



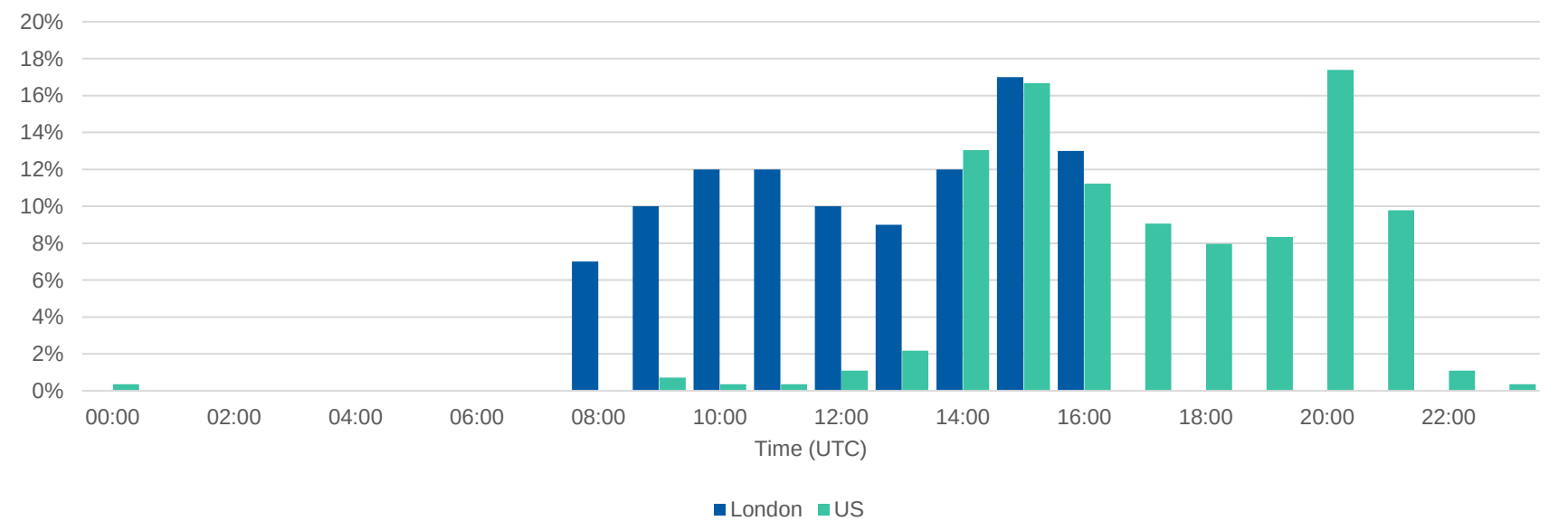
Mitigating Against Large Scale Systemic Failure in E-Trading

Chris Hawley, Executive Director

March 2025

Time of Day Matters

Approx. Average Volume on London and US Stock Exchanges



London Stock Exchange Incident

December 2023



Small-cap trading on London stock market hit by outages

Reuters

December 5th, 2023

A hardware failure caused degraded performance in a disk array.

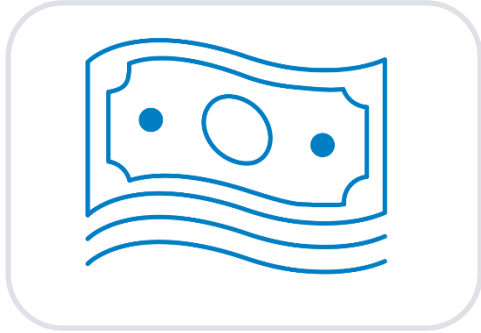
This was below the automated failover threshold but still caused the market to stop trading twice.

Sources:

<https://www.reuters.com/world/uk/lseg-says-incident-impacting-trading-stock-market-2023-12-05/>

https://docs.londonstockexchange.com/sites/default/files/documents/live_-_001_-_05122023_-_london_stock_exchange_-_05_december_2023_-_technical_incident_update.pdf

Potential Risks From Incidents



Financial



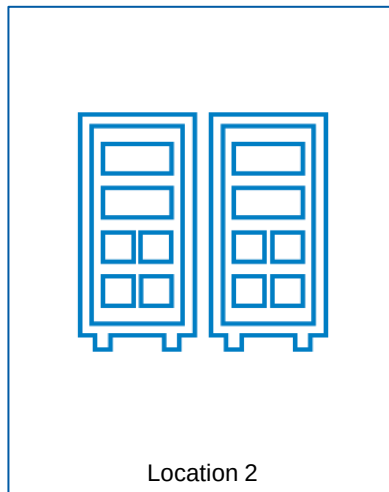
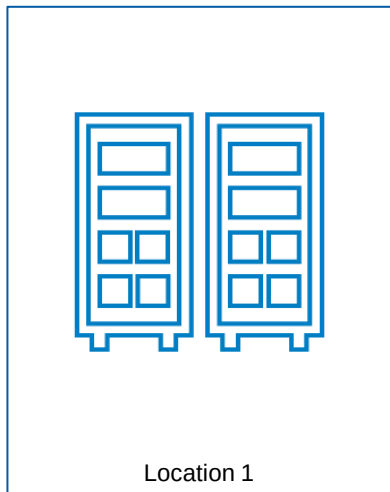
Regulatory



Reputational

Typical Availability Patterns

Physical Deployments



Multiple instances running in multiple locations.



Protects against host/network failures



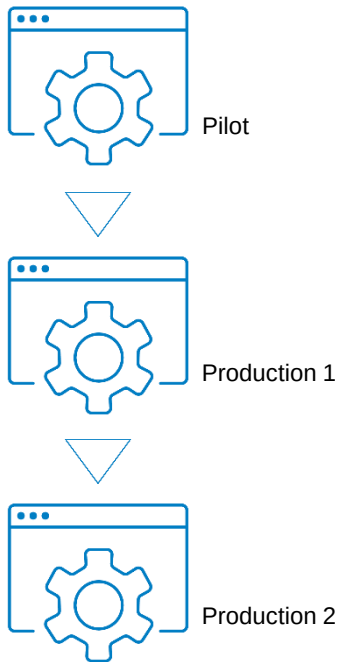
Regular use ensures functionality works



Ability to scale for capacity and segregation requirements

Typical Availability Patterns

Staggered Deployments



Changes progressively rolled out over different instances



Builds confidence in a change via steadily increasing scope



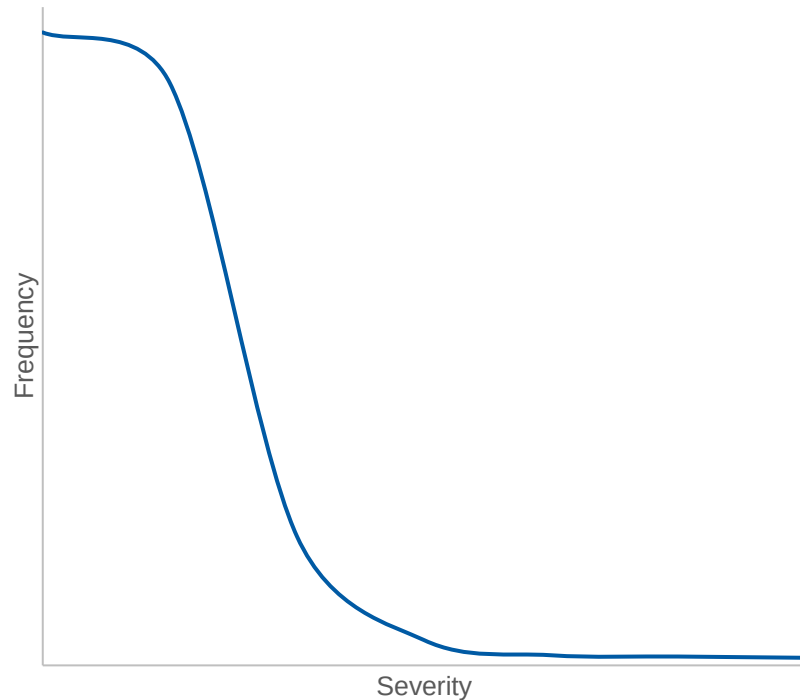
Impact of an issue is reduced, and allows uninterrupted trading if we must roll back

Things Can Still Go Wrong

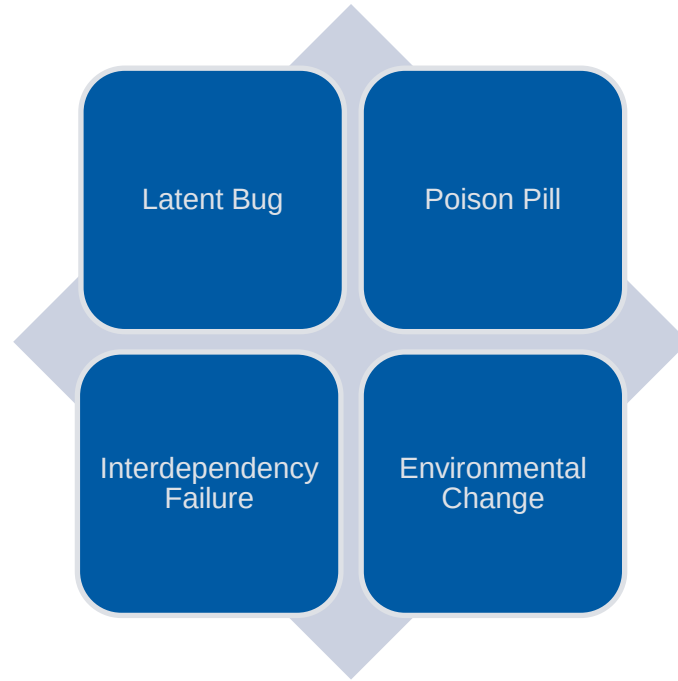
Tail Risks Still Exist

Those approaches reduce the risk, but can't eliminate it

- Complex systems will always be exposed somewhere
- Problems can go years without being triggered
- When triggered, we end up with widespread impact



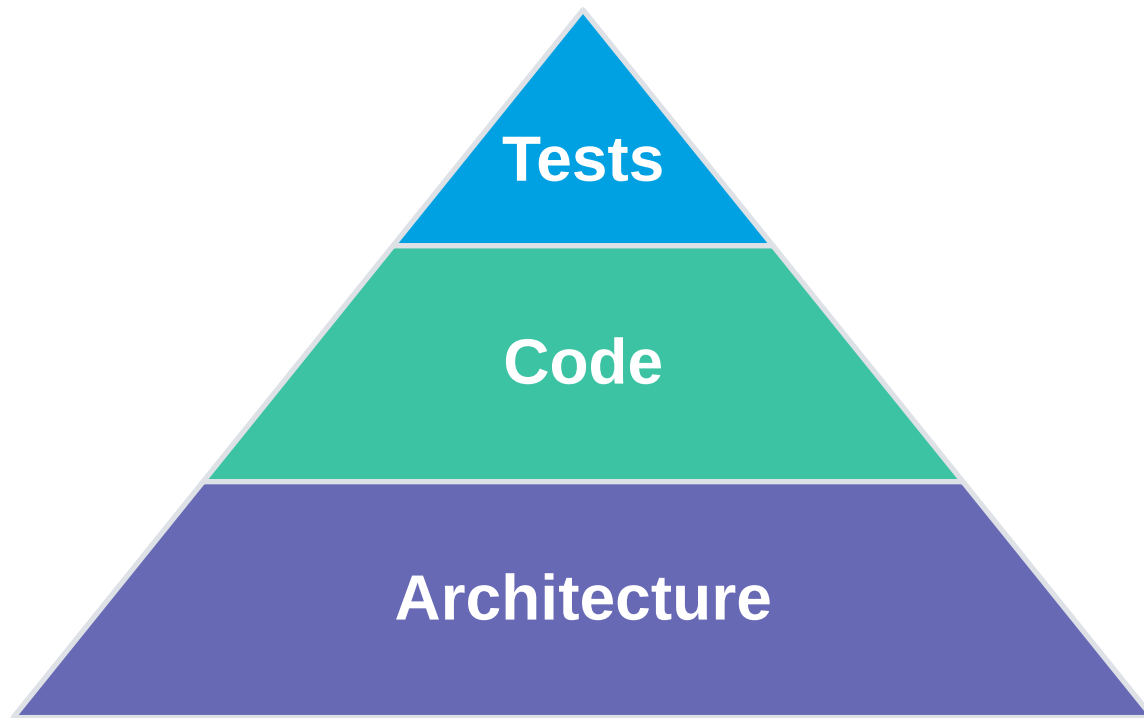
Long Tail Risks



Incident Example



Mitigating Against Systemic Issues



Mitigating Against Systemic Issues

Reducing Blast Radius



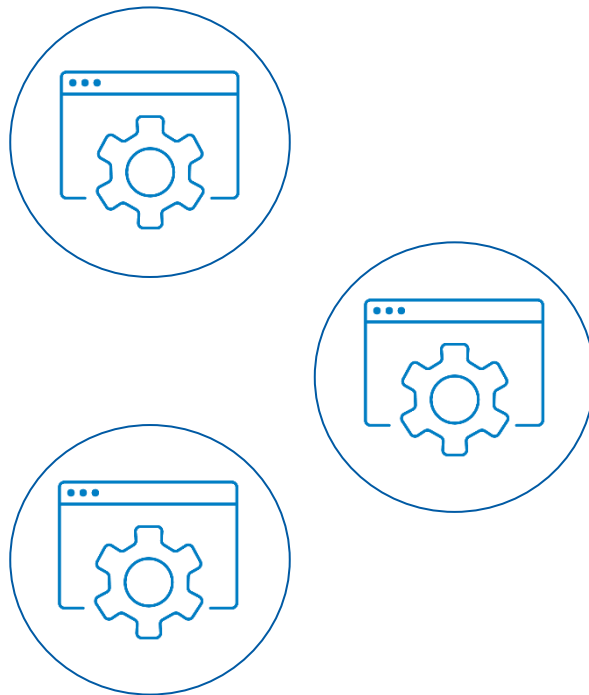
Mitigating Against Systemic Issues

Reducing Blast Radius



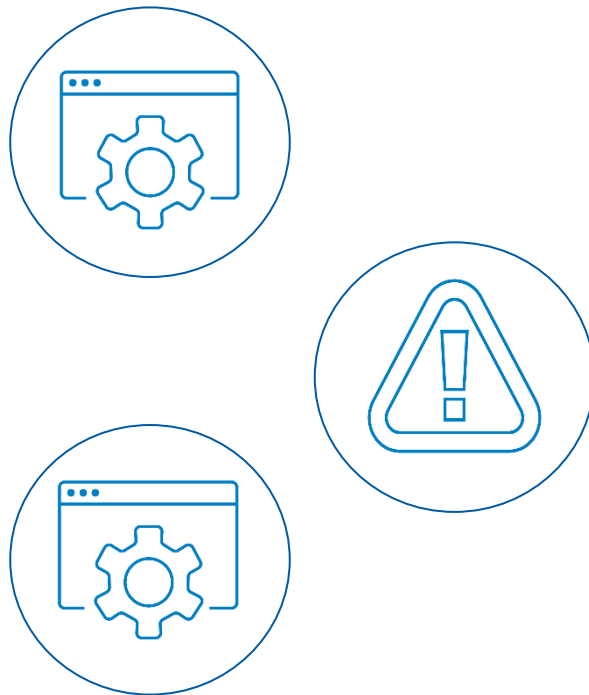
Mitigating Against Systemic Issues

Reducing Blast Radius



Mitigating Against Systemic Issues

Reducing Blast Radius



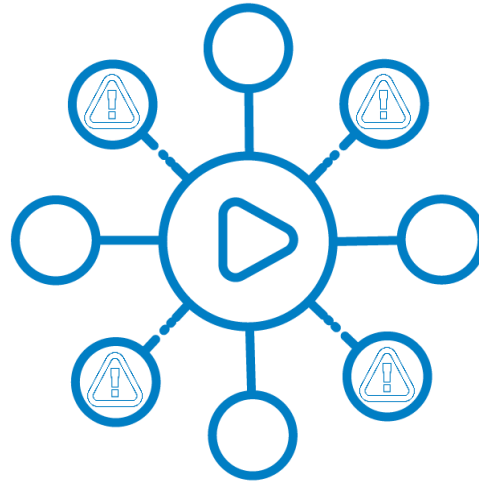
Mitigating Against Systemic Issues

Modular Functionality



Mitigating Against Systemic Issues

Modular Functionality



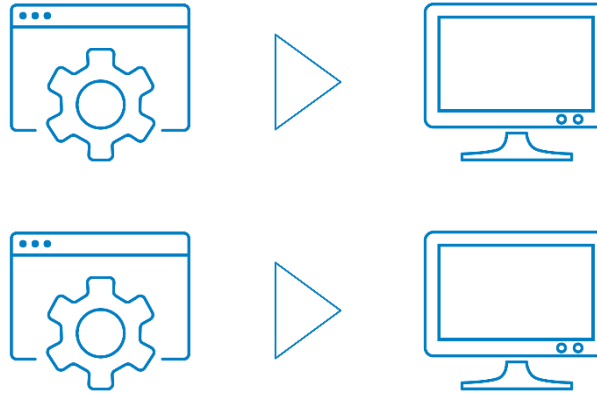
Mitigating Against Systemic Issues

Modular Functionality



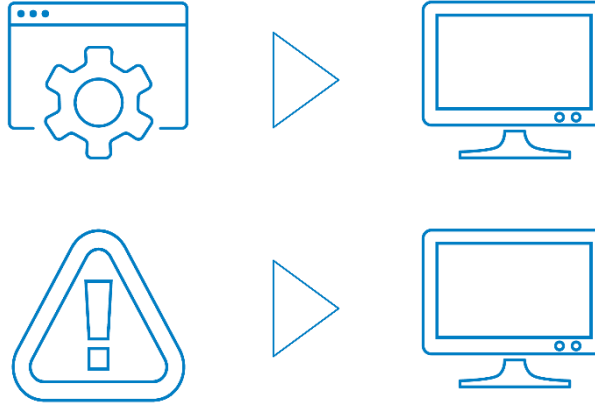
Mitigating Against Systemic Issues

Alternative System



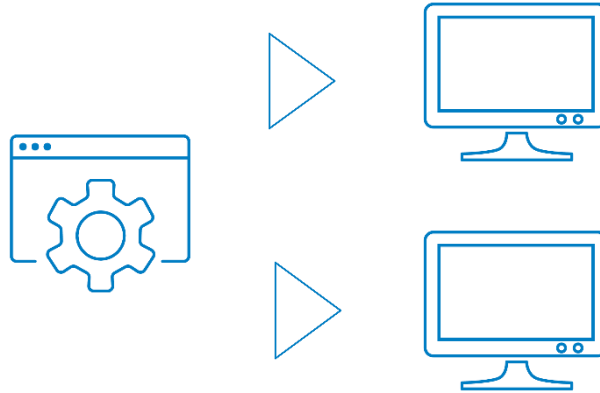
Mitigating Against Systemic Issues

Alternative System

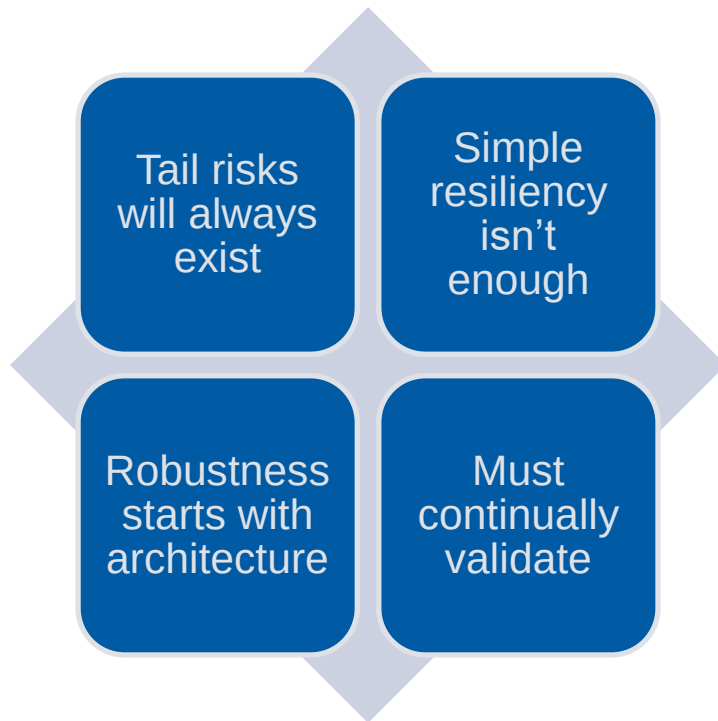


Mitigating Against Systemic Issues

Alternative System



Summary



Questions?