Inside ArangoDB's new Sharding

Max Neunhöffer

NoSQL matters 2014

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Horizontal Scaling — scale out

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$\Longrightarrow$ You want to use a database that can do sharding.

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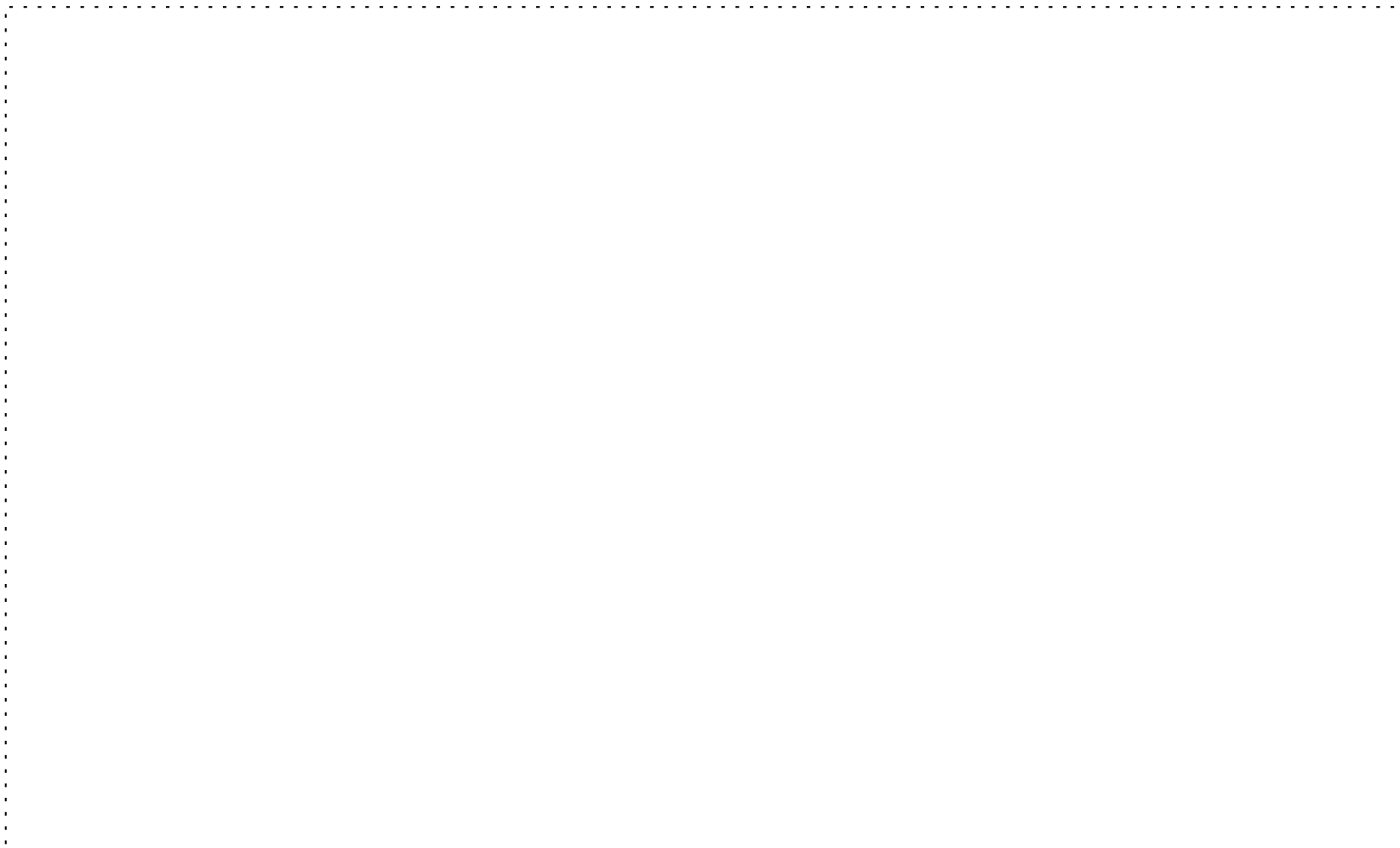
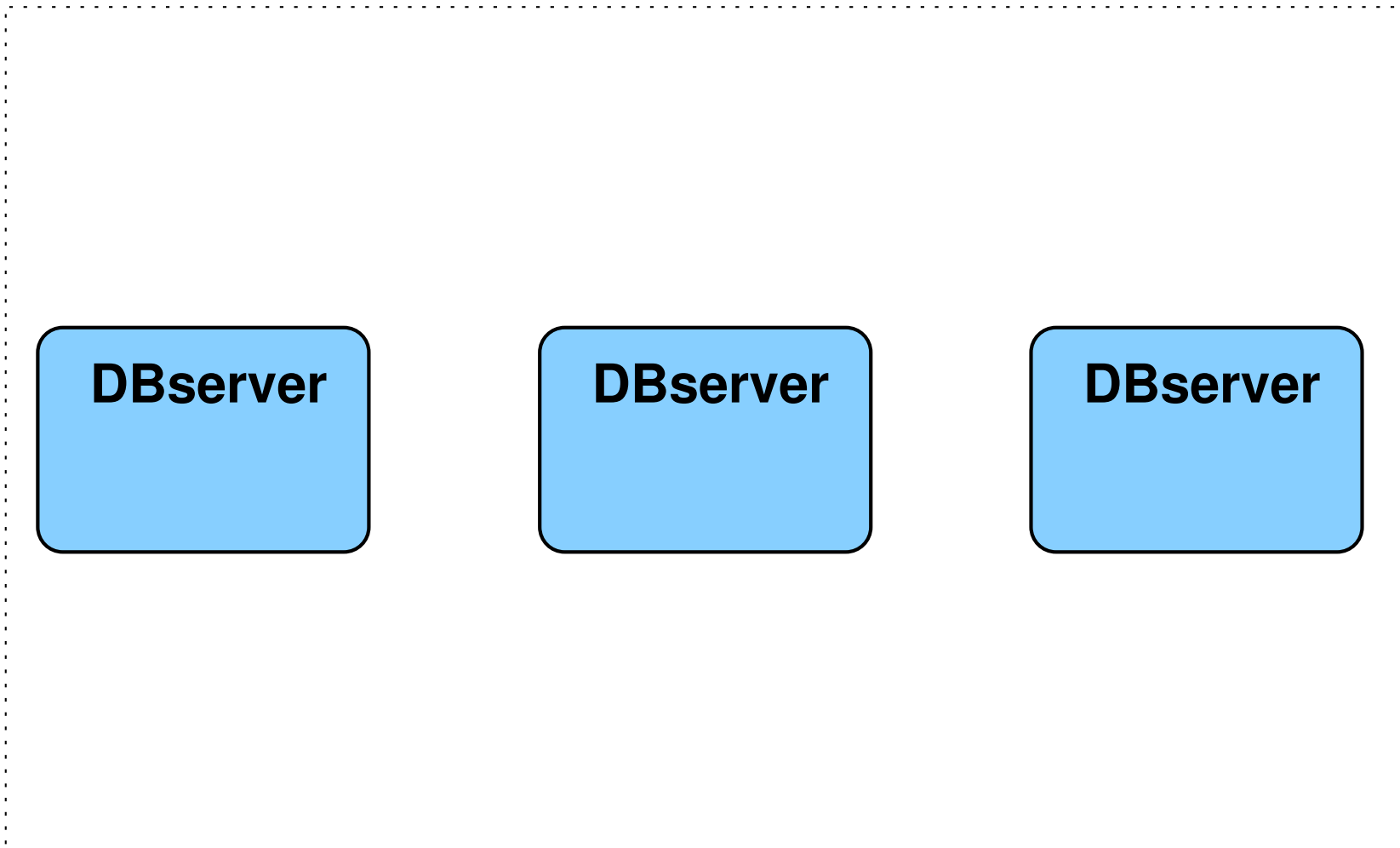
- ... recently added sharding in Version 2.0.

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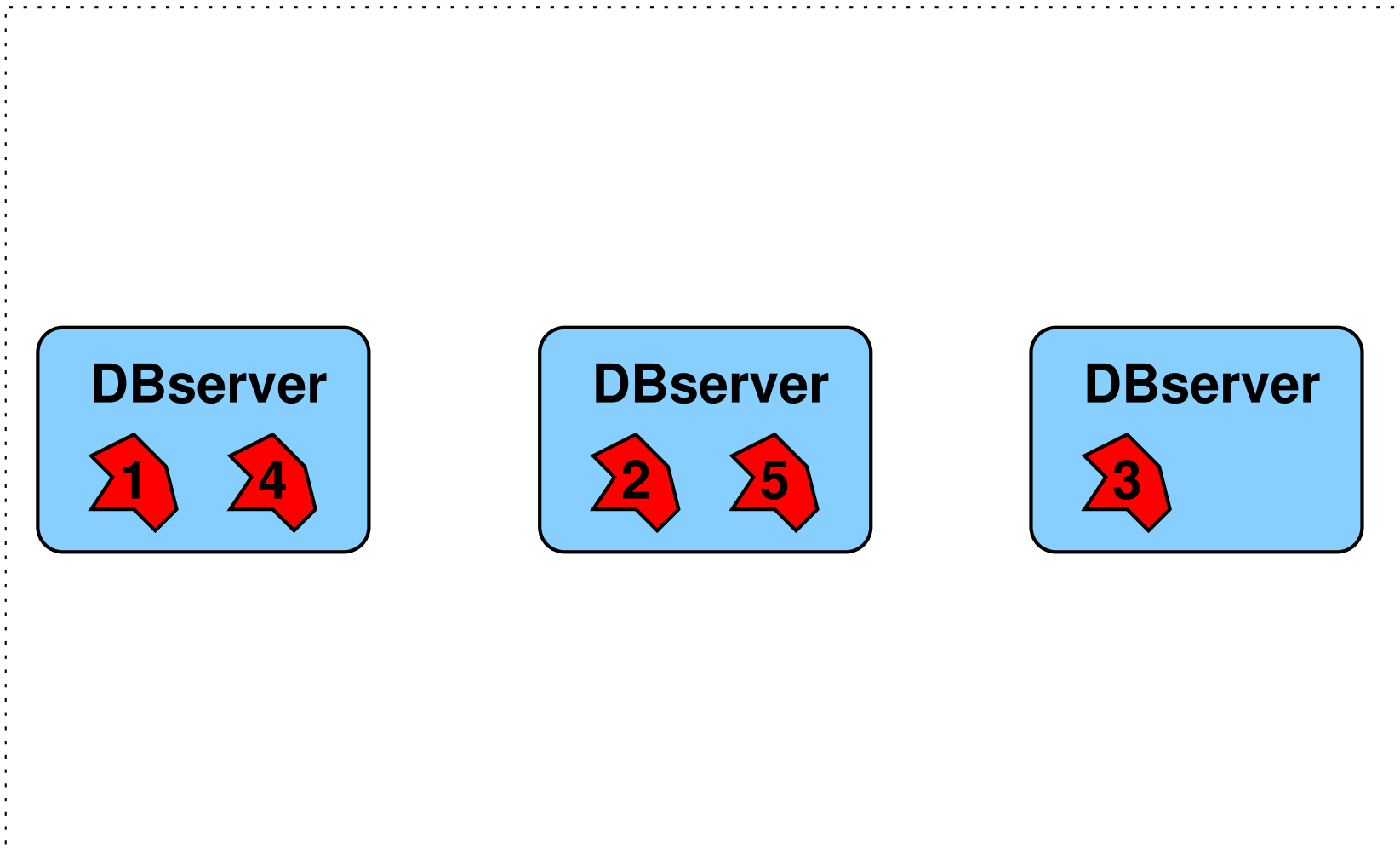
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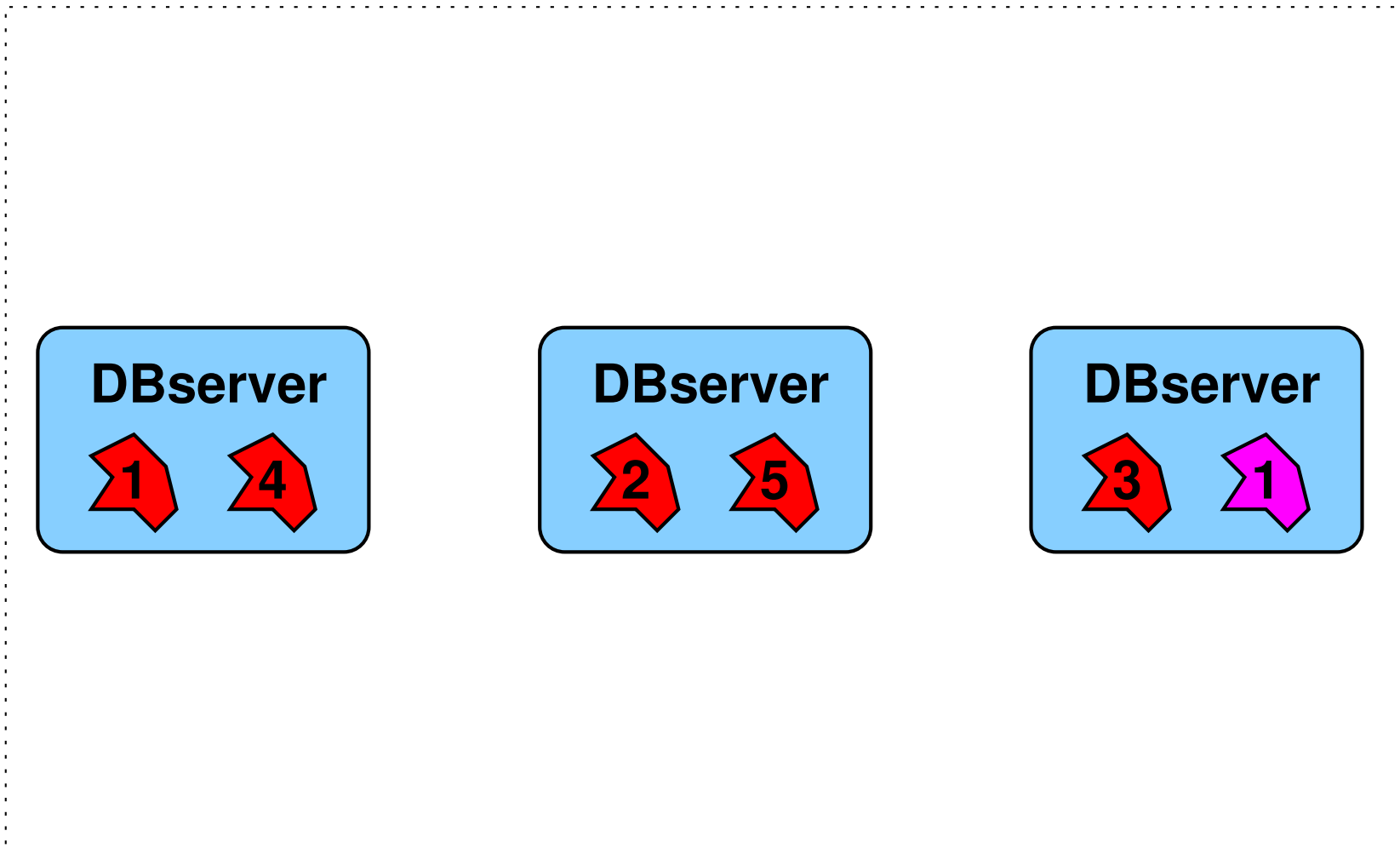
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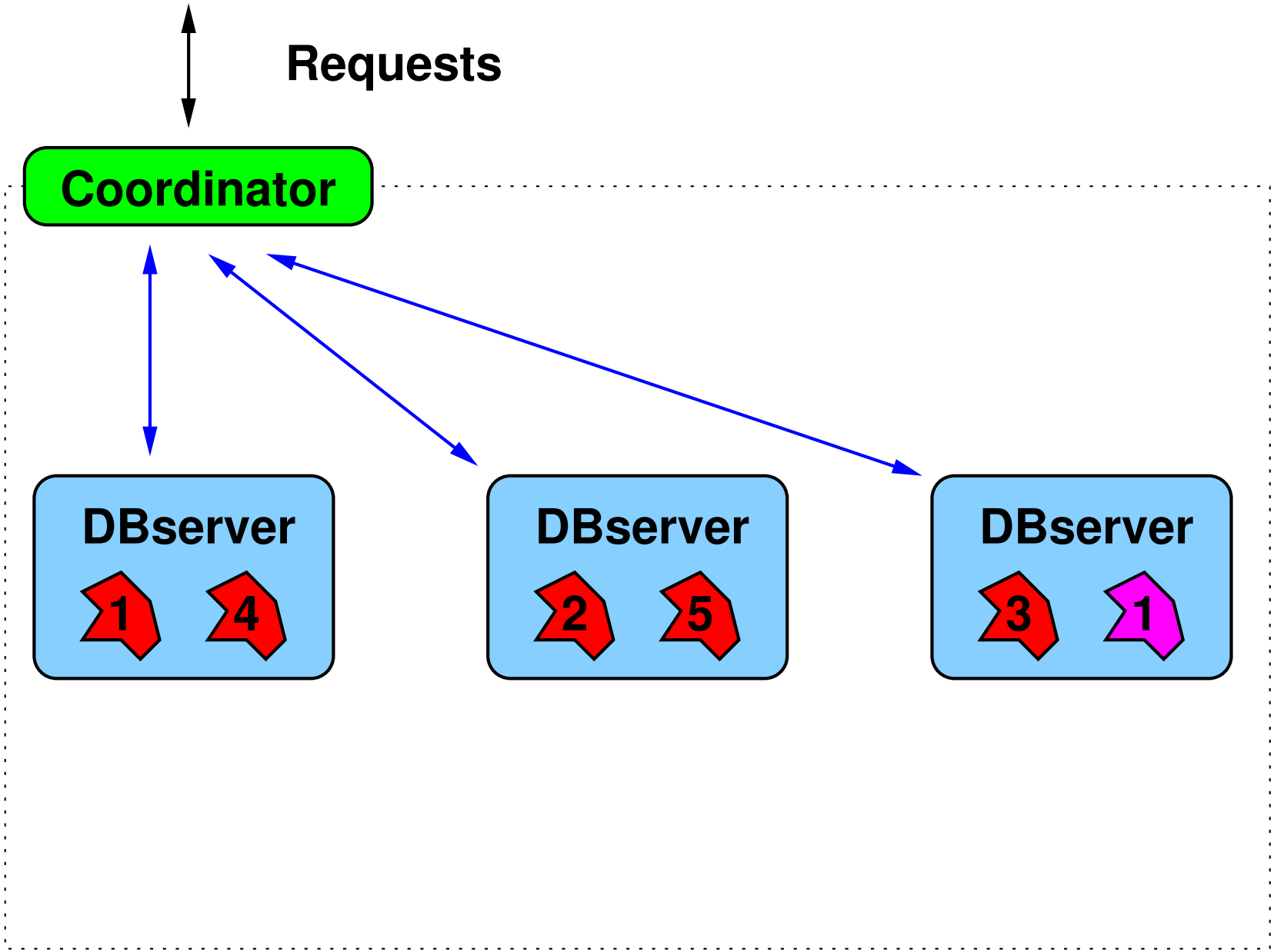
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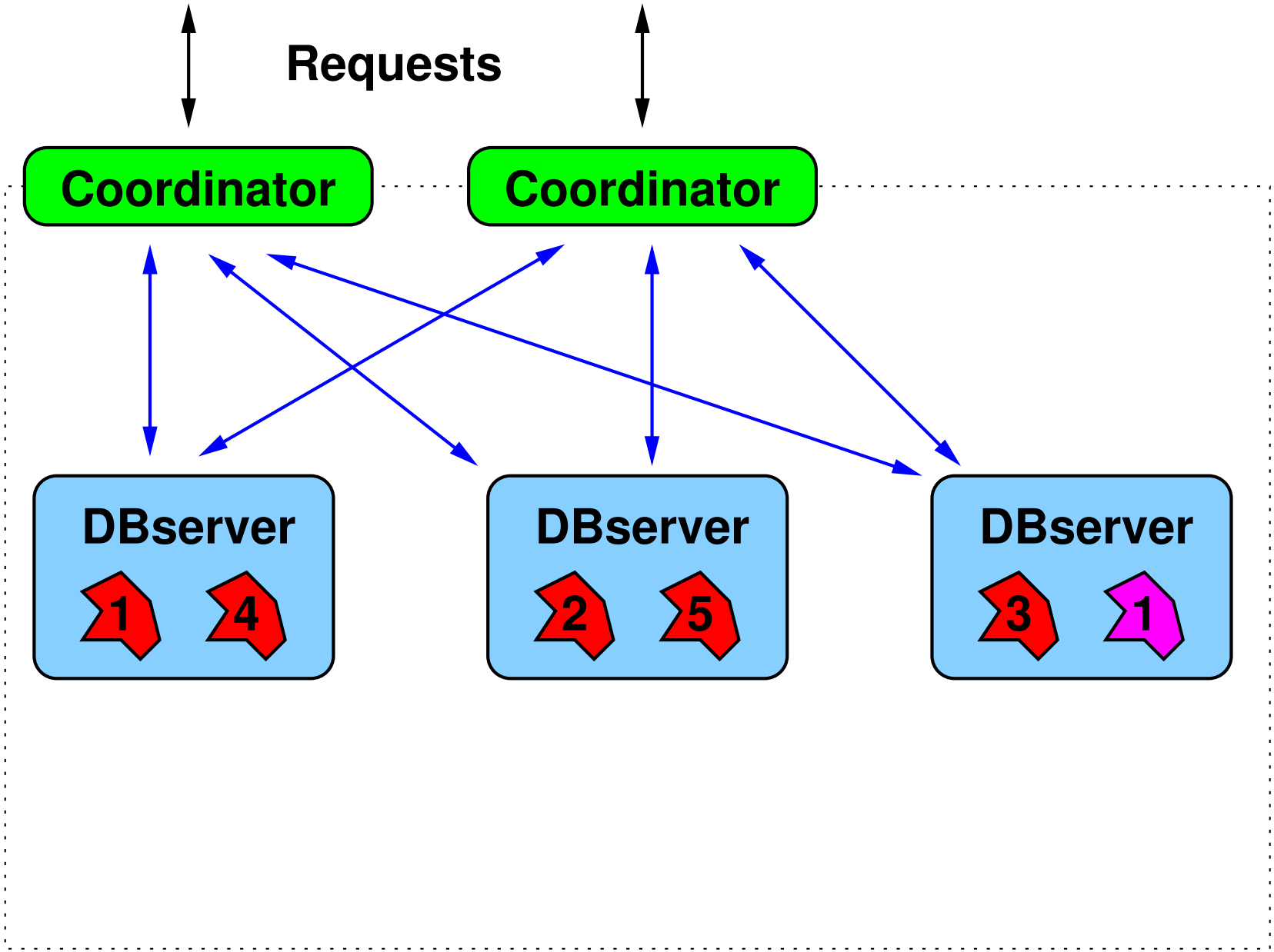
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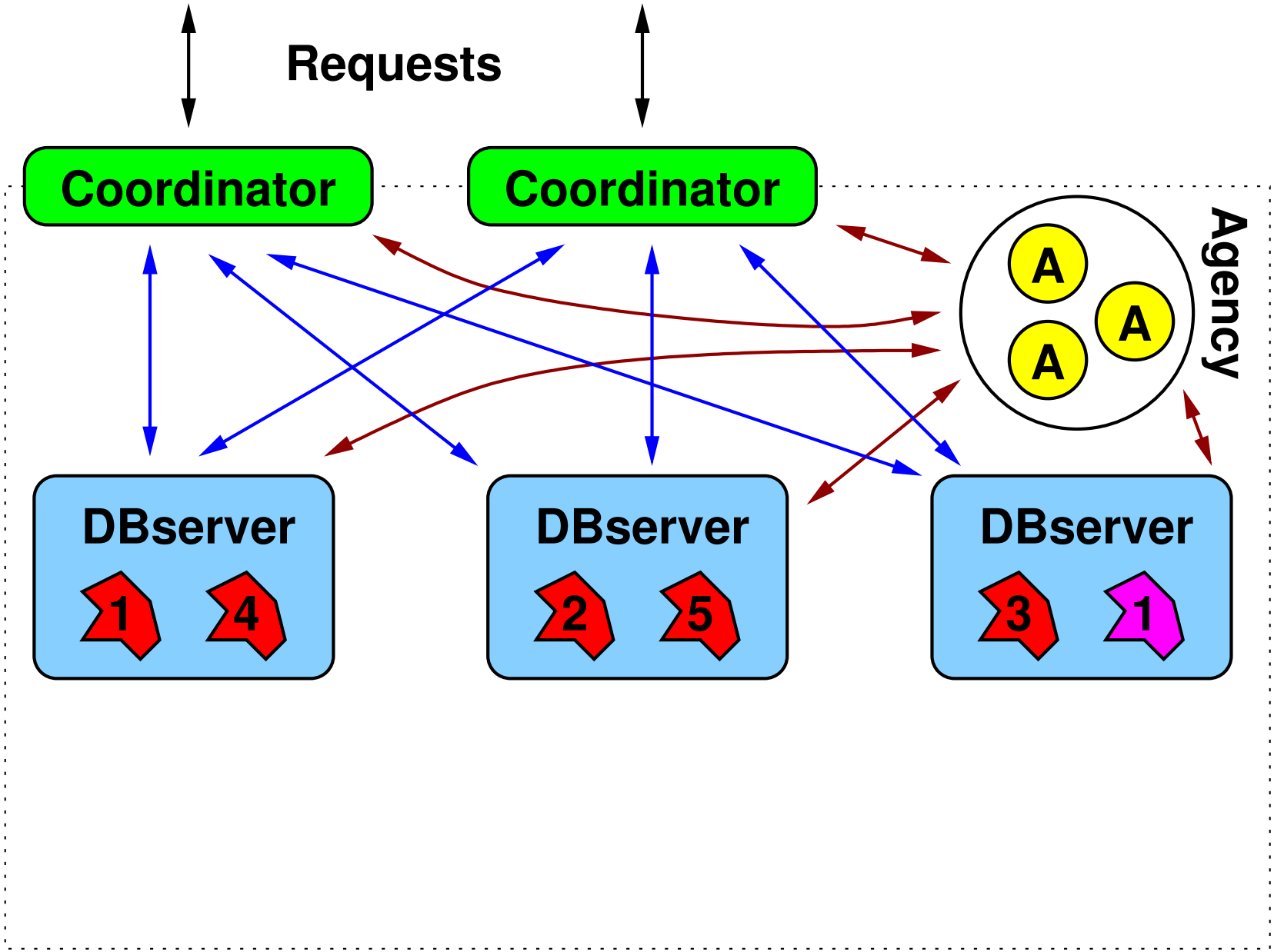
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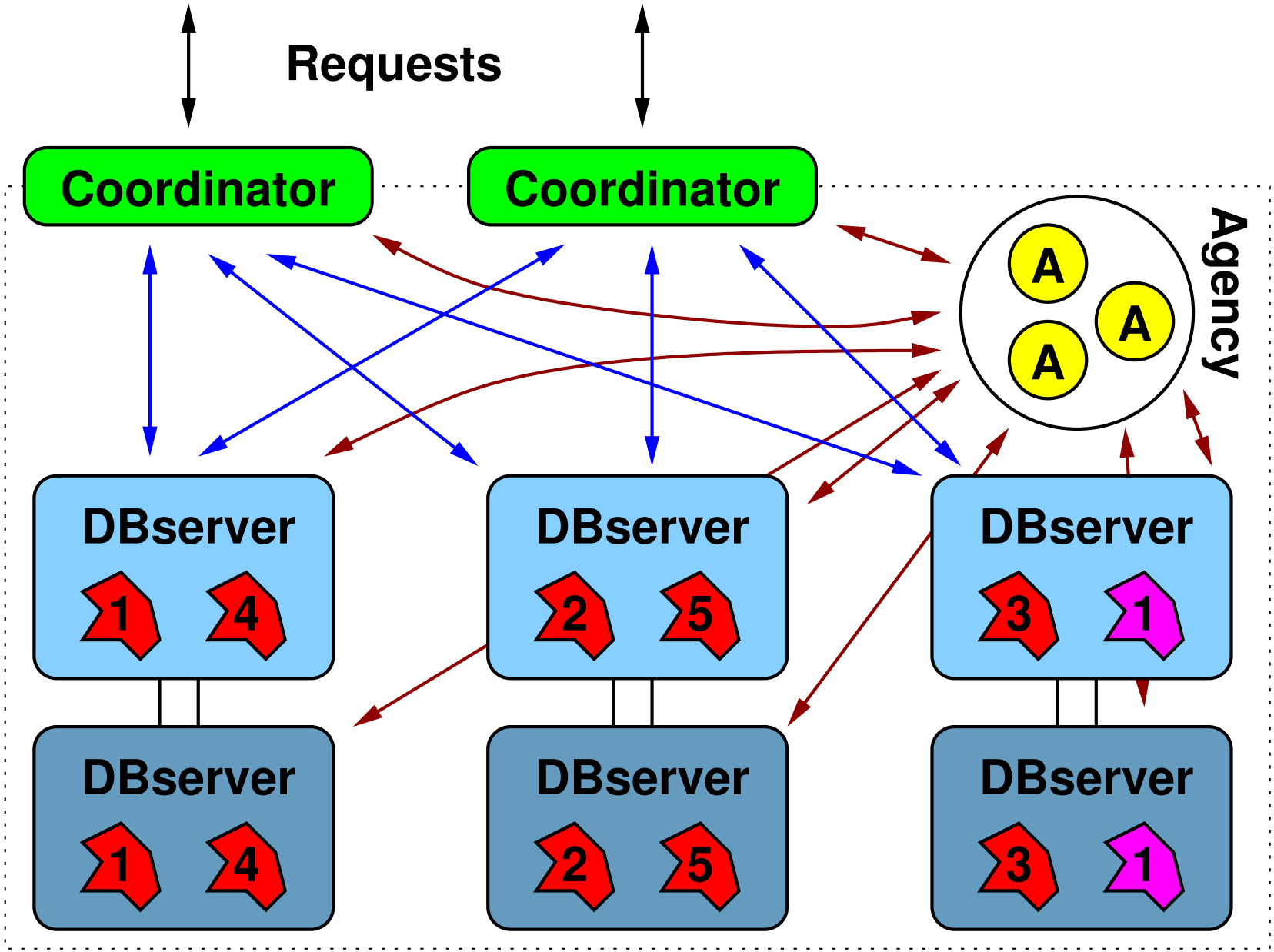
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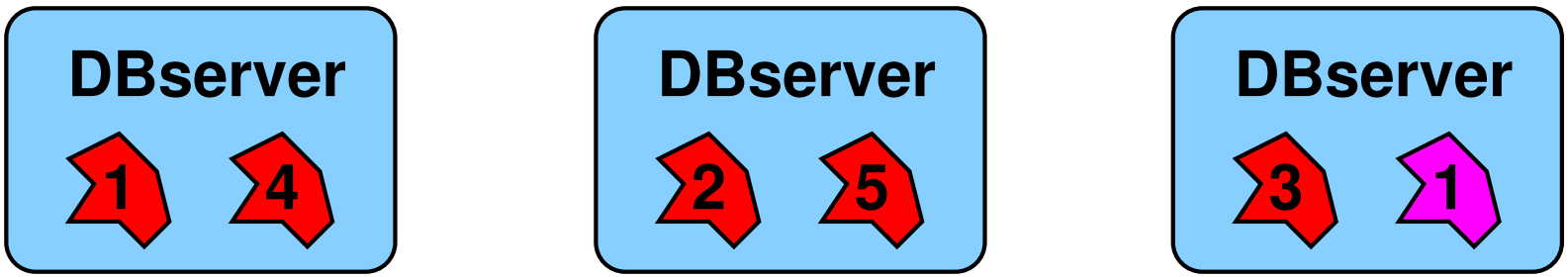
Sharded collections



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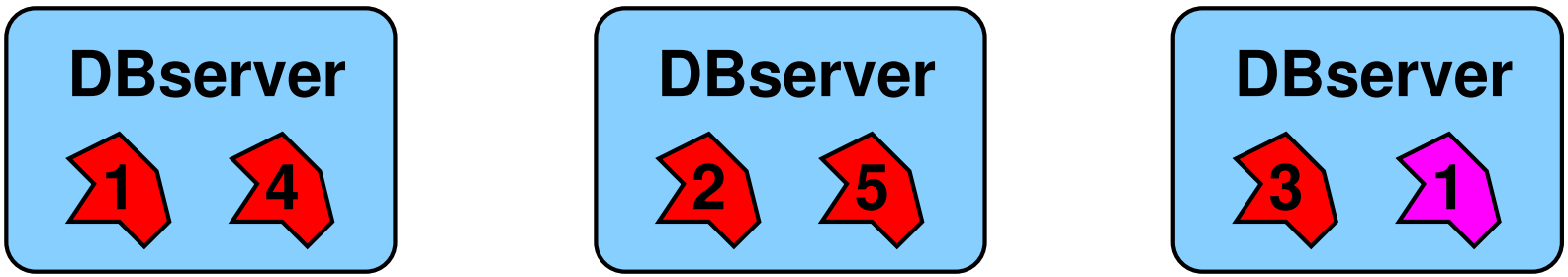

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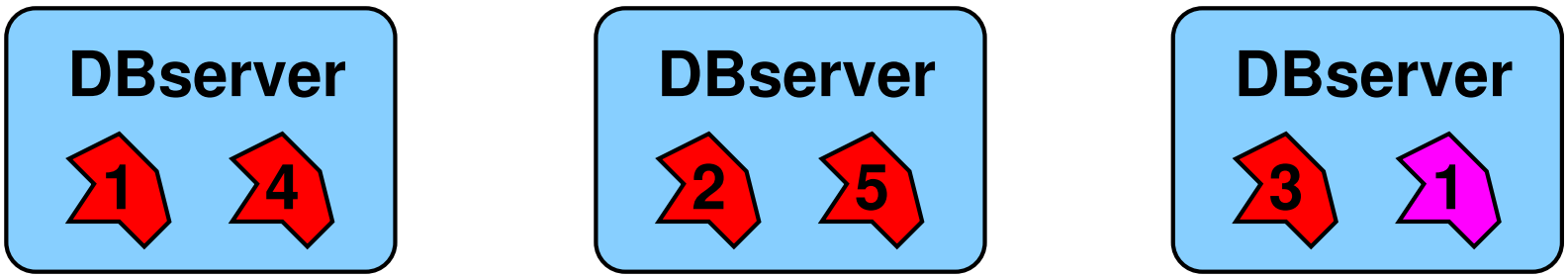

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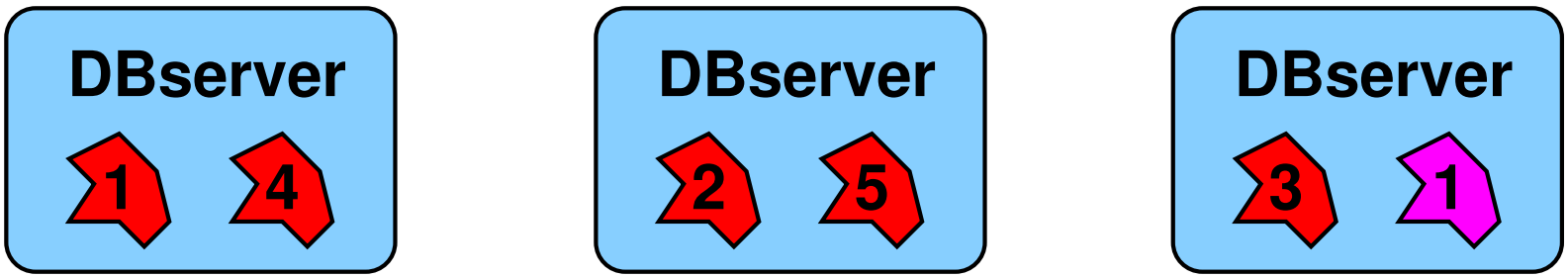

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- Each document in the collection is stored in exactly one shard.
- The shard is chosen by shard keys, which are one or more attributes in the documents (default: `_key` only).
- The coordinators redirect incoming queries to the right DBserver(s).

Reading a document in a sharded collection

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More difficult case

If we use other shard keys than `_key`, it needs to ask every shard!

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Easier case

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AQL queries are much more complicated, but handled similarly.

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This brings us to TRANSACTIONS . . .

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- It is only asked, when two transactions try to modify the same doc.

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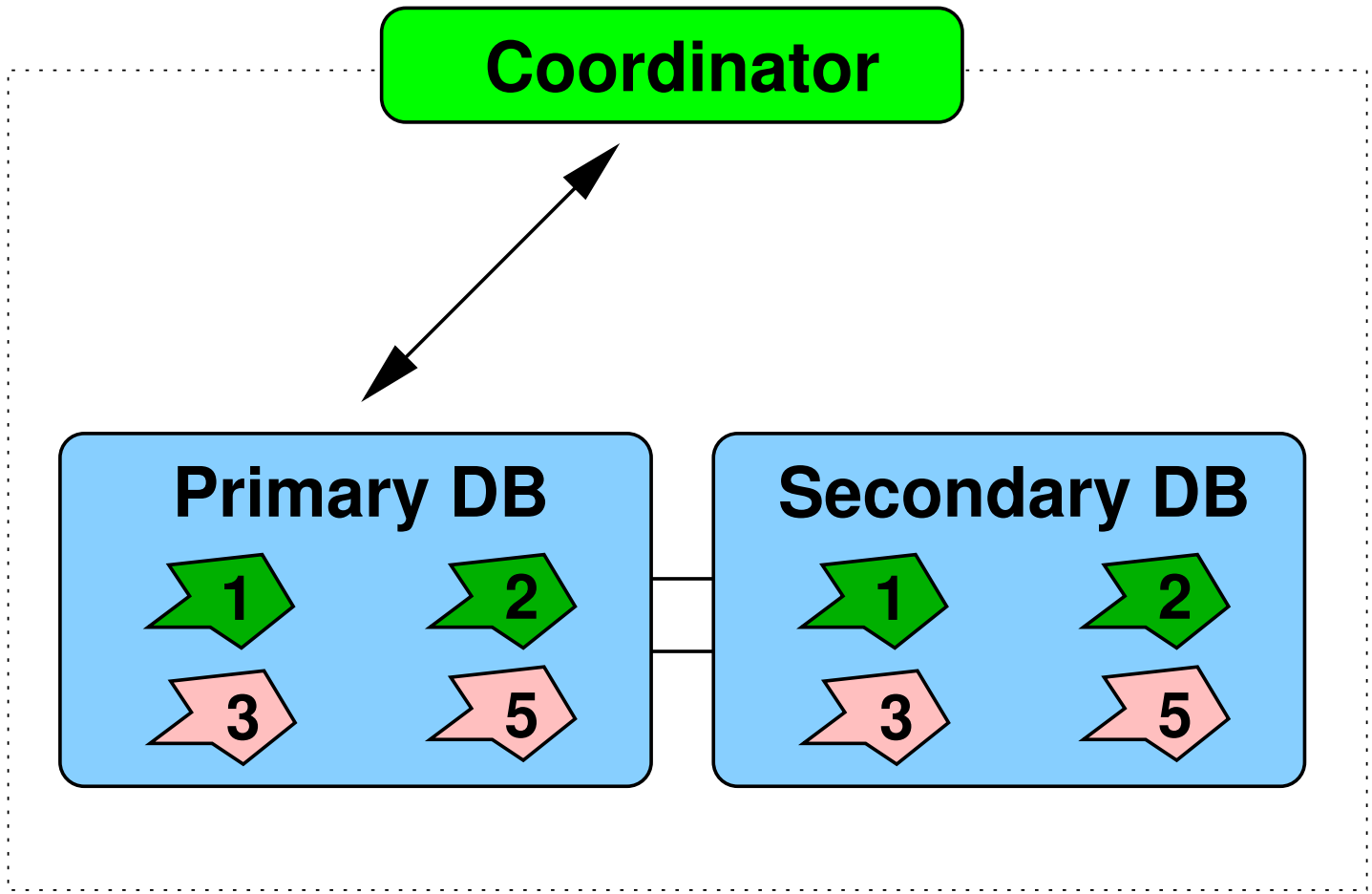
- **Eventually**, we will implement full transaction semantics in the MVCC sense.

Fault tolerance and automatic failover



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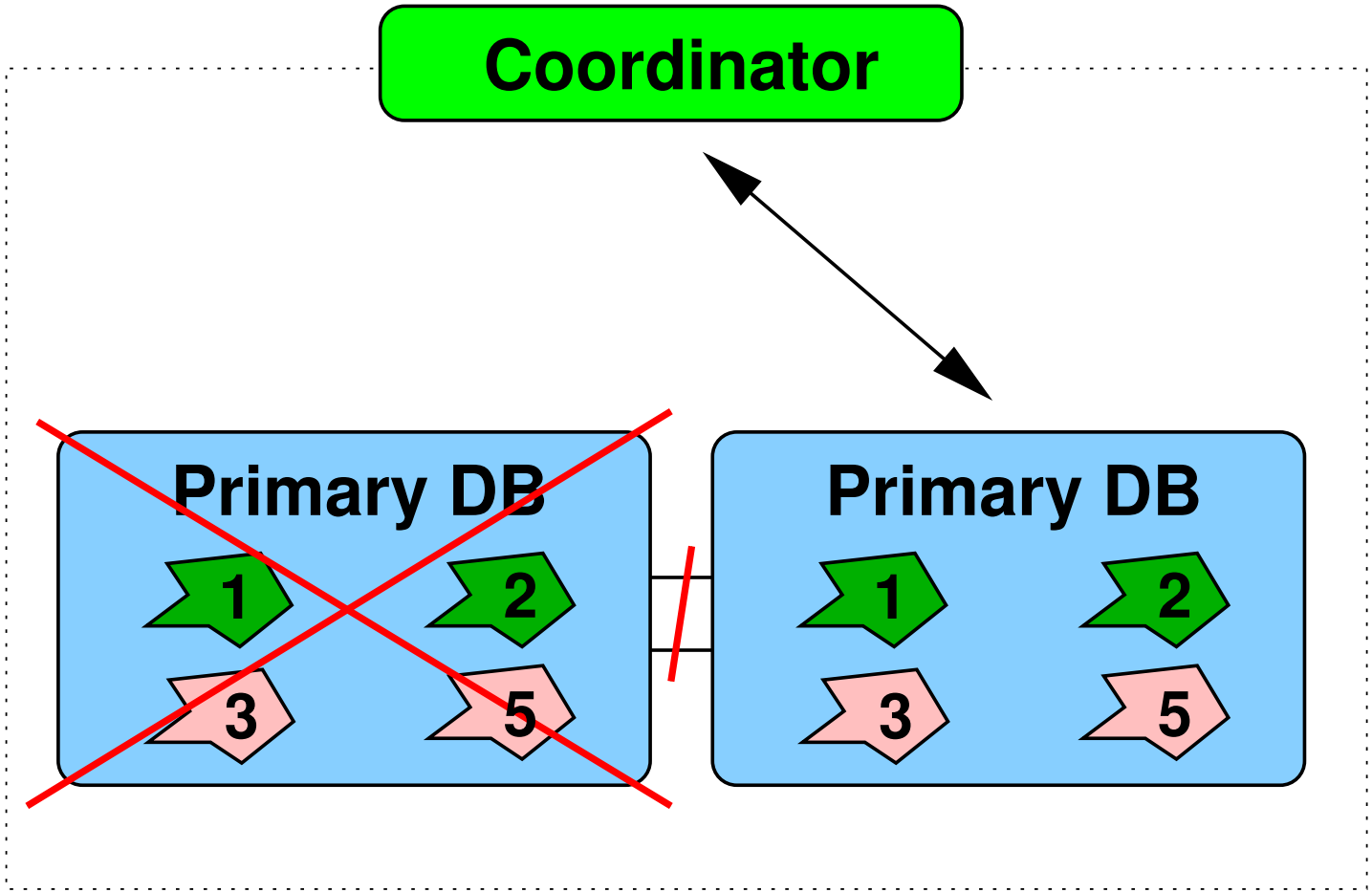

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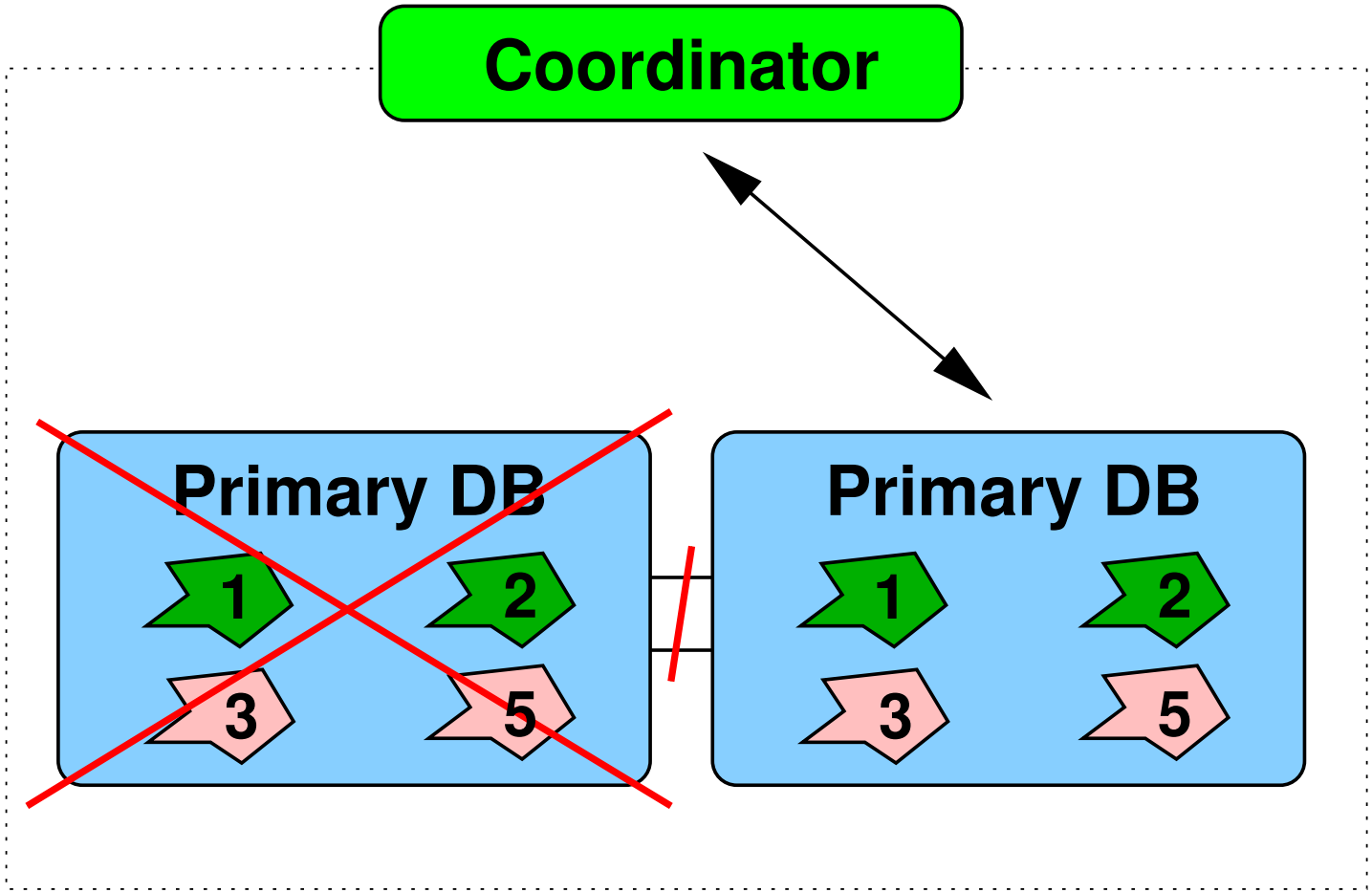
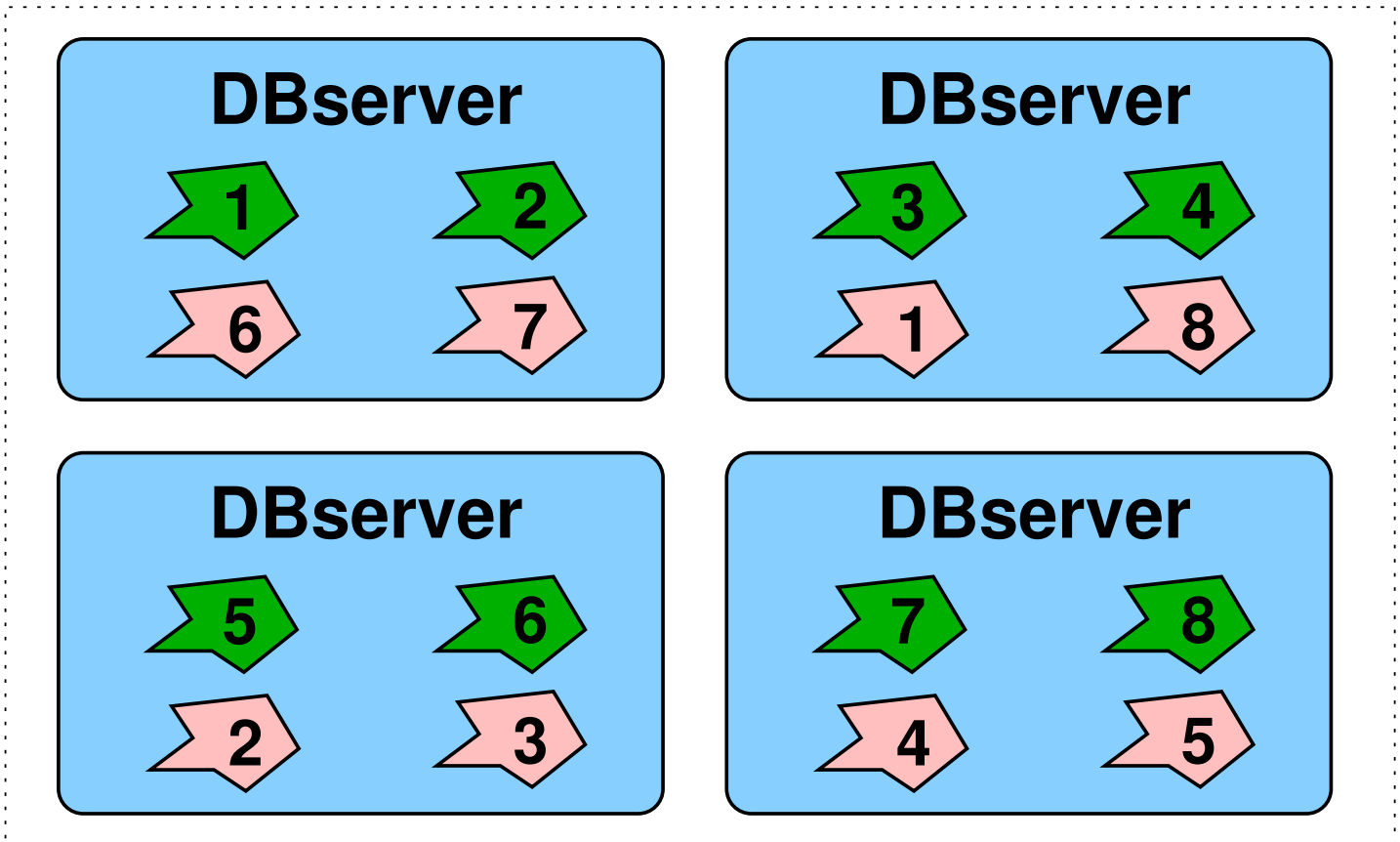


Synchronisation and failover organisation is done via the agency.

Distributed failover

Green: primary shard instances **Pink:** secondary shard instances



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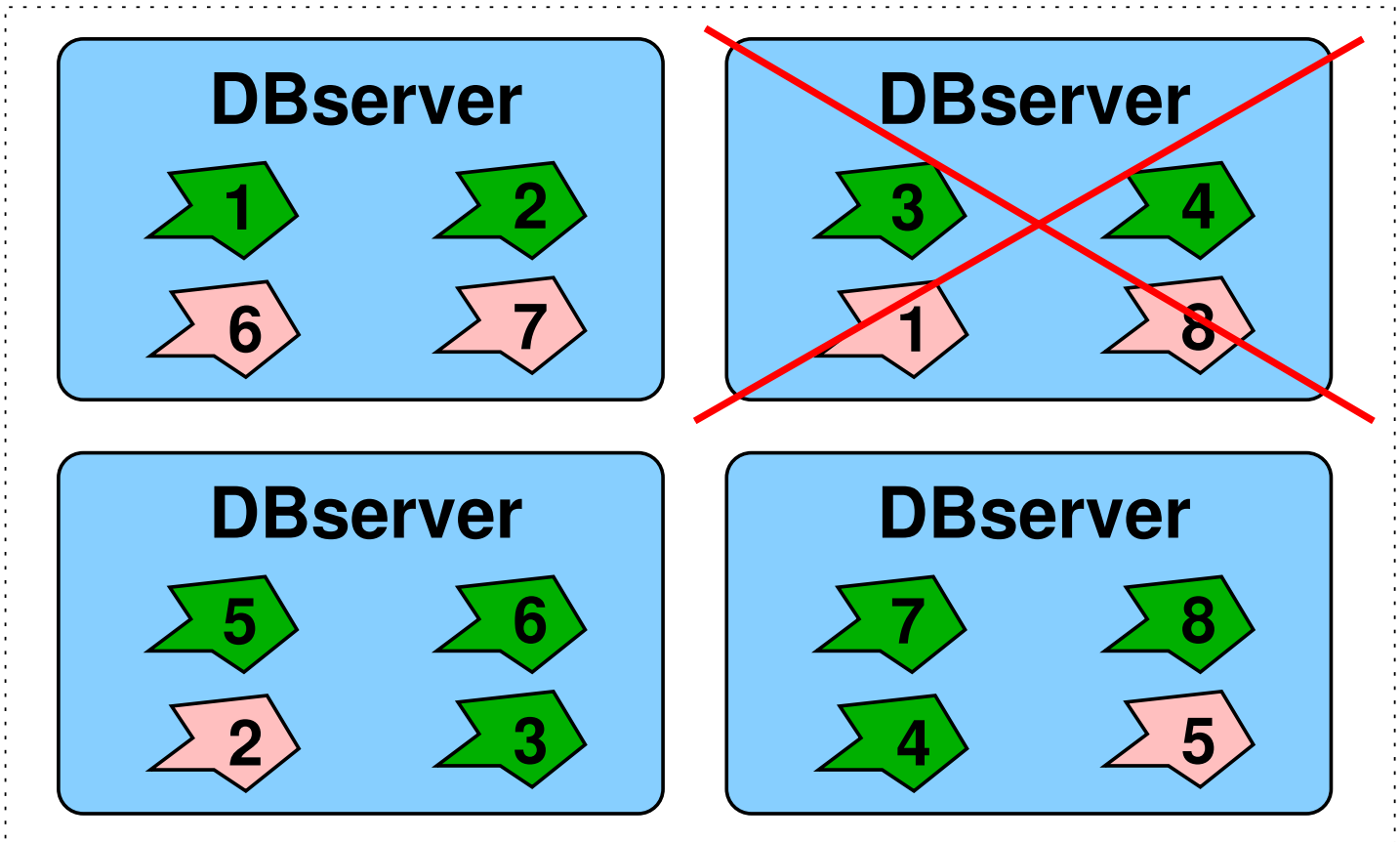

If any one server fails, all shards are still there, and the load is still relatively evenly distributed.

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- Authentication with and in cluster, including SSL

Todo (see roadmap for later this year)

- Dump and restore for clusters

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Stay tuned for new releases later this year!