AWS re:Invent

NOV. 29 – DEC. 3, 2021 | LAS VEGAS, NV

ARC319-R1

Improving reliability with fault isolation and shuffle sharding

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Why are we here?



Agenda

Scope of impact

Sharding

Shuffle sharding

Q&A

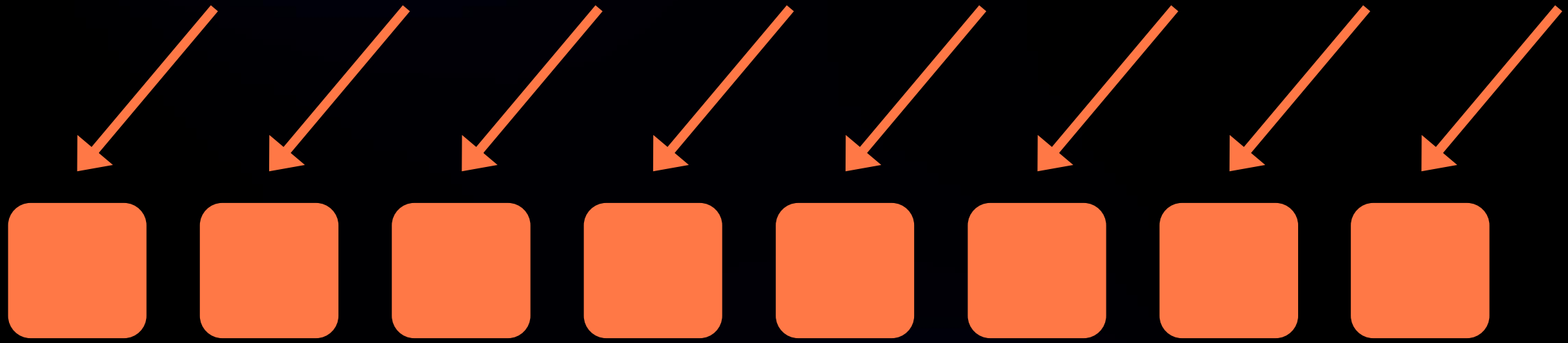
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Scope of impact

- What is the potential impact of a failure?
- How do I determine my scope of impact?
- How can I determine the severity?
- What does this mean for decision making?
- What can I measure?

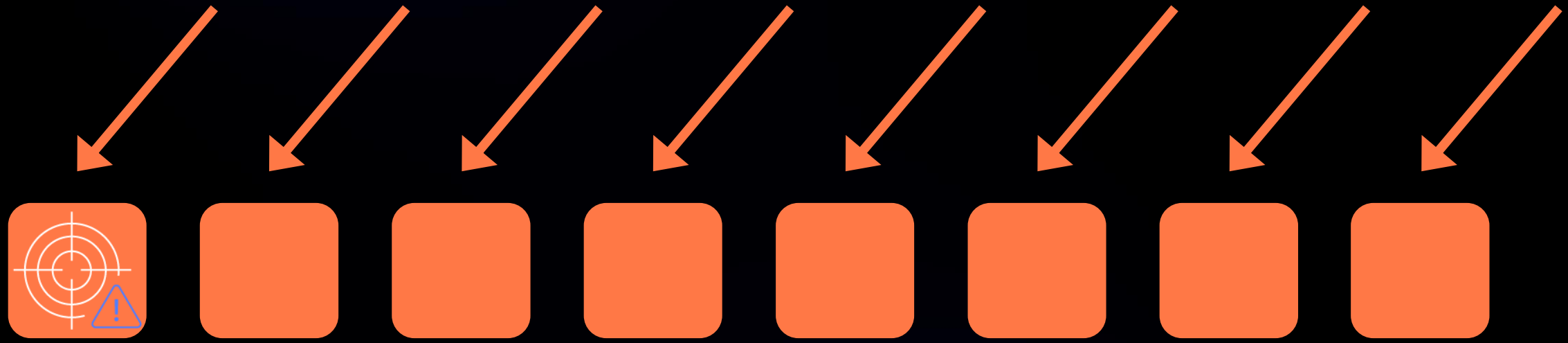
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Traditional workloads



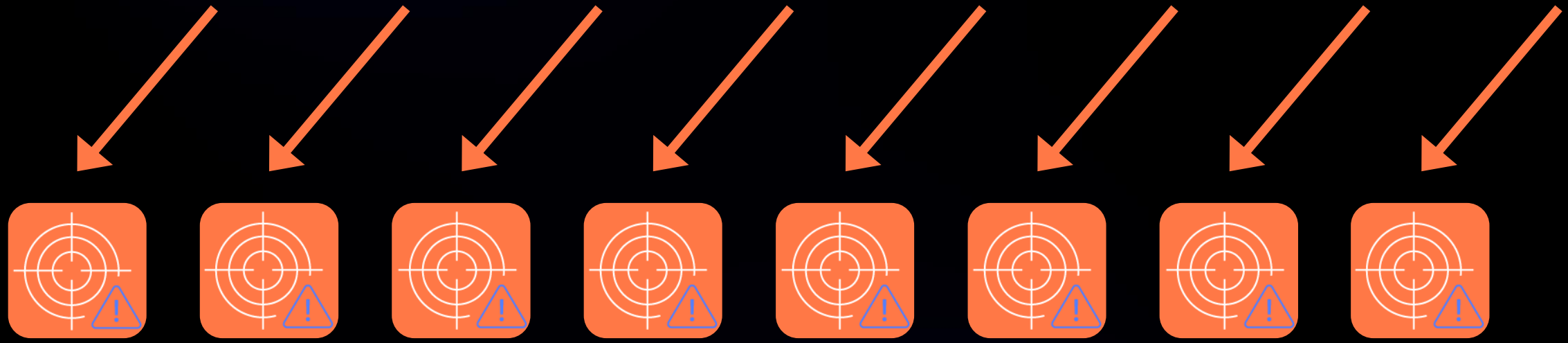
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Traditional workloads



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Traditional workloads



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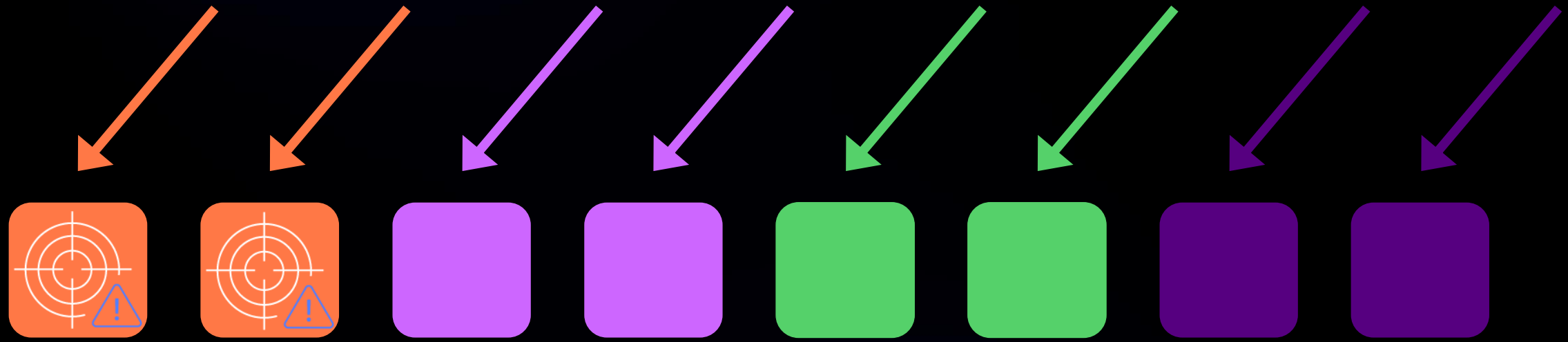
Scope of impact – Traditional

Scope of impact = All users

100%

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Sharding workloads



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Scope of impact – Sharding

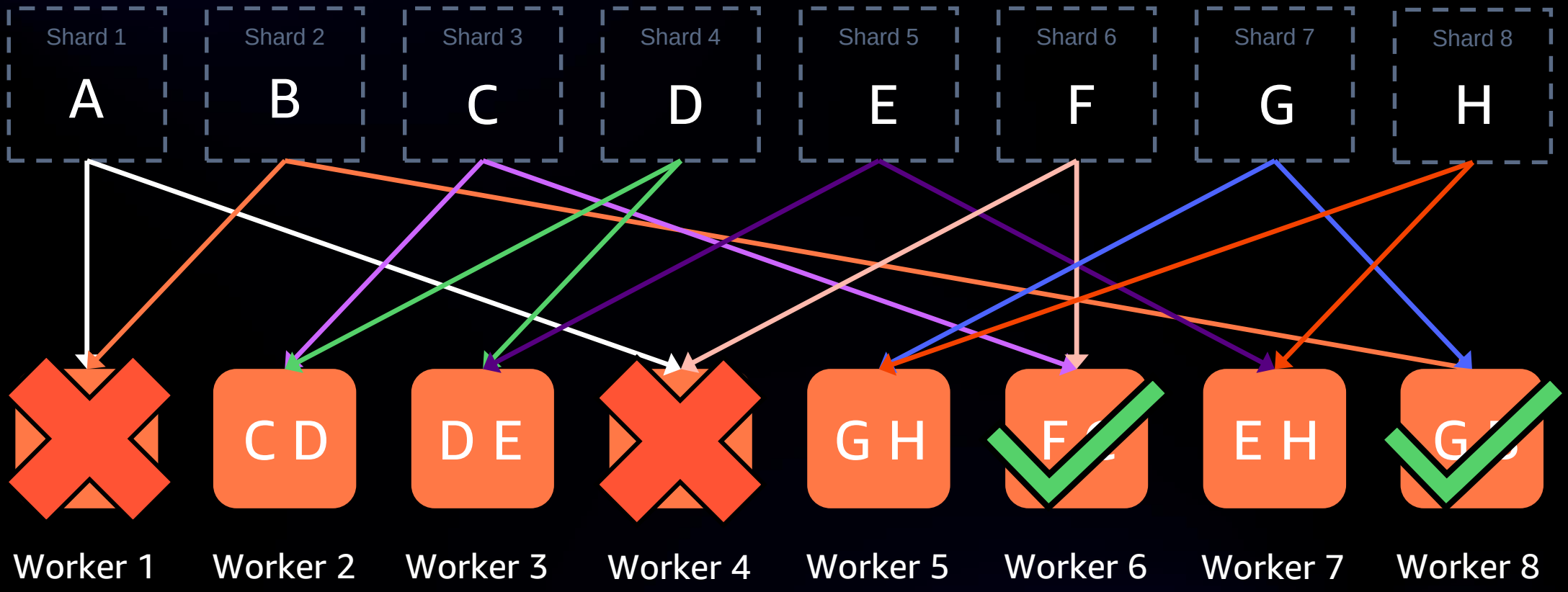
$$\text{Scope of impact} = \frac{1}{\text{Shards}} \text{ X } 100$$

$$\text{Scope of impact} = \frac{1}{4} \text{ X } 100$$

25%

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Shuffle-sharding workloads



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Scope of impact – Shuffle sharding

$$\text{Scope of impact} = \frac{1}{\text{Combinations}} \text{ X } 100$$

$$\text{Scope of impact} = \frac{1}{8} \text{ X } 100$$

12.5%

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Scope of impact – Shuffle sharding

N – number of worker nodes

S – shard size (workers per shard)

$$\text{Scope of impact} = \frac{1}{\text{Combinations}} \times 100$$

$$\text{Combinations} = \frac{N!}{S!(N-S)!}$$

$$\text{Scope of impact} = \frac{1}{28} \times 100$$

$$\text{Combinations} = \frac{8!}{2!(8-2)!}$$

3.6%

aws

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Conclusion

- Sharding to limit impact
- Shuffle sharding to exponentially limit impact further

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Other sessions

- ARC308 – Improve workload resiliency using shuffle sharding
- ARC316 – Well-architected reliability: Best practices you can use now
- ARC317 – Best practices for disaster recovery of workloads on AWS

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Useful links

- Workload isolation using shuffle-sharding - https://go.aws/3mVoSJB

- Fault Isolation with Shuffle Sharding lab - https://bit.ly/3Br5F8H

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Thank you!

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