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EUROPE'S LEADING AEM DEVELOPER CONFERENCE

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Designing a cluster-aware application

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What is this talk about?

- Details of AEM clustering
- Its direct impact on common APIs and application patterns
- How to reflect this in your application

$ whoami

- Jörg Hoh, @joerghoh
- 10+ years experience with AEM/CQ5
- SRE @ Adobe

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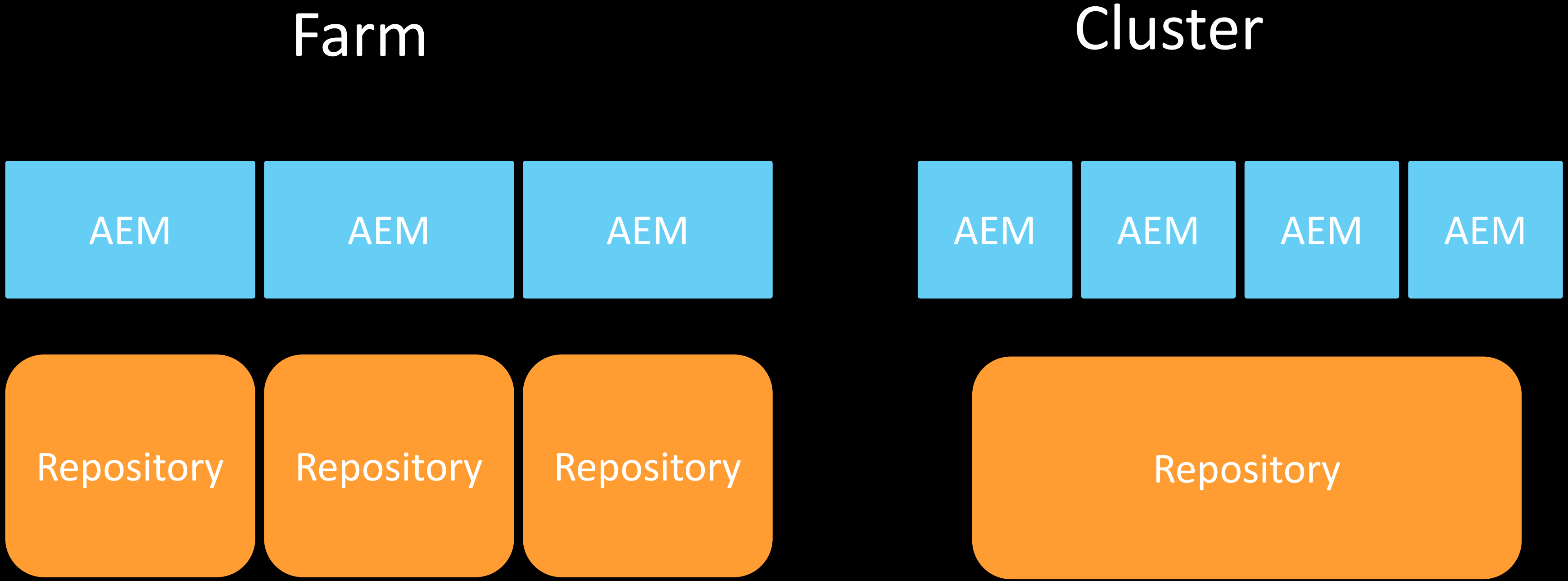
Farm vs Cluster (logical view)

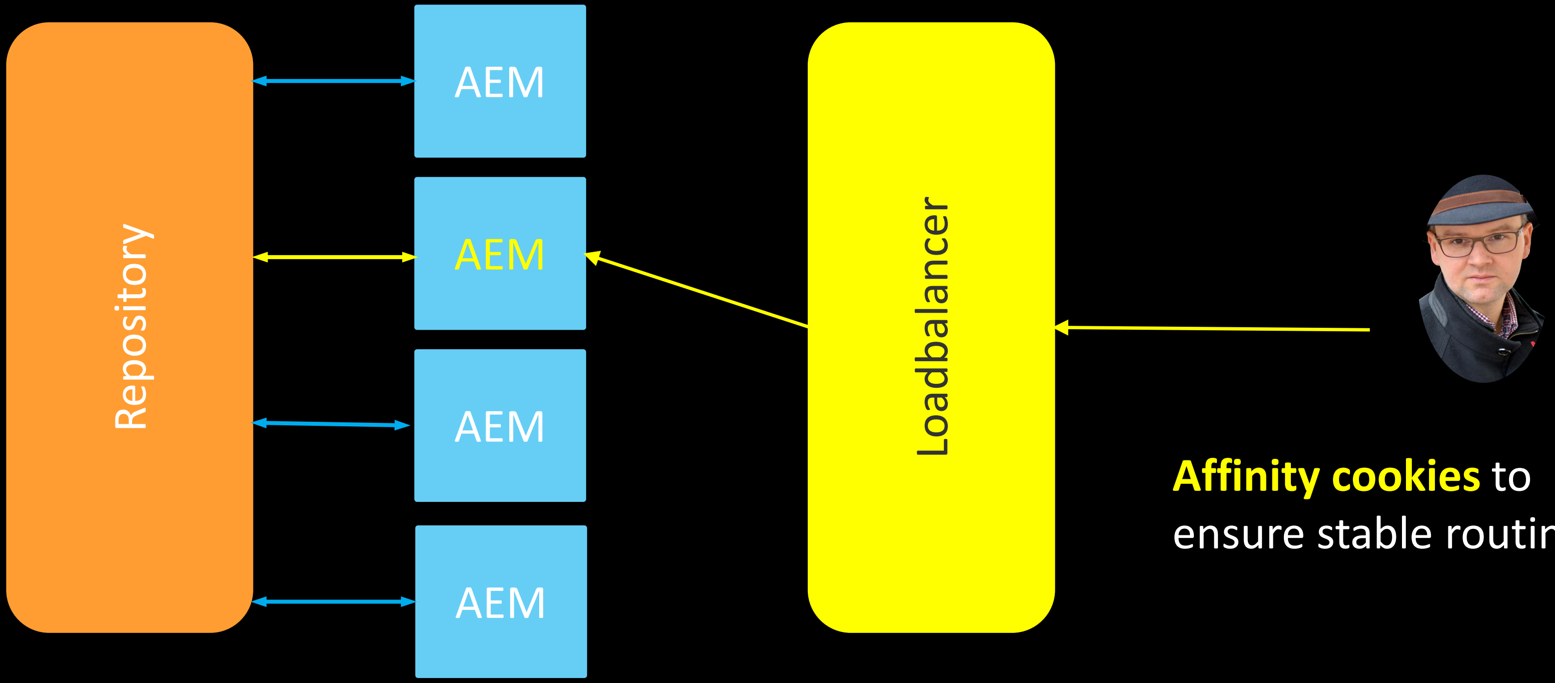


Specifics of a shared repository

- Multiple AEM instances read and write to the same repository.
- Changes made in a single cluster node can trigger changes in other cluster nodes.
- Eventually consistent

Eventual consistency

Sync delay up to 2 sec



Affinity cookies to ensure stable routing

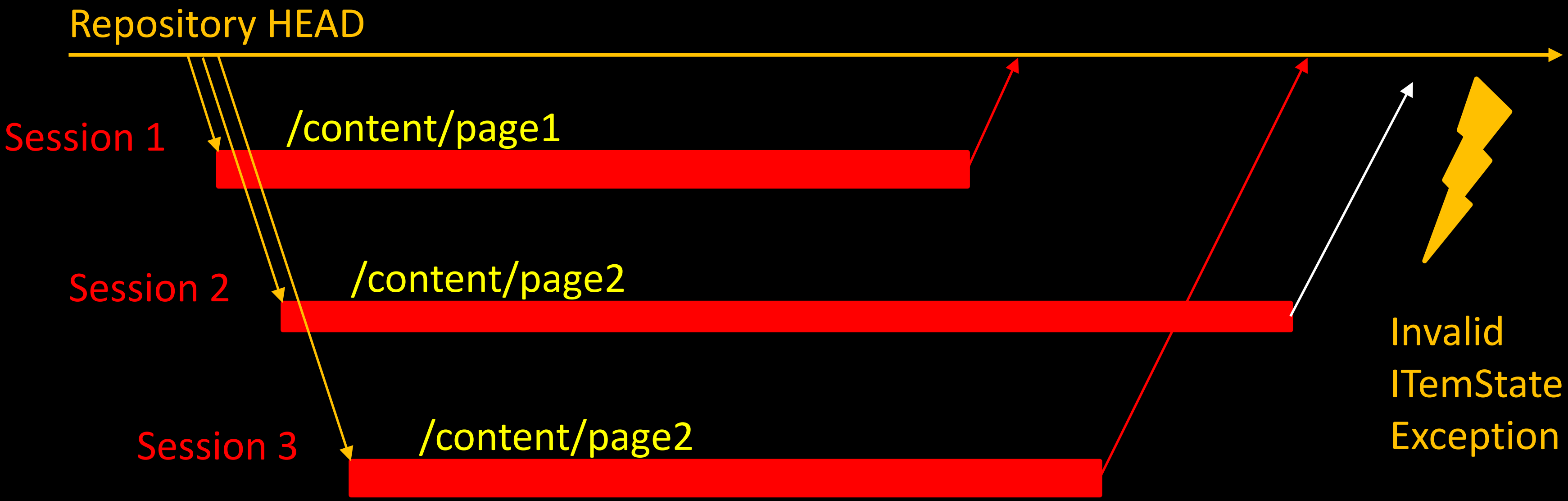
Concurrency in an AEM cluster

Same rules as in non-clustered AEM instances

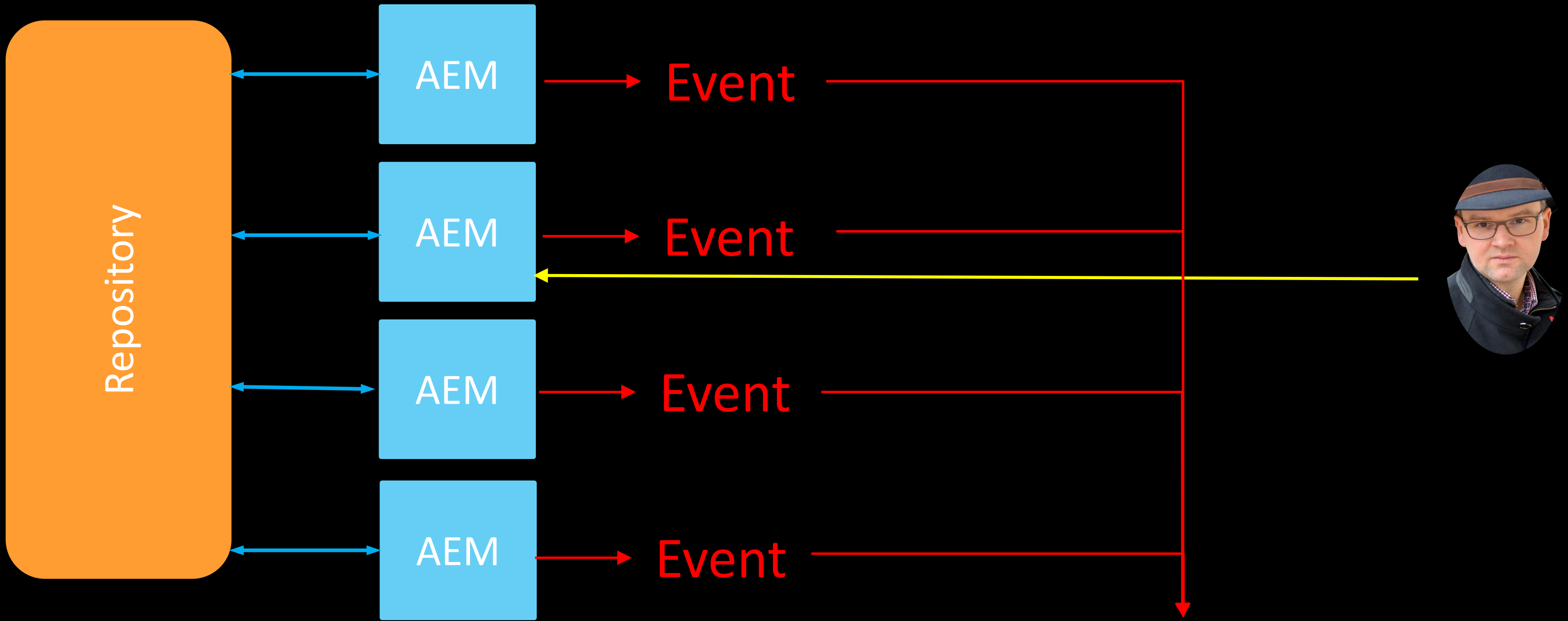
- MVCC pattern: Concurrent updates get not visible during the runtime of a session unless you invoke refresh()
- Expect InvalidItemStateExceptions when modifying nodes concurrently

Concurrent writes in an AEM cluster

Same rules as in non-clustered AEM instances



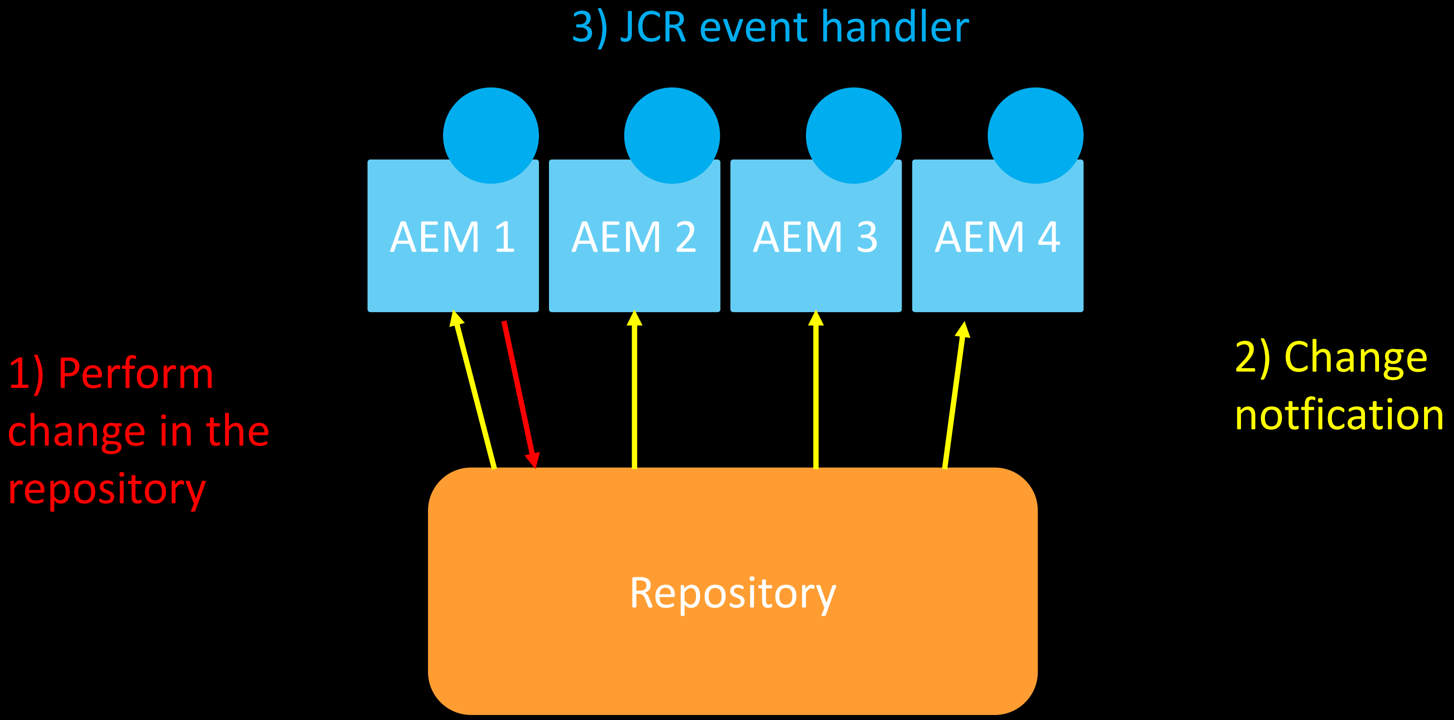
One event -- multiple event handlers



JCR Observation Listener

- By default you see all changes in the repository, including changes made on other cluster instances.
- You might handle the same event n times.
- Avoid any assumption that a local change has triggerd this event.

JCR Observation Listener



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JCR Observation – receive only local events

```
JackrabbitEventFilter ef = new JackrabbitEventFilter()
        .setAbsPath("/content/mysite")
        .setNodeTypes(new String[{"cq:Page"})
        .setEventTypes(Event.NODE_ADDED)
        .setIsDeep(true)
        .setNoExternal(true);
JackrabbitObservationManager om =
        (JackrabbitObservationManager)
        session.getWorkspace().getObservationManager();
om.addEventListener (this, ef);
```

Sling ResourceChange Event Listener

- Abstracted JCR Observation
- Just local events: implement the `ResourceChangeListener` interface
- All events: implement the `ExternalResourceChangeListener` interface

Sling Events

- Normally used just locally.
- Distributed events possible, but rarely used.
- Mark events as distributable by adding the property “`event.distribute`” to the event properties.

Sling Jobs

- Nothing has changed.
- Exactly once guarantee

AEM workflows

- Luckily, AEM takes care of that.
- Workflows can be invoked on any node, but are executed only on the cluster leader.

Scheduler

- Each clusternode has its own scheduler.
- Support to run only once in a cluster (property “scheduler.runOn=LEADER”)
    - These jobs will only start on the cluster leader.

Usecase: cache

- In memory caches must always reflect the current state of content in the repository.
- It must not be maintained by the code modifying this content, but only by JCR Observation / ResourceChangeListener

Usecase: Execute a task exactly once

- Easiest: When there is a triggering action, let this action create a Sling Job or workflow.
- Scheduled job (”scheduler.runOn=LEADER”)
- Trigger it externally via a request

Conclusion

1 change -> multiple events

- Check all your event handlers!
- Do you have code, which needs to run exactly once?

Conclusion

Eventual consistency

- Respect the affinity cookie!

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Thank you

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