	EPCIS Translation	Attribute Value
-	-	EPCIS Event Type	Object
When	Date/Time	Event Time	2018-10-16 07:00:00.000 GMT-04:00
	-	Record Time	2018-10-16 16:00:00.000 UTC
What	Item (GTIN)	GTIN	00614141000012*
	Lot or Batch or Serial #	Lot	20180330F101
	Quantity	Quantity	100
	Unit of Measure	-	Bushel
Where	-	Read Point	0614141012350
	-	Biz Location	0614141012350
Why	-	Biz Step	Commissioning
	-	Disposition	Active
	Activity Type	Biz Transaction Type	ProdOrder
	Activity ID	Biz Transaction ID	W0123
	-	ILMD (mda:)	harvestdate 2018-10-16

*This GTIN is the individual onion

Type	Key Data Element Name	EPCIS Translation	Attribute Value
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What	Item (GTIN)	GTIN	00614141000012*
	Lot or Batch or Serial #	Lot	20180330F101
	Quantity	Quantity	100
	Unit of Measure	-	Bushel
Where	-	Read Point	0614141012350
	-	Biz Location	0614141012350



How do you verify?

Visibility Events

- Visibility data consists of **events**, each of which records something that happened in the real world.
- An event has four dimensions:
 - **What**: what physical objects were involved
 - **When**: when the event took place (timestamp)
 - **Where**: where the event took place (location identifier)
 - **Why**: what business process step was being carried out

Critical Tracking Events/Key Data Elements

Critical Tracking Events

Critical Tracking Events are activities in the supply chain that must be recorded by the capture of key information about a business step for product movement in the supply chain. Typically, these events involve a product's transformation, transportation, or depletion.

Key Data Elements

The attributes to describe/support the critical tracking event; this data answers the What, Where, When, Who and Why of the event.



Performance animated

BLOCKCHAIN CONTRACT

Baggage contract

Custodians

SYS-IN	LAX-45	AA-163	ORD-K11
ORD-B6	UA-298	EWR-C99	SYS-OUT

Custodian Pairs

SYS-IN / LAX-45	LAX-45 / AA-163	AA-163 / ORD-K11	ORD-K11 / ORD-B6
ORD-B6 / UA-298	UA-298 / EWR-C99	EWR-C99 / SYS-OUT	

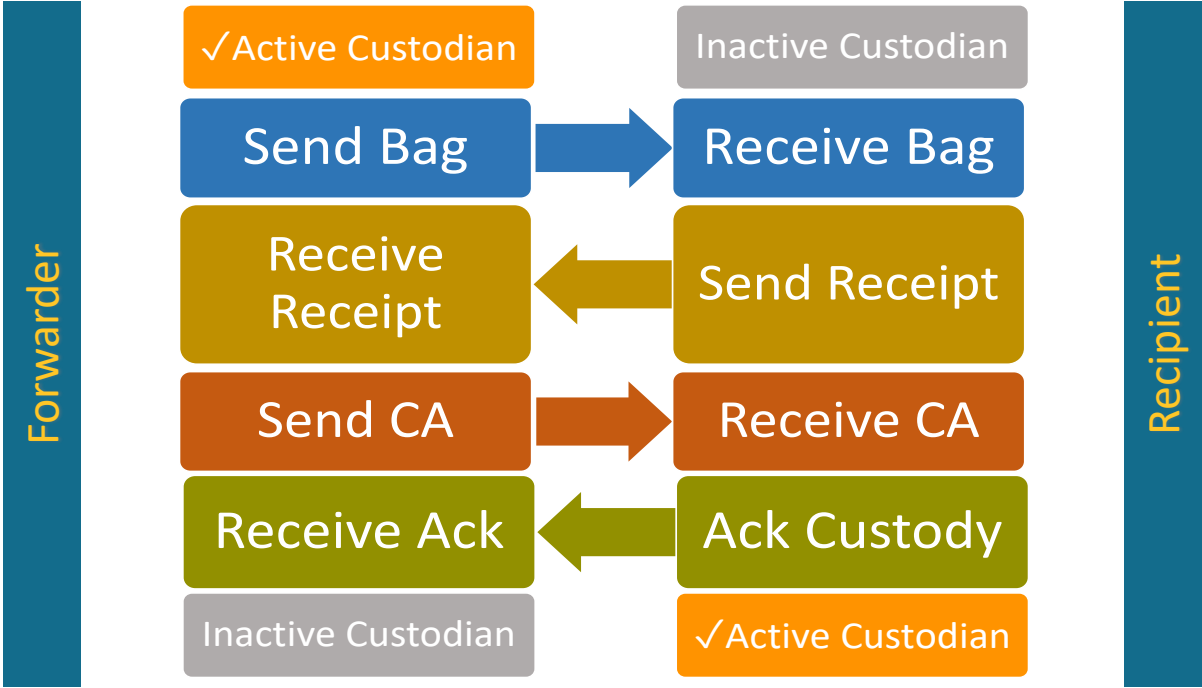
Baggage contract

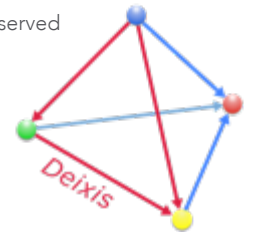
Custodian Pairs

SYS-IN / LAX-45	LAX-45 / AA-163	AA-163 / ORD-K11	ORD-K11 / ORD-B6
ORD-B6 / UA-298	UA-298 / EWR-C99	EWR-C99 / SYS-OUT	

- ✓ Each pair of custodians consists of a *forwarder* and a *recipient*
- ✓ The current pair exchanges a *bag* for a *receipt*
- ✓ The current pair exchanges a *permission to forward* for a *certificate of acceptability*
- ✓ The next pair becomes the current pair

Interactions between Custodians

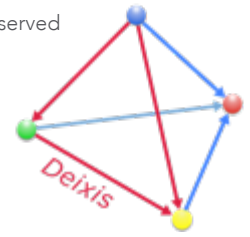




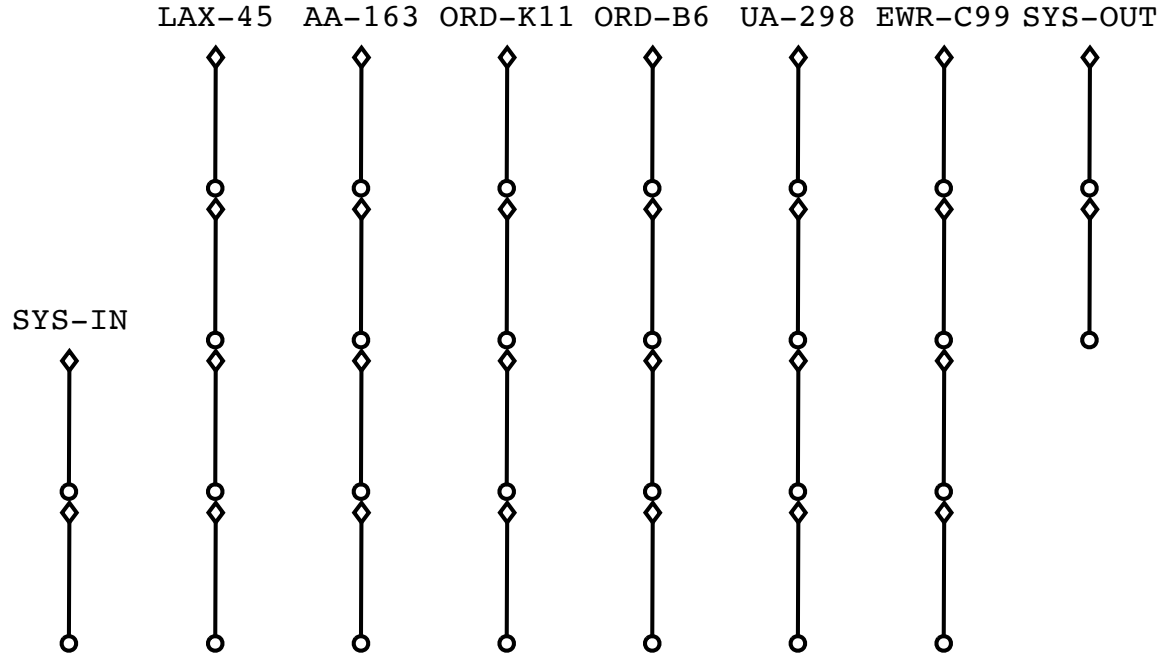
Baggage contract parties

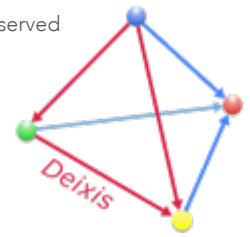
LAX-45 AA-163 ORD-K11 ORD-B6 UA-298 EWR-C99 SYS-OUT

SYS-IN

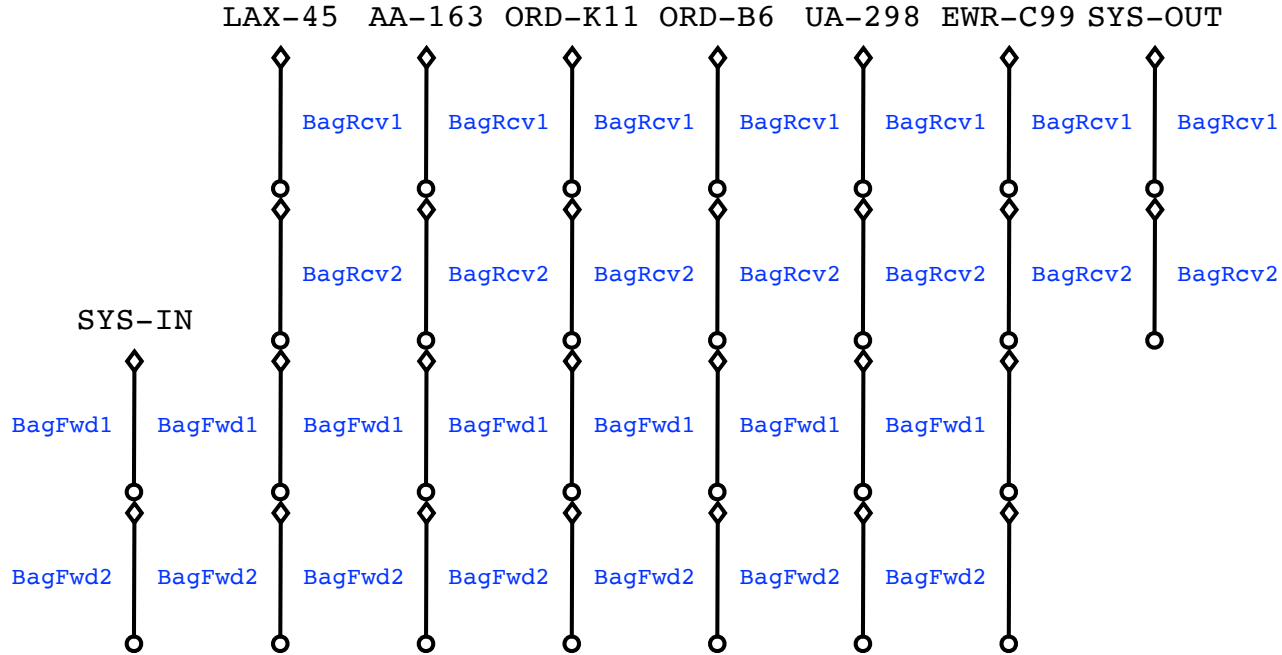


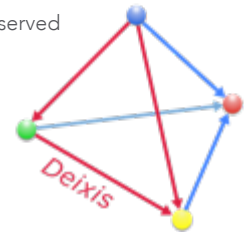
Baggage contract cascades



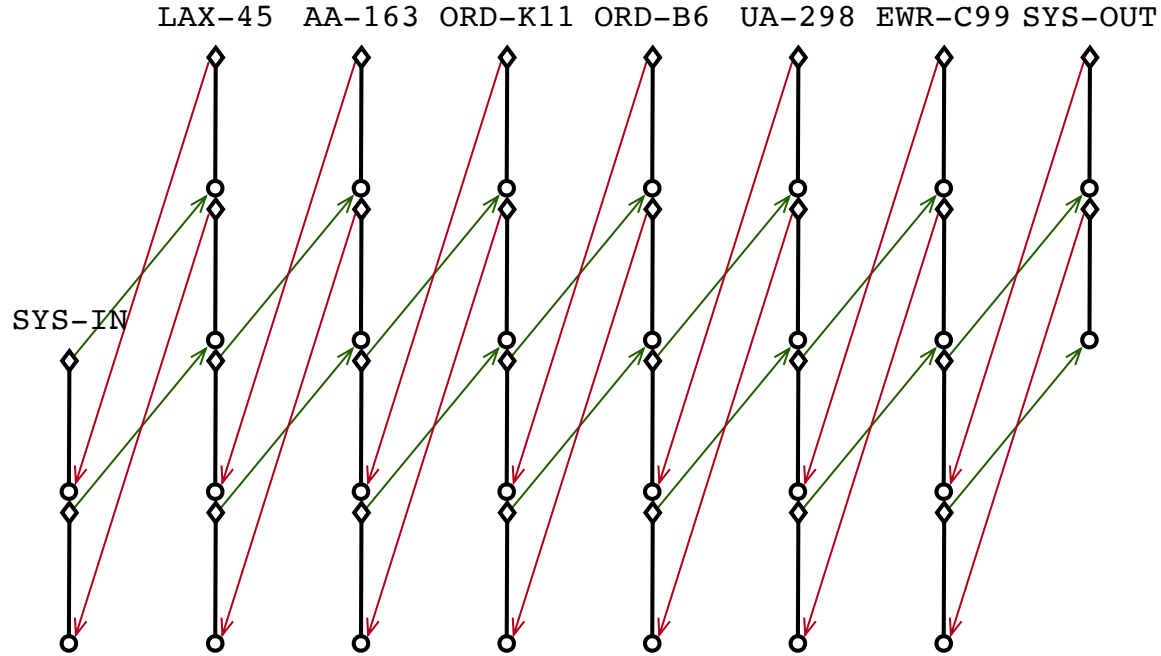


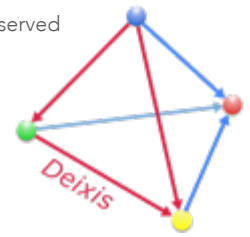
Baggage contract clauses



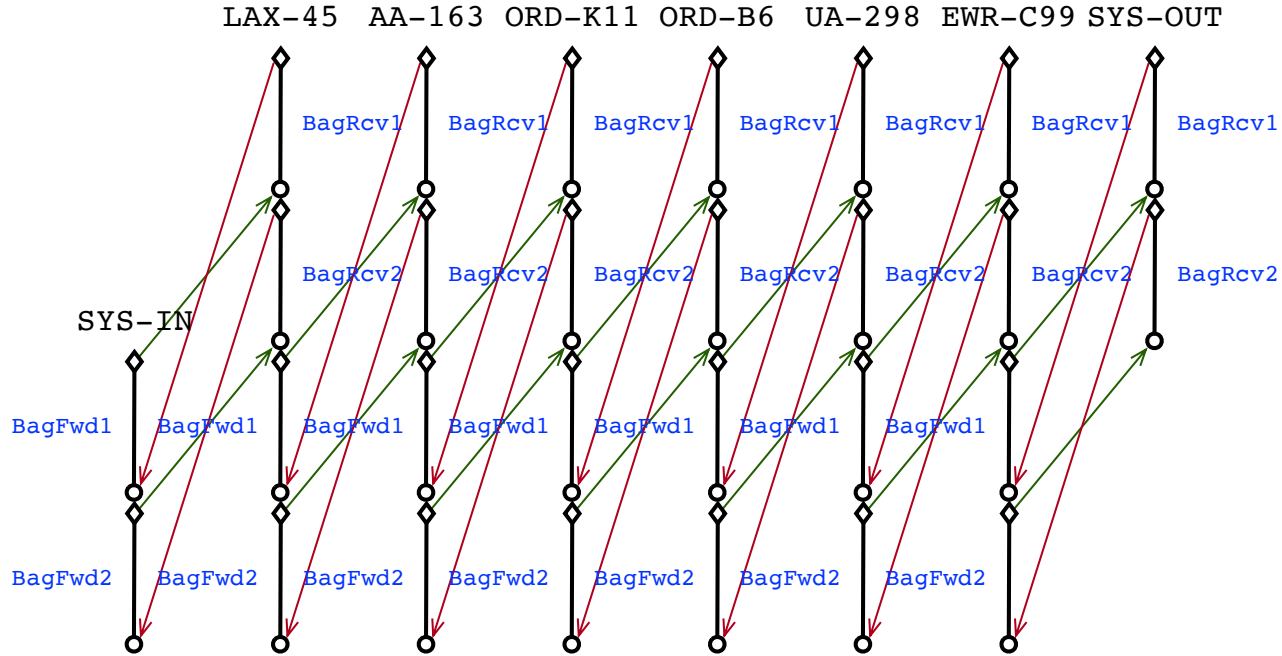


Baggage contract exchanges



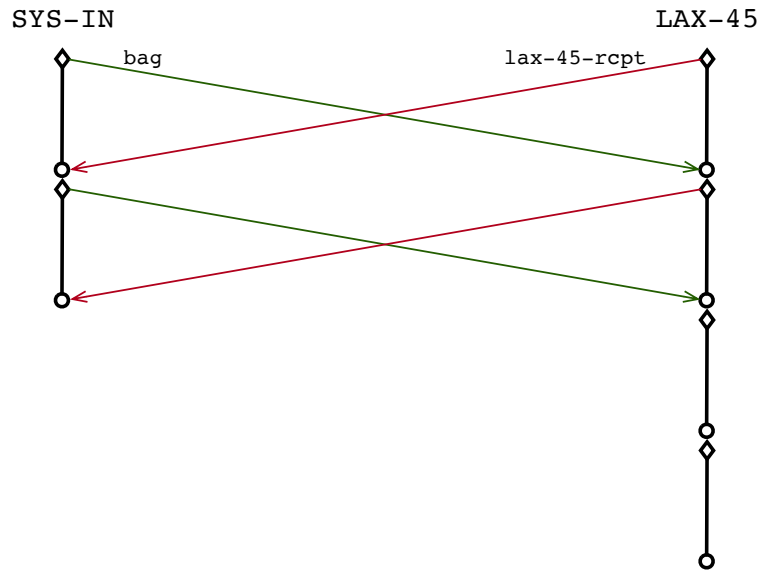


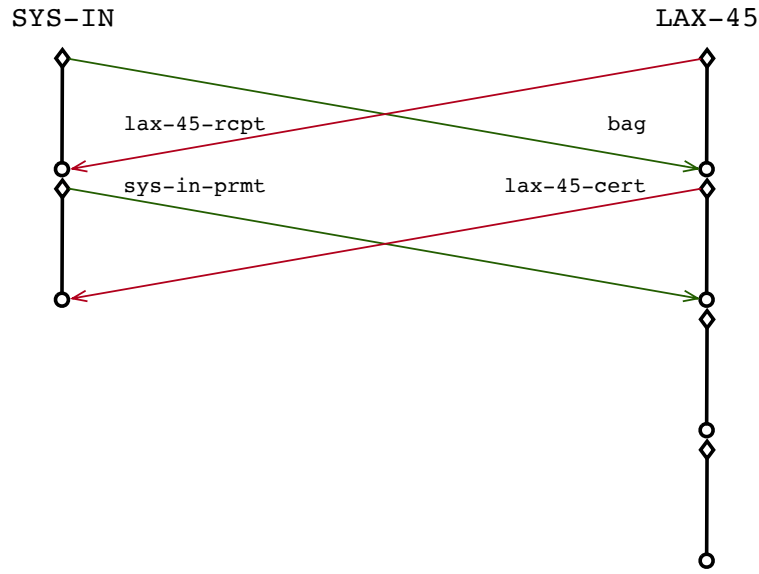
Baggage contract visualized

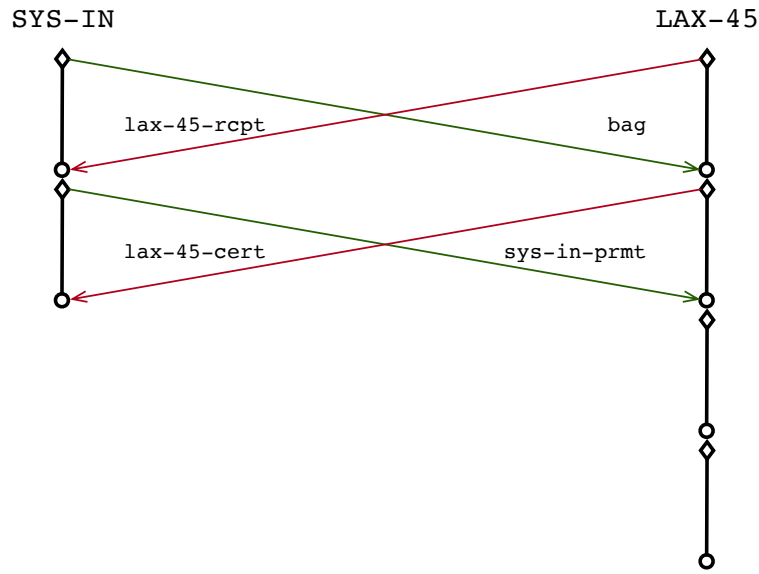


Performance animated

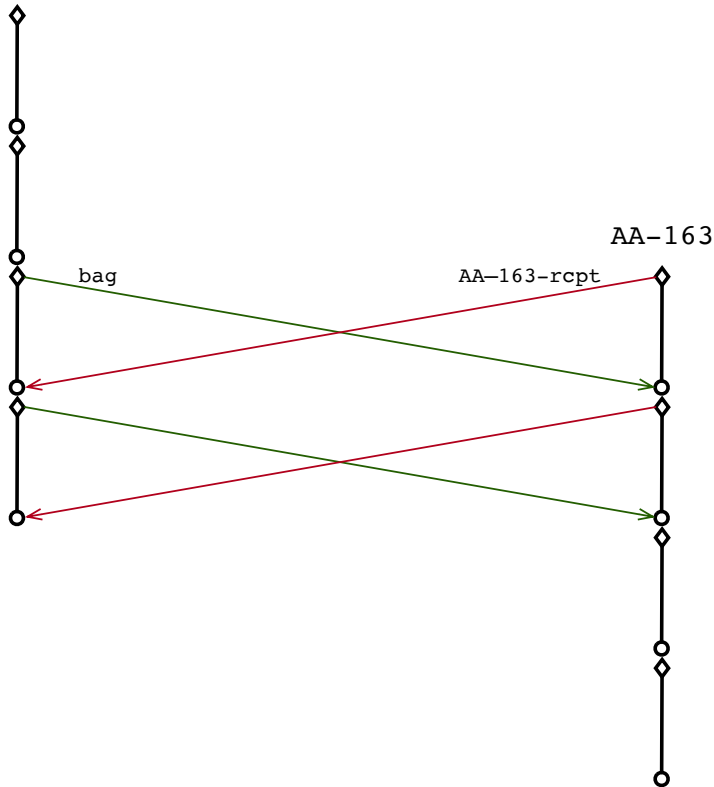
BLOCKCHAIN CONTRACT



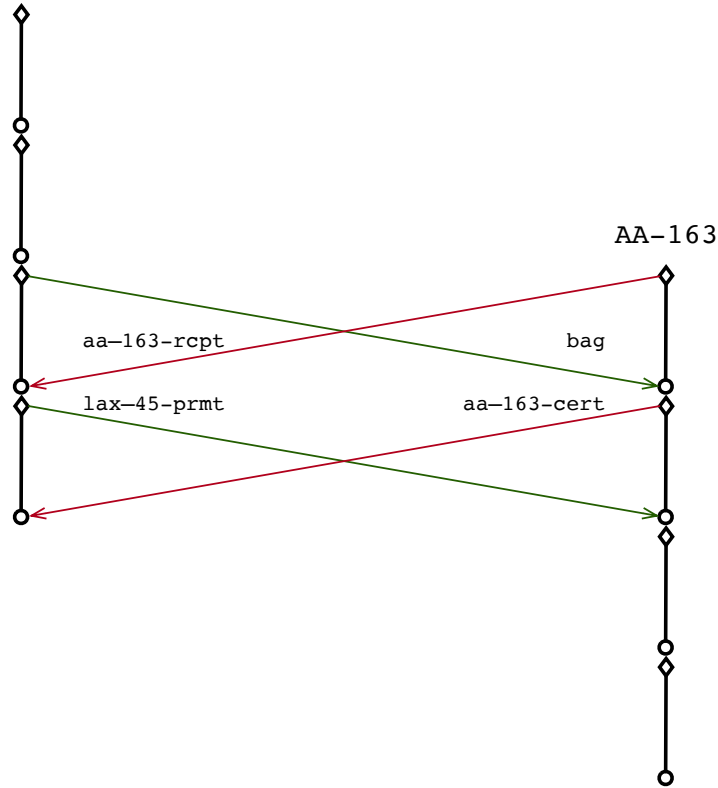




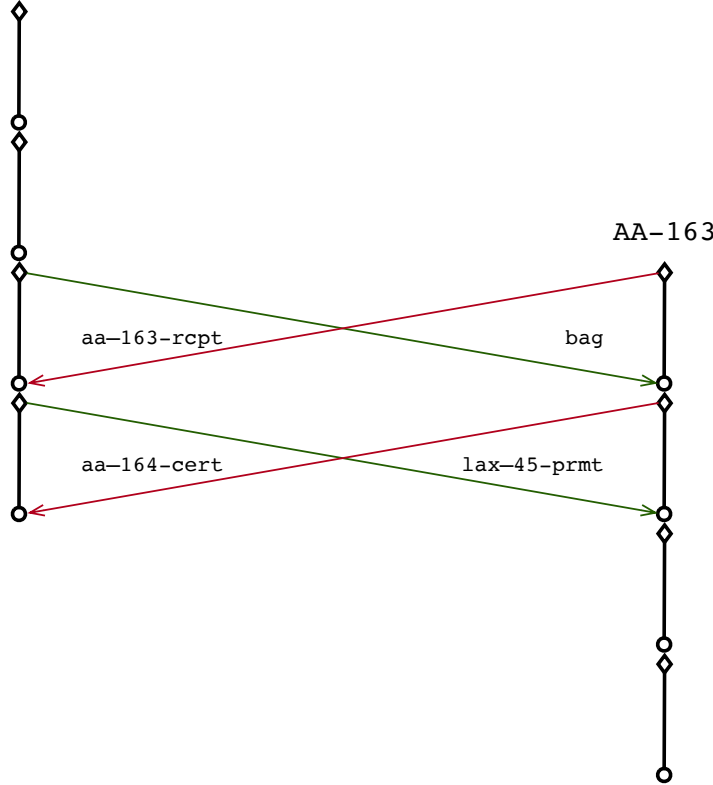
LAX-45



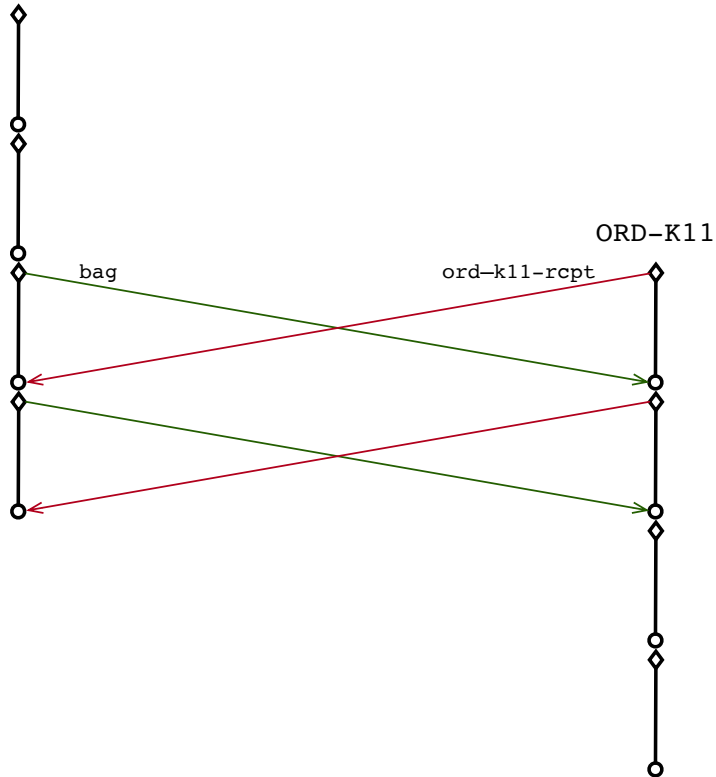
LAX-45



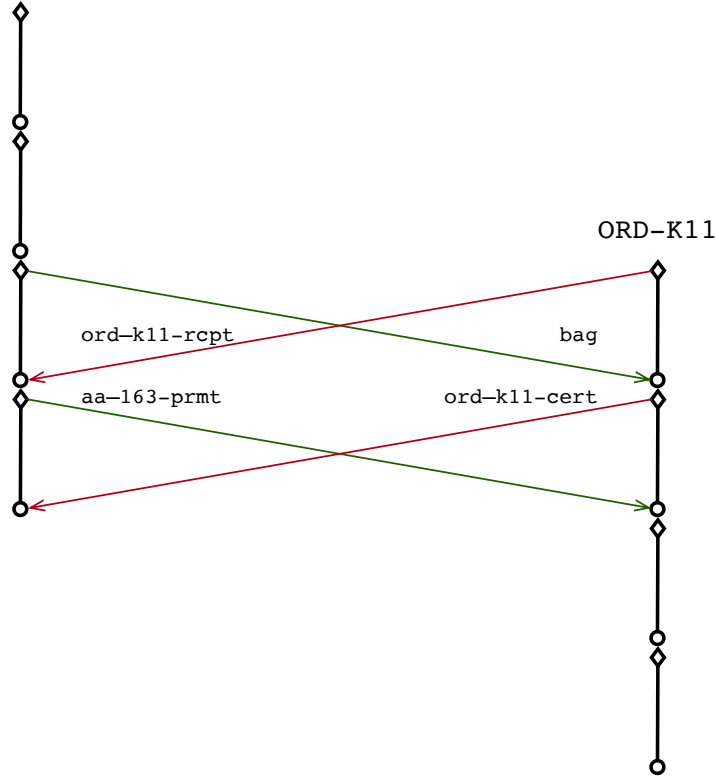
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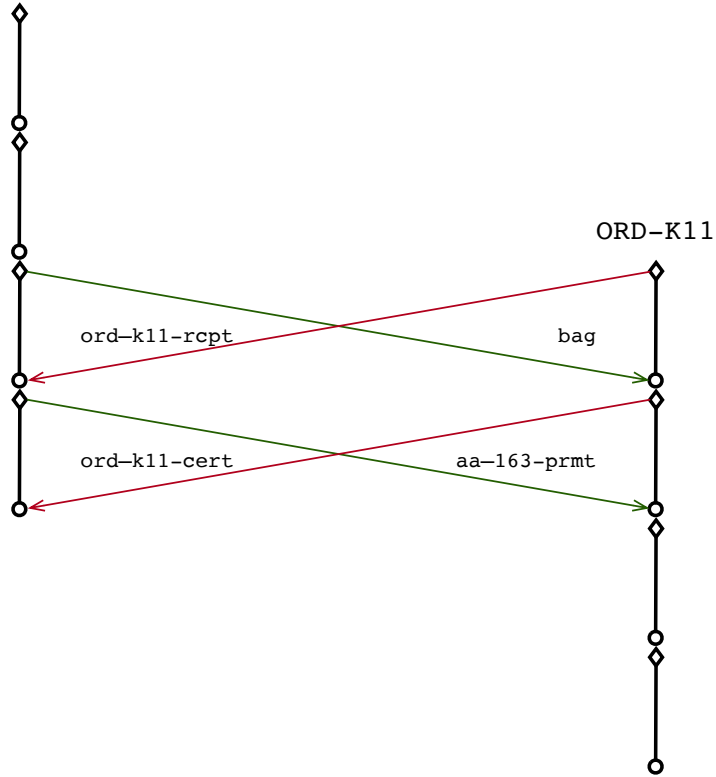
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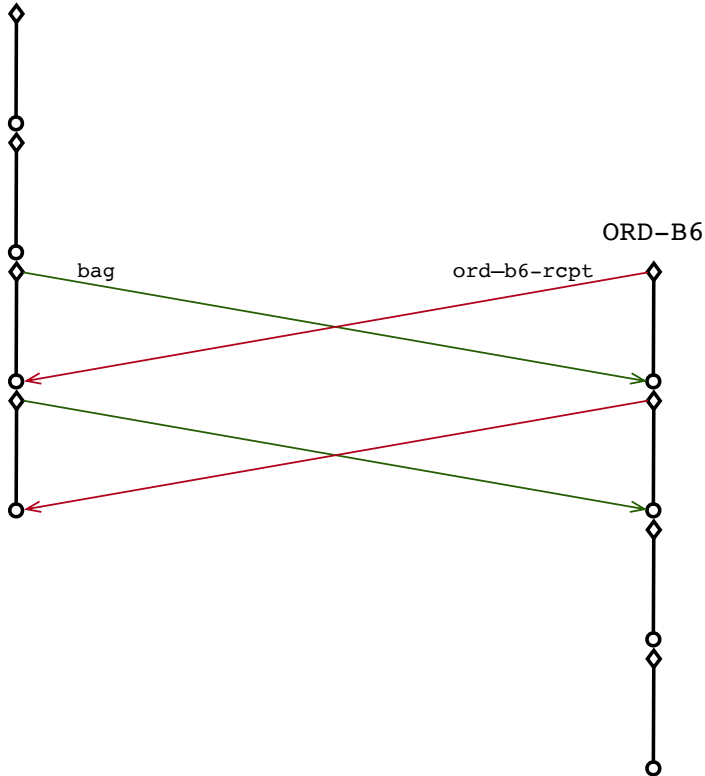
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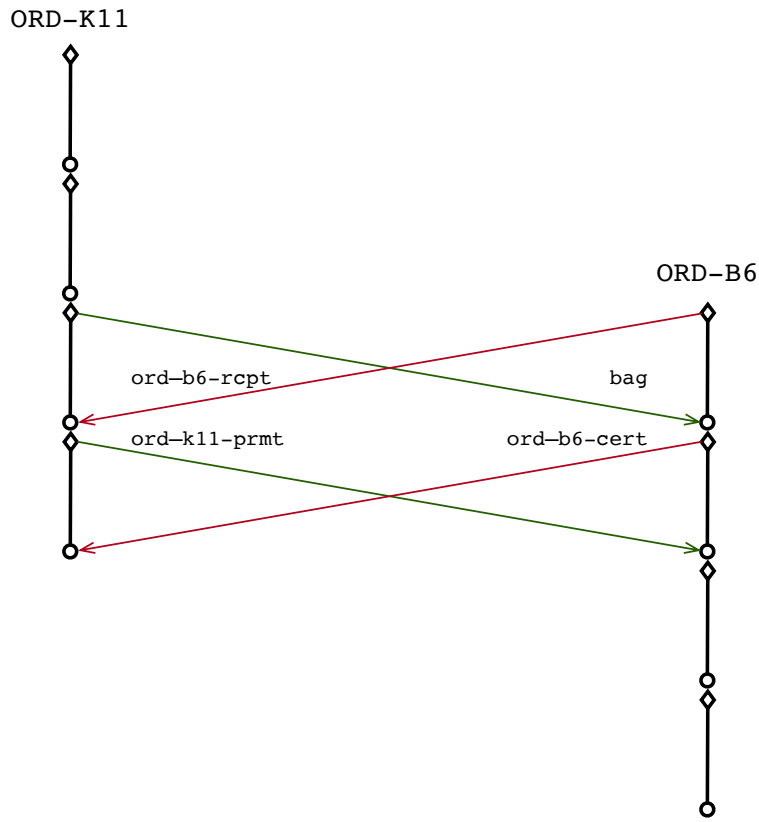


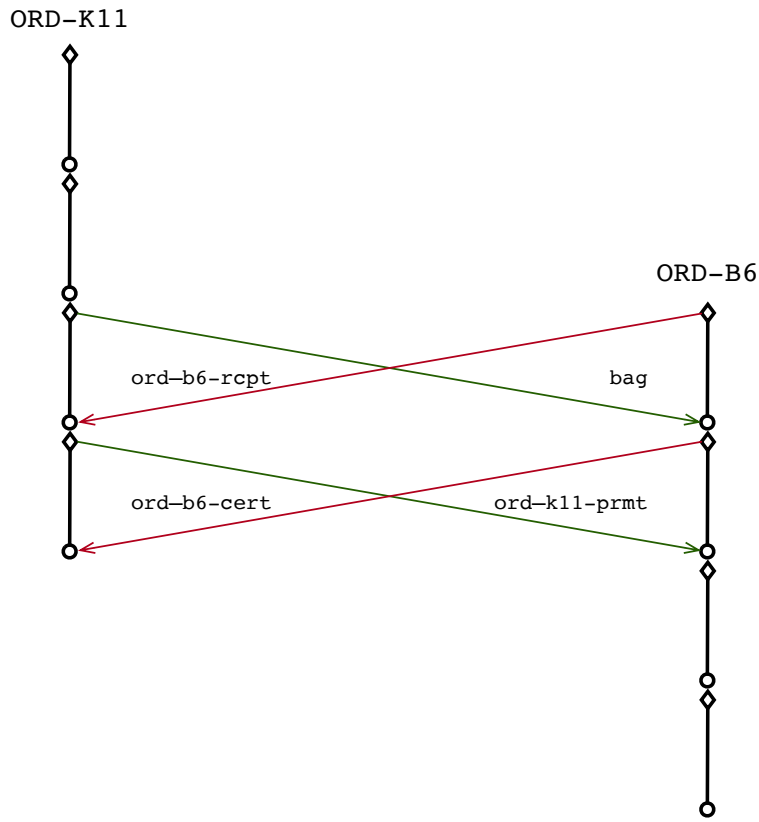
AA-163



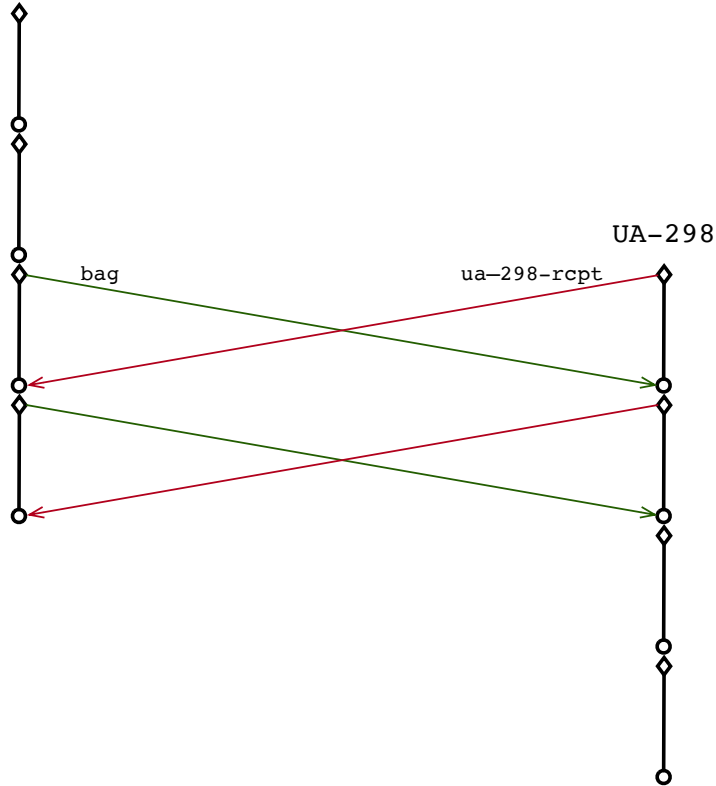
ORD-K11



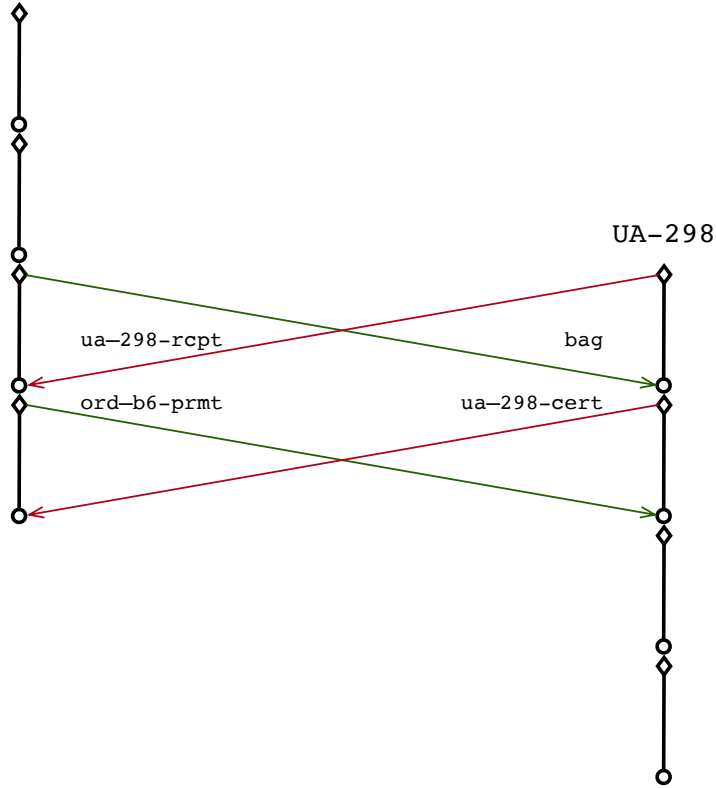




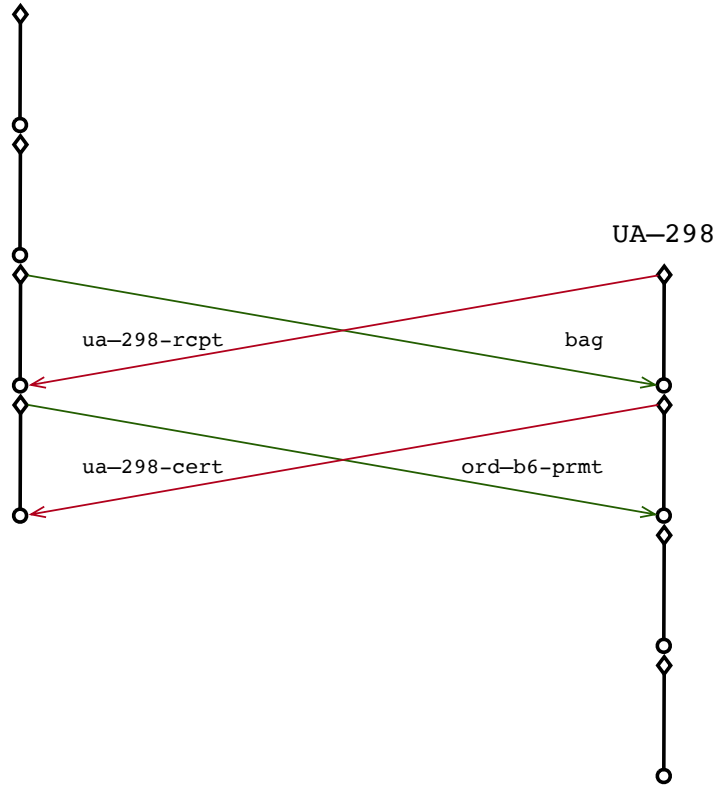
ORD-B6



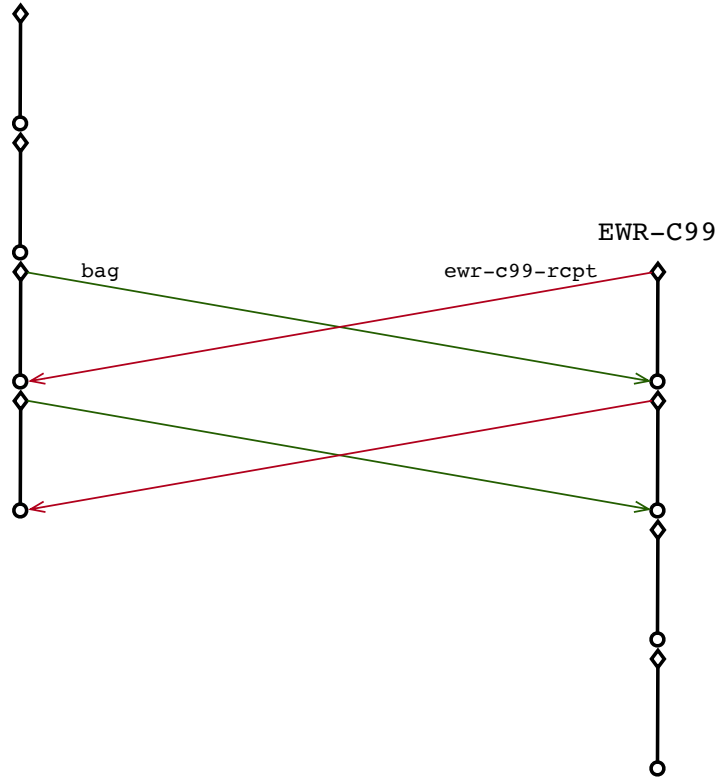
ORD-B6



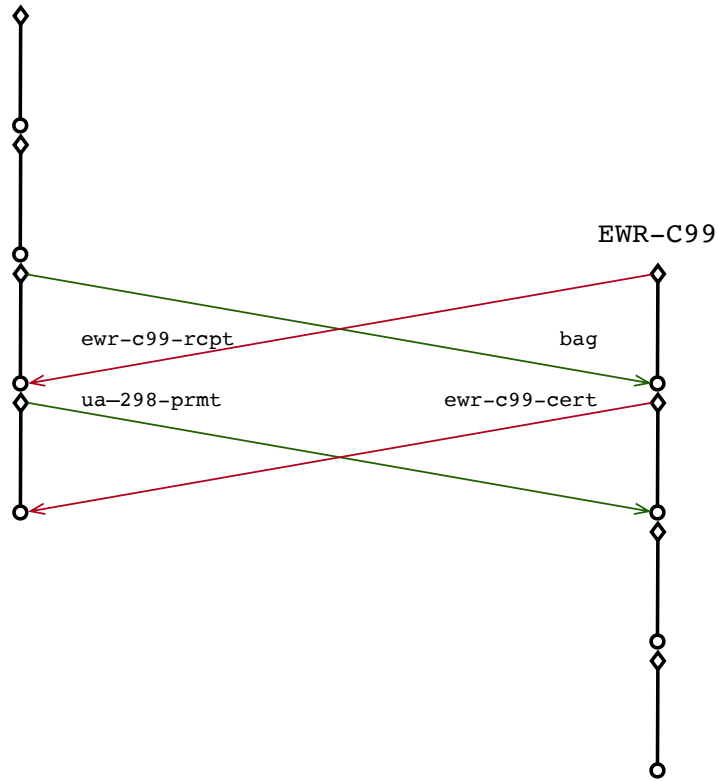
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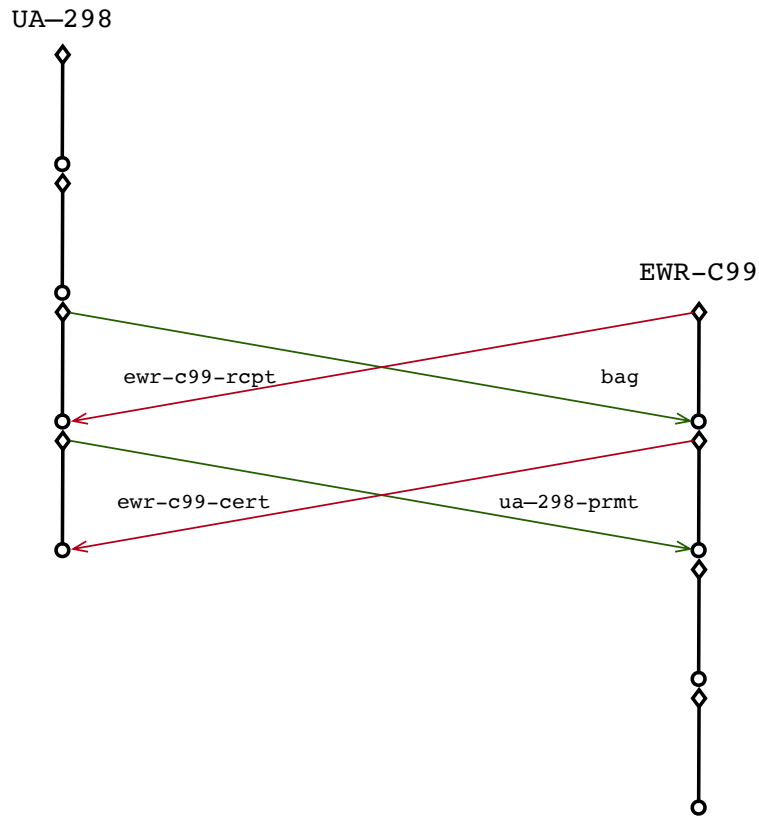


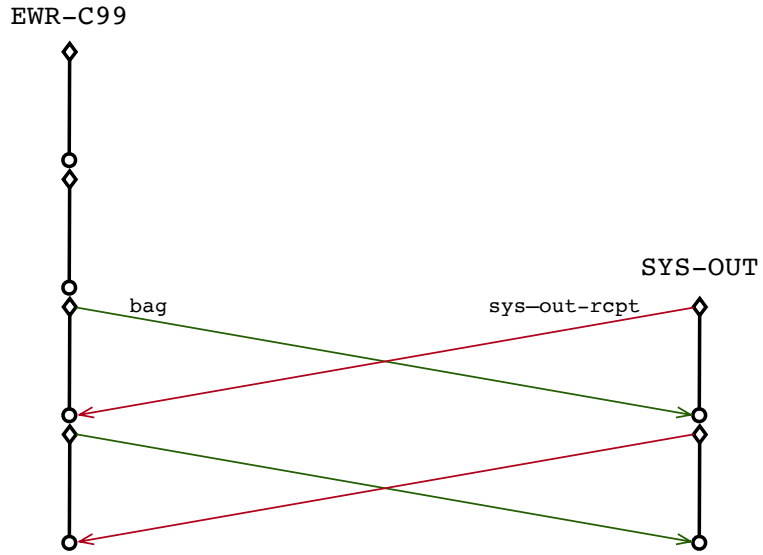
UA-298

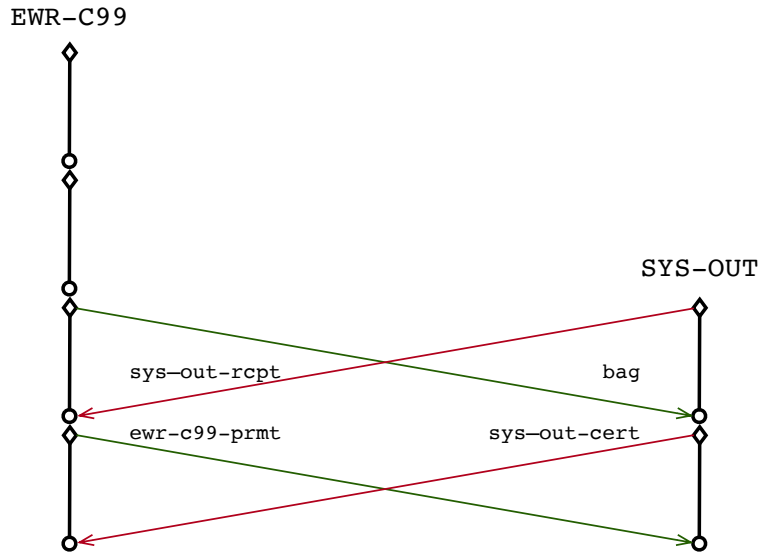


UA-298

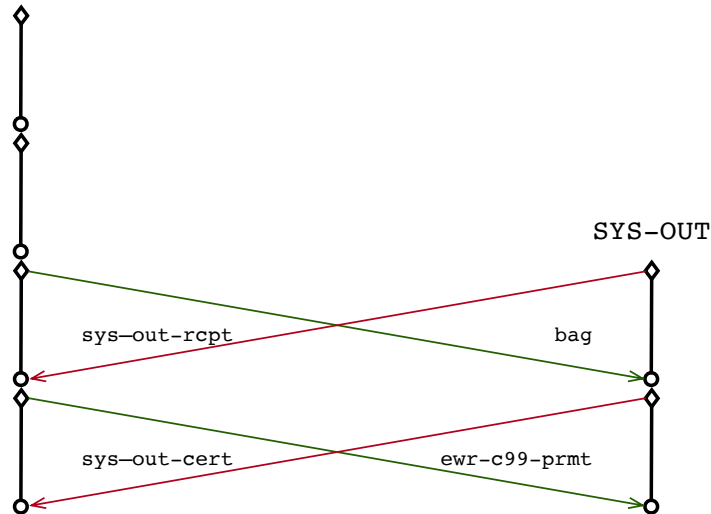








EWR-C99



Governance and remediation

BLOCKCHAIN CONTRACT

Provable Contract Properties

Interaction phase 1

- A recipient cannot have received a bag without having given a receipt
- A forwarder cannot have forwarded a bag without having received a receipt

Interaction phase 2

- A recipient cannot have received a permission to forward without having given a certificate of acceptability
- A forwarder cannot have received a certificate of acceptability without having given a permission to forward

Questions?

Thank You!