Gianmaria Del Monte, <u>Diego Pennino</u>, Maurizio Pizzonia

University of Roma3

04/02/2020

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Maurizio Pizzonia

Probler

Scalability SoA

Our Solution

Conclusion

Problem

Scalability

Common Problems:

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Scalability

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Our Solutio

Conclusior

Problem

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Common Problems:

- P New transactions are always broadcasted to all nodes
- P Each new block is broadcasted to all nodes

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Common Problems:

- P New transactions are always broadcasted to all nodes
- P Each new block is broadcasted to all nodes
- P All nodes process all transactions that have to be included in the next block

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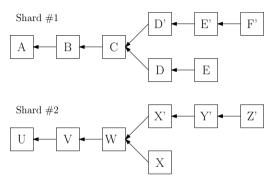
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State Of the Art



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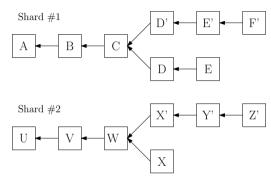
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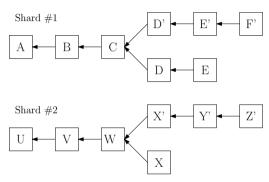
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Problems:

P Small shard = better scalability, less security

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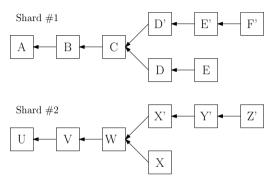
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Problems:

- P Small shard = better scalability, less security
- P Reassignment of the members of shard

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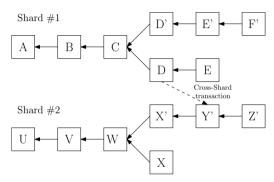
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Problems:

- P Small shard = better scalability, less security
- P Reassignment of the members of shard
- P Cross-shard communications

Blockchain Architecture	Our Soit		Our Solution
iianmaria Del Monte, <u>Viego Pennino,</u> Maurizio Pizzonia	Transaction Creation	Validation and confirmation	Storage DHT (as in [1])
roblem icalability			
our Solution			1
onclusion			1
		rdini, Diego Pennino, Maurizio Pizz Distributed Hash Tables: Decou	onia: pling Validation from State Storage.

DLT@ITASEC 2019: 43-55

Our Solution

Toward a Scalable

Public

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Storage DHT

 $Node_1$

 $Node_2$

• • •

• • •

. . .

 $Node_n$

Transaction Creation

Validation and confirmation

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Our Solution

Transaction Valida
Creation

Validation and confirmation

N committees

 $committee_1$

 $committee_2$

• • •

• • •

 $committee_n$

Storage DHT

 $Node_1$

 ${\rm Node_2}$

• • •

• • •

• • •

 ${\rm Node}_n$

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Conclusion

Our Solution

Transaction Creation

node

Validation and confirmation

Storage DHT

N committees

 $committee_1$

 $committee_2$

•••

•••

 $committee_n$

 ${\rm Node}_1$

 $Node_2$

. . .

• • •

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 $Node_n$

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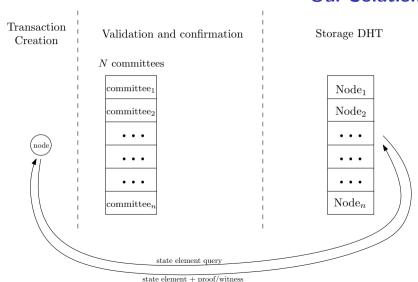
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Transaction Validation and confirmation Creation N committees committee₁ committee₂ node $committee_n$

Storage DHT

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Transaction Validation and confirmation Creation N committees committee₁ nodecommittee₂ node node $committee_n$

Storage DHT

 $Node_1$ $Node_2$ \cdots $Node_n$

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Problei

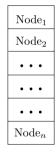
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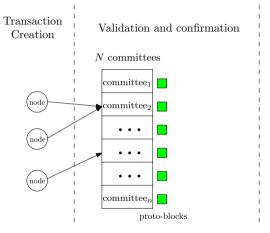
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Storage DHT





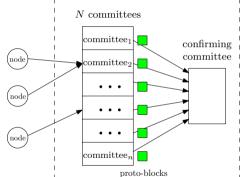
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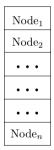
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Storage DHT



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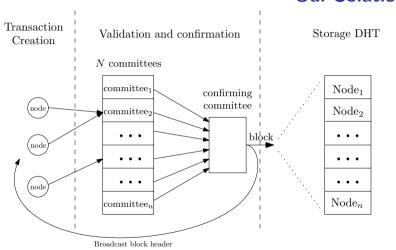
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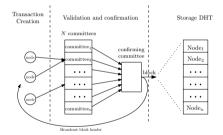
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Conclusion

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Architecture:

- Only one blockchain
- No heavy broadcast
- Workload is balanced among all nodes



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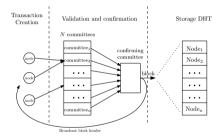
Conclusion

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Architecture:

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Open problems:



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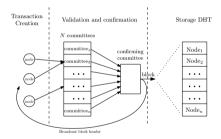
Conclusion

Architecture:

- Only one blockchain
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Open problems:

x bottleneck Confirming committee



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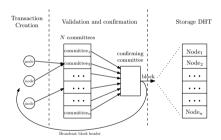
Conclusion

Architecture:

- Only one blockchain
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Open problems:

- x bottleneck Confirming committee
- x multicast details



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Thanks for your attention!

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