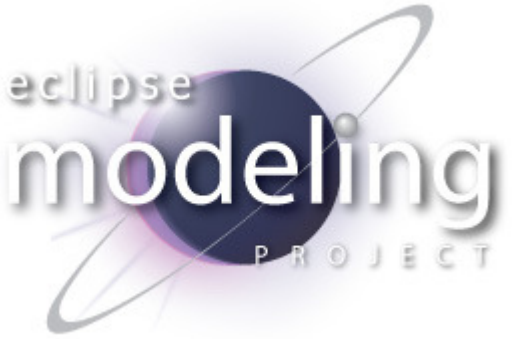

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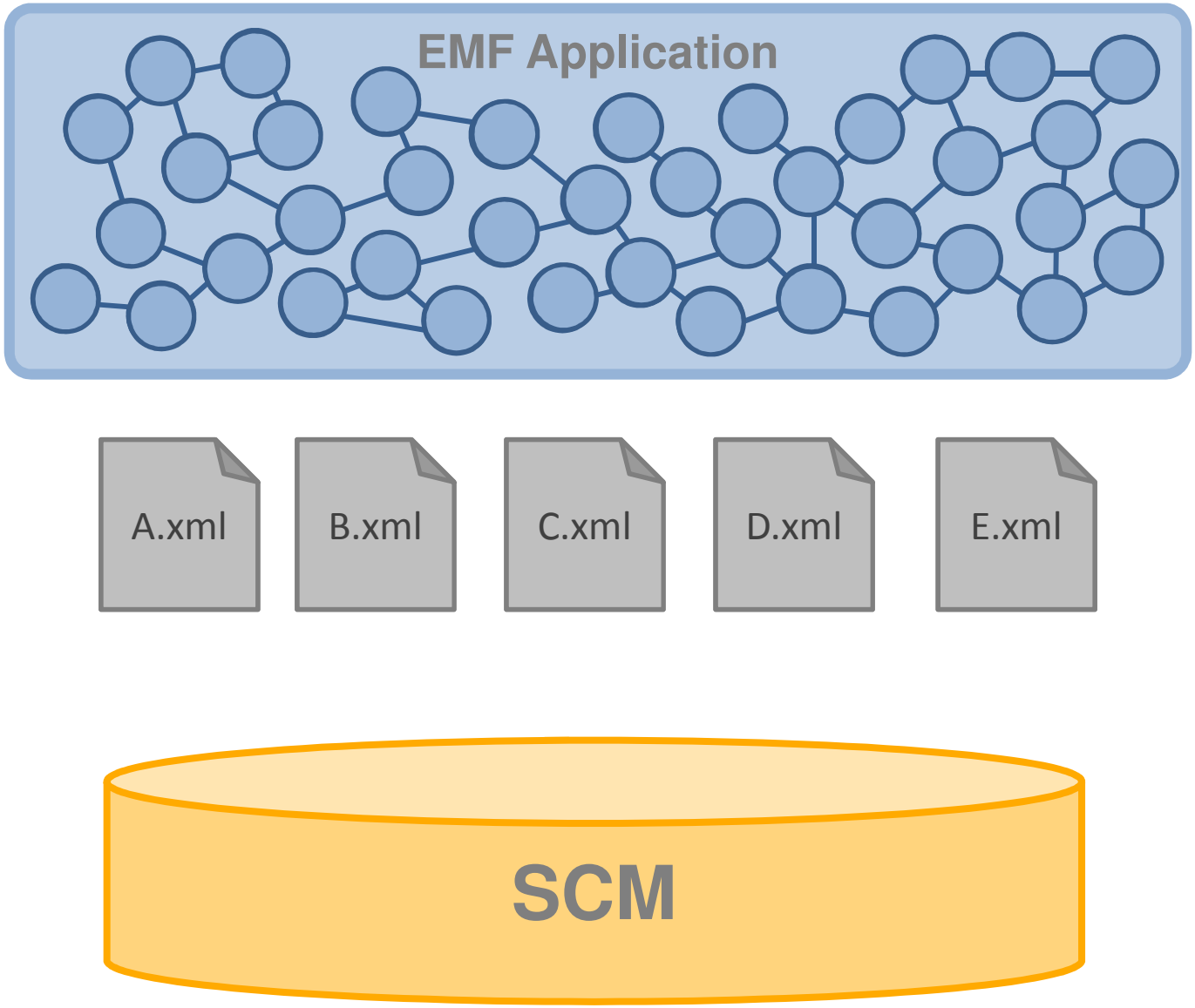
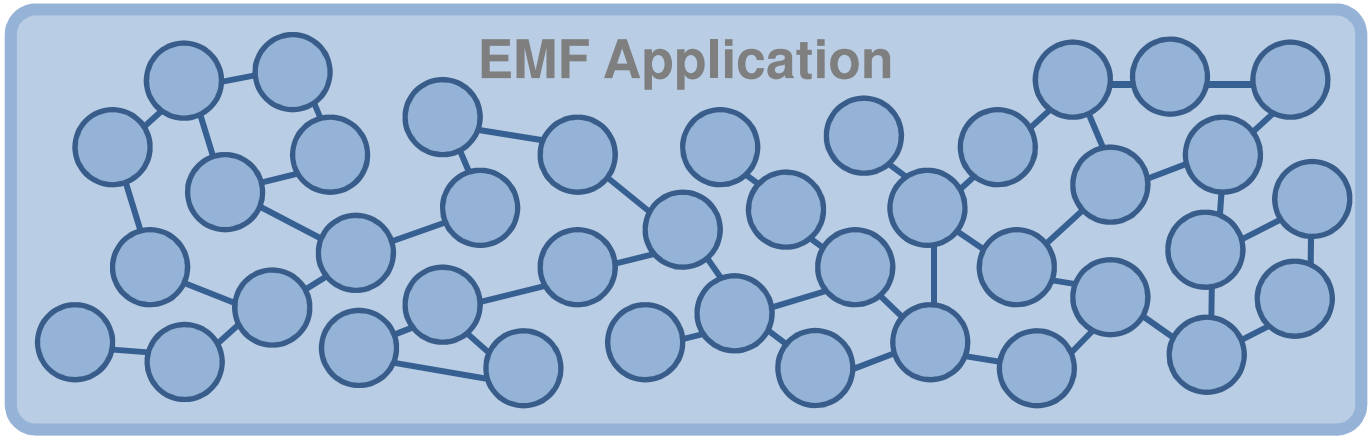
Scale, Share and Store your Models with CDO

EclipseCon Talk, March 24, 2010

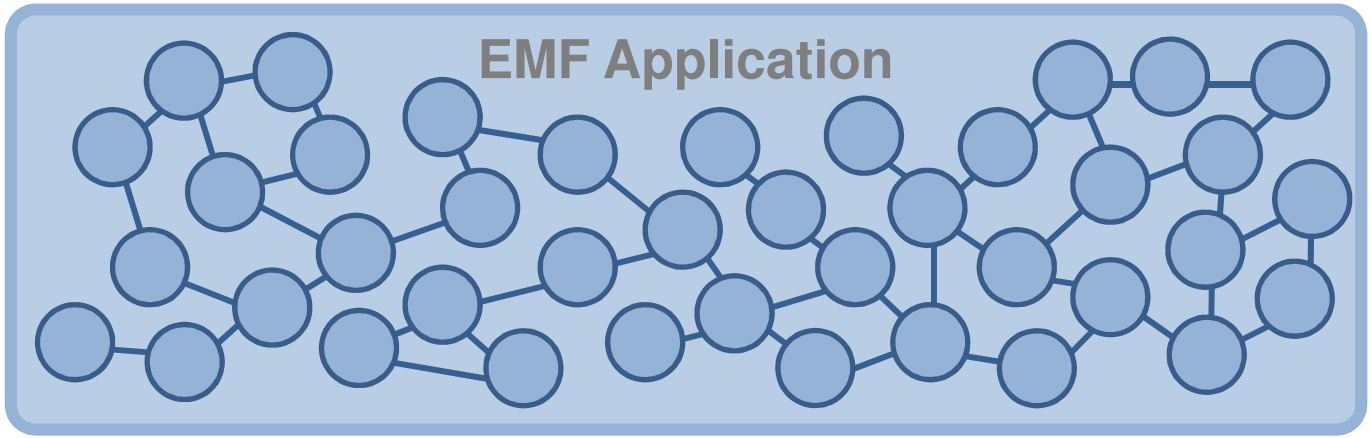
Wednesday, 14:30, 50 minutes | Stevens Creek

7 · 8 · 9 · 10 · 11 · 12 · 13 · 14 · 15 · 16



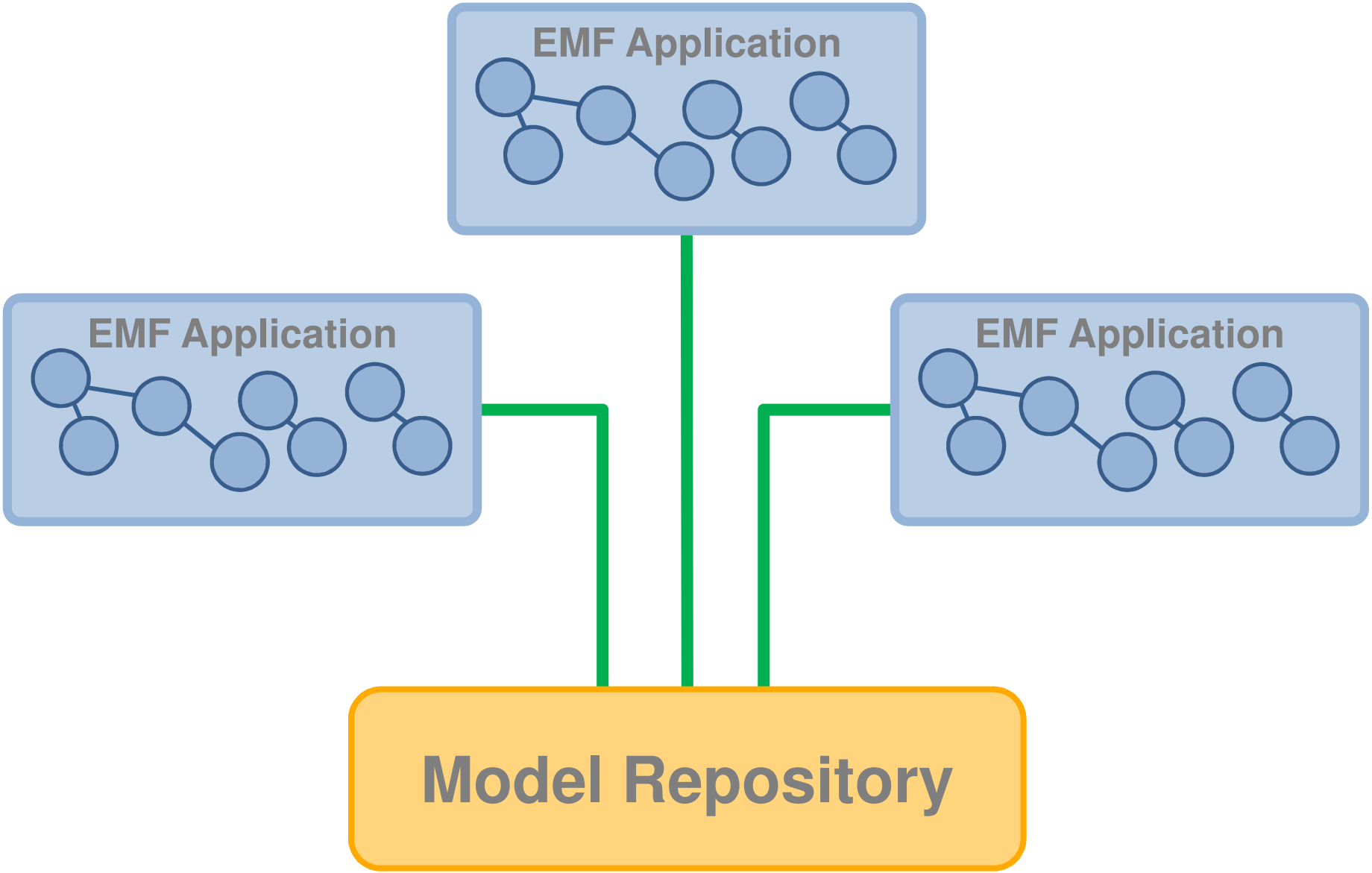


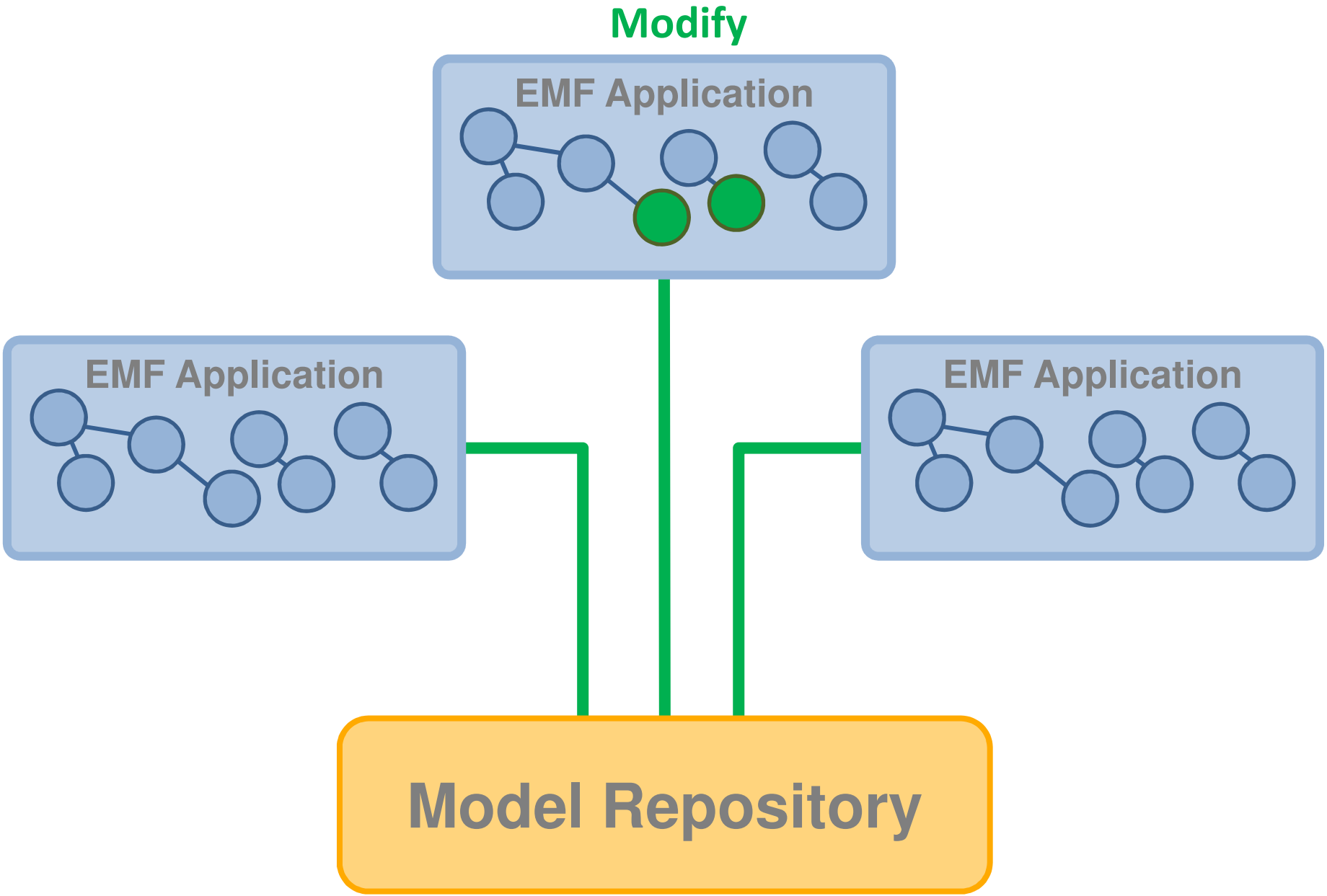
- Huge models require lots of smaller files
- Partitioning must be done at design time
- Saving changes is not transactional safe
- Loading single objects is still impossible
- Garbage collection of objects is impossible
- Conflicts must be resolved in text form
- No change notifications to other clients

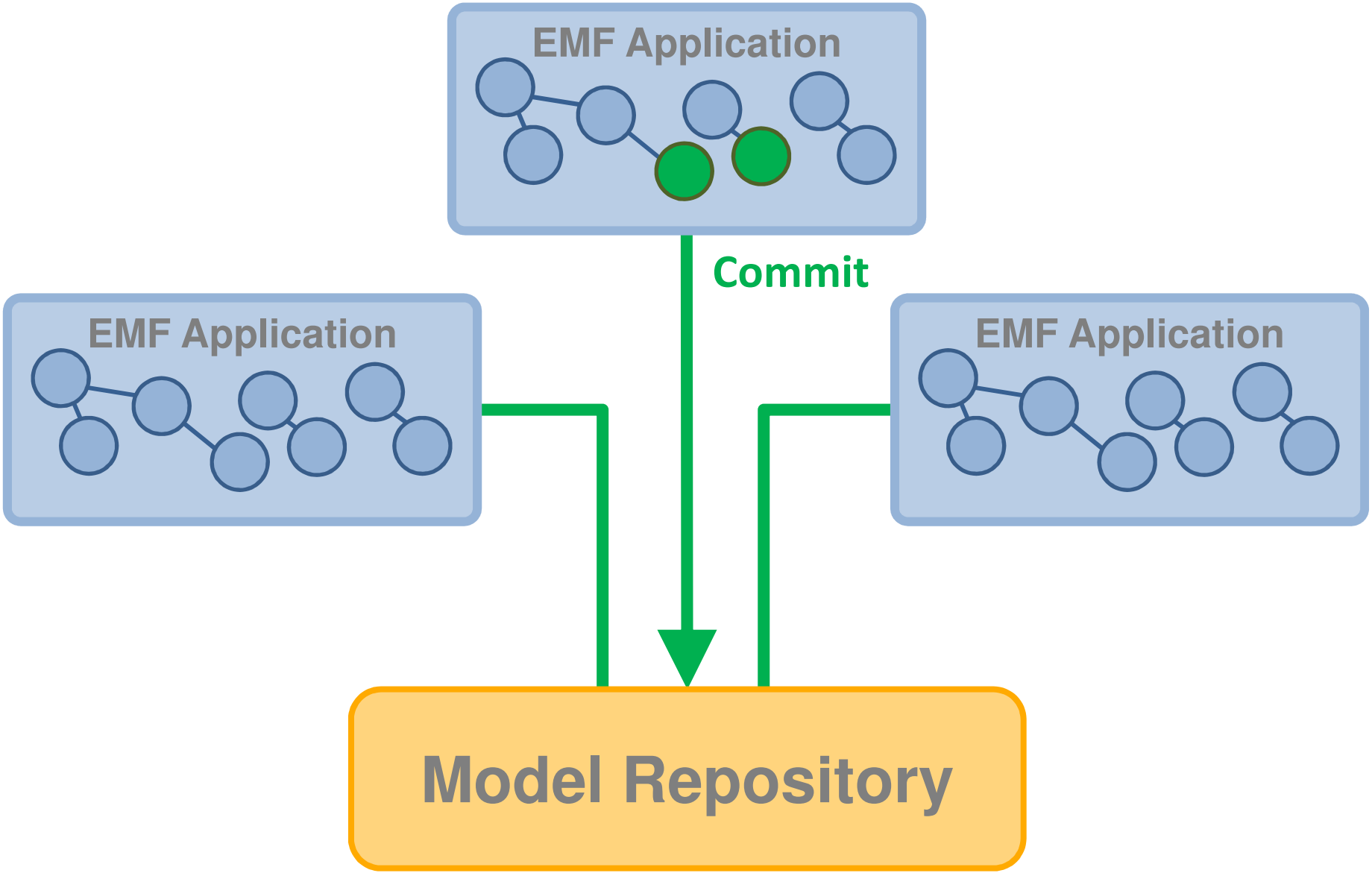


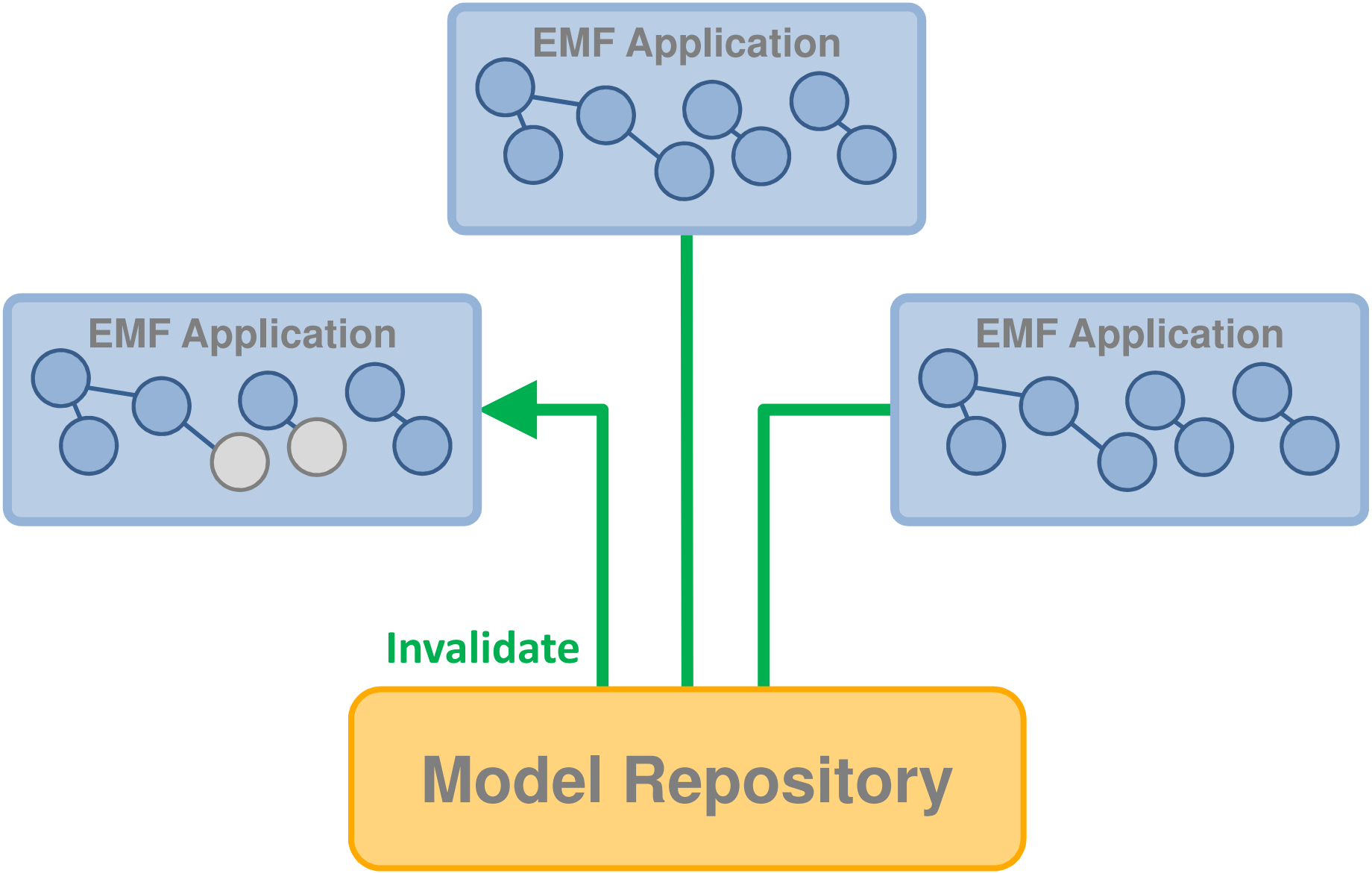
Does not scale well

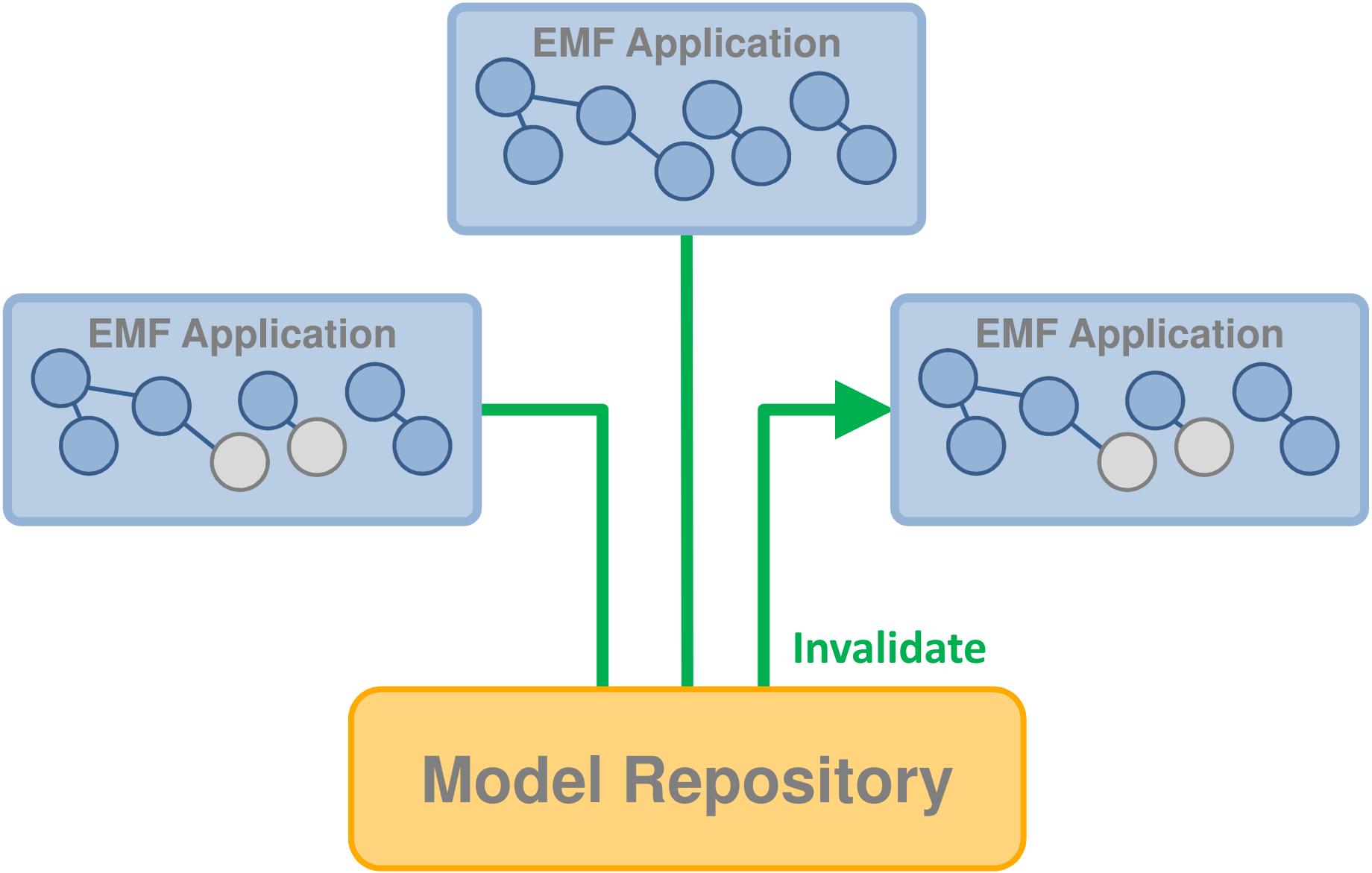
Not suitable for multi-user

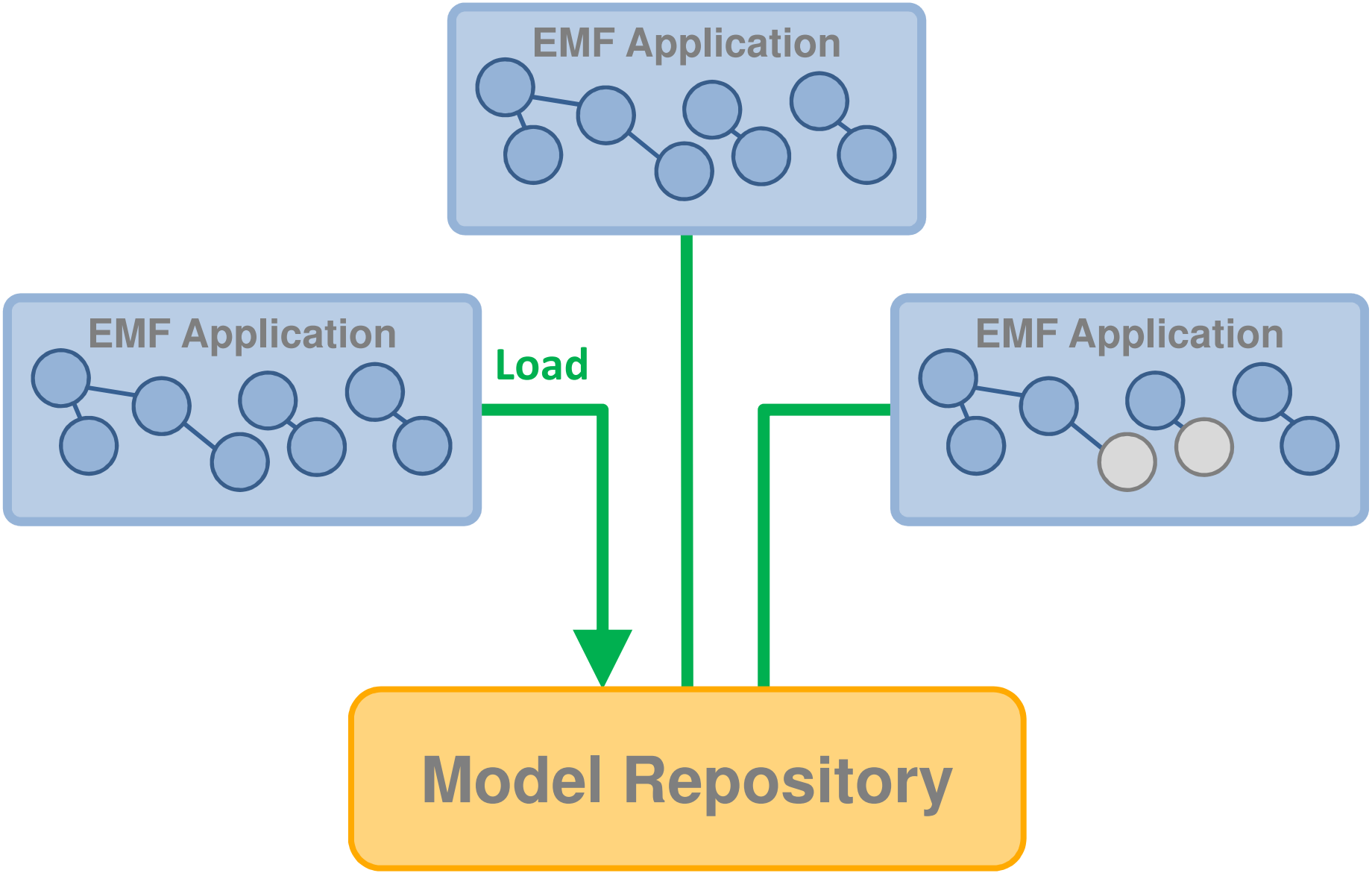


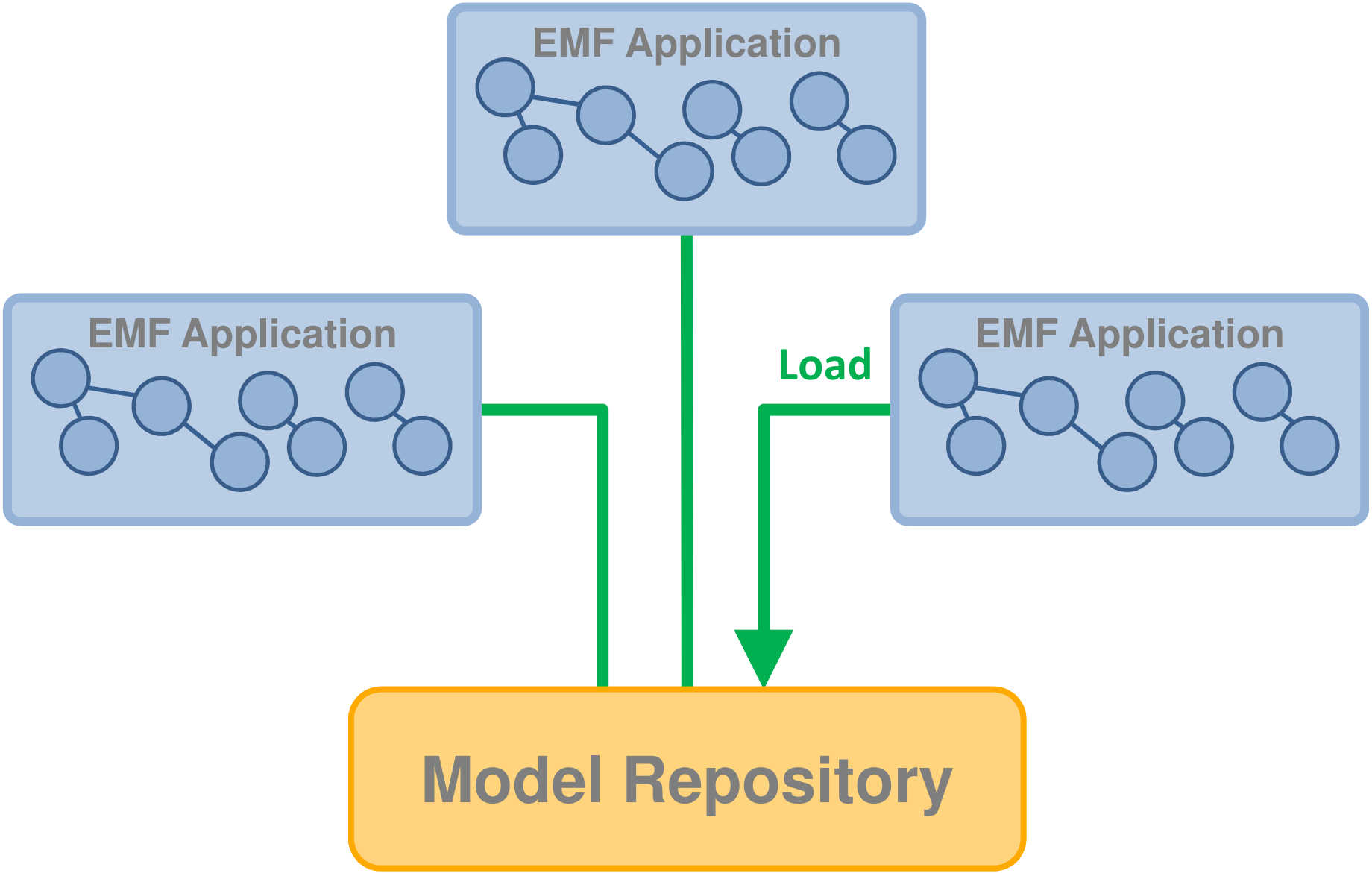


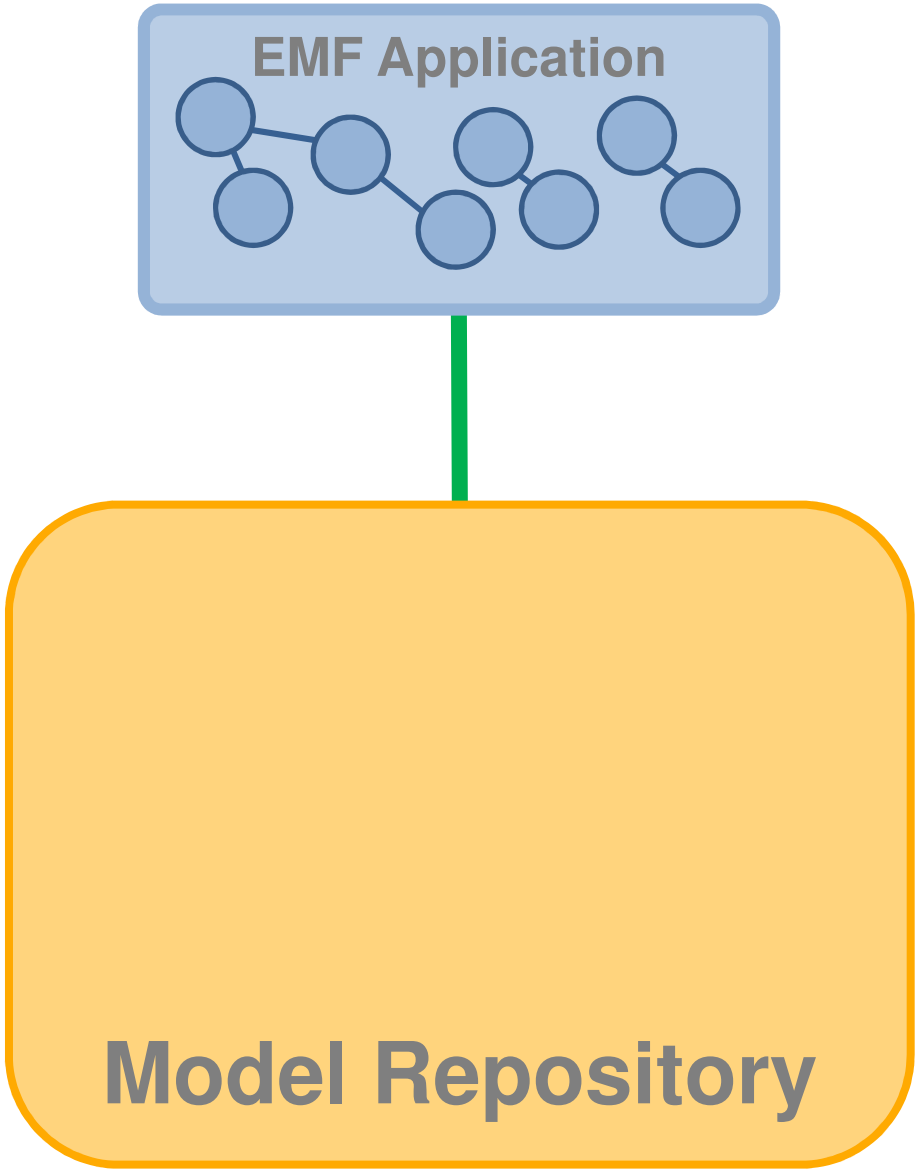


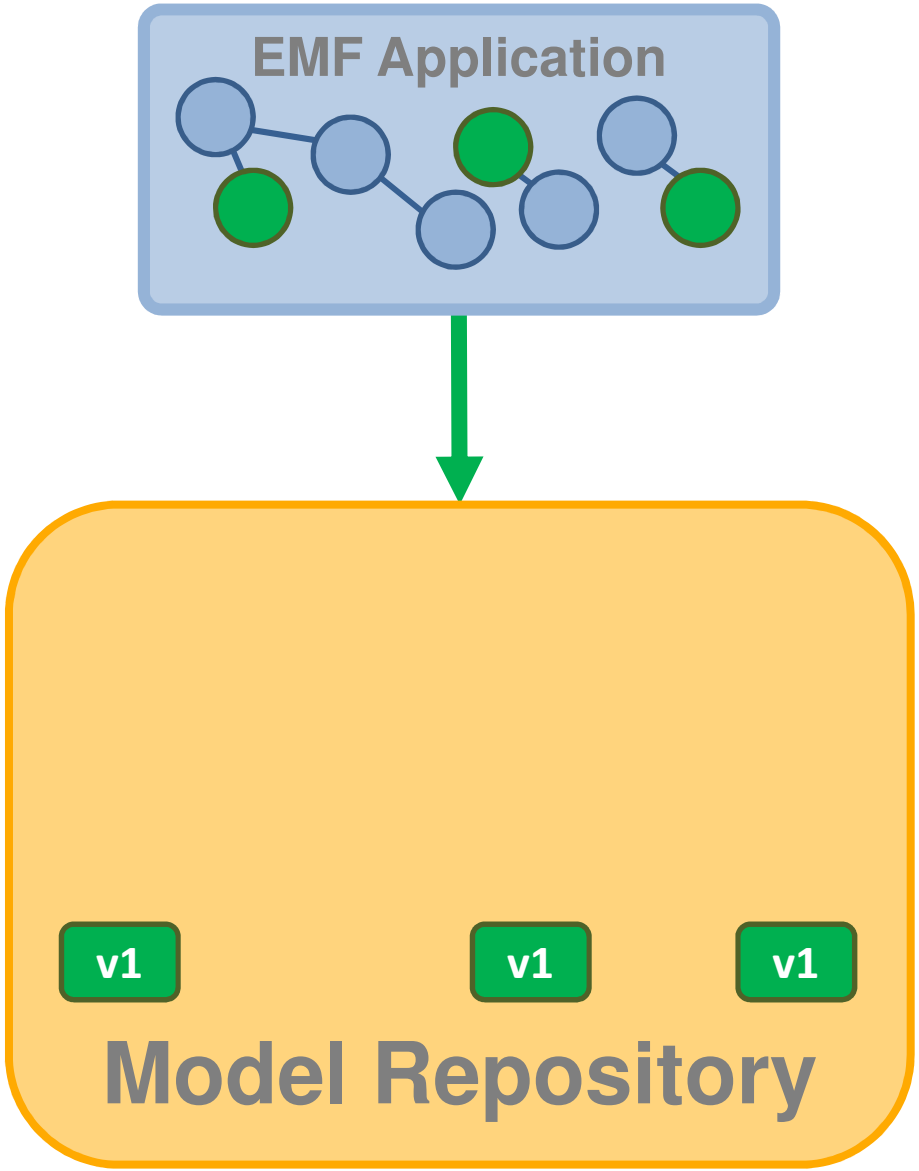


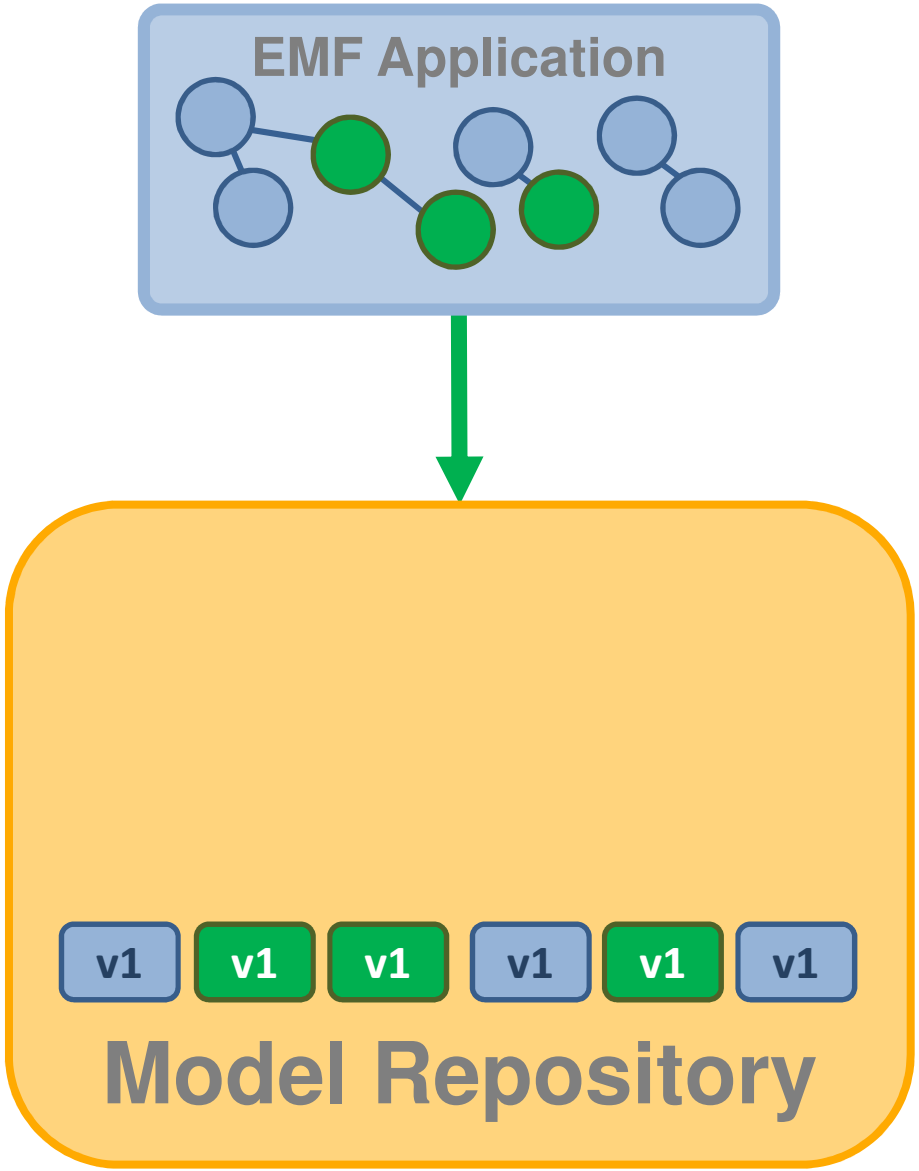


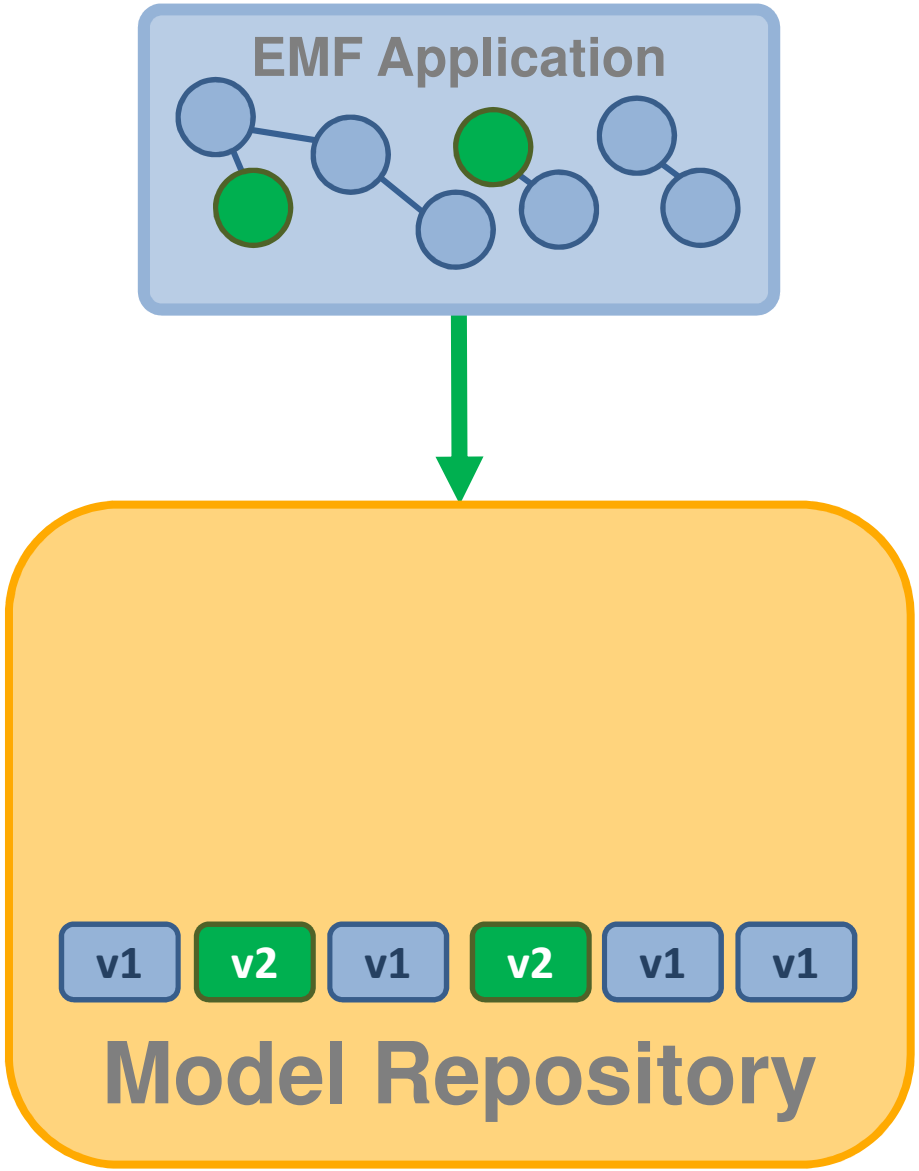


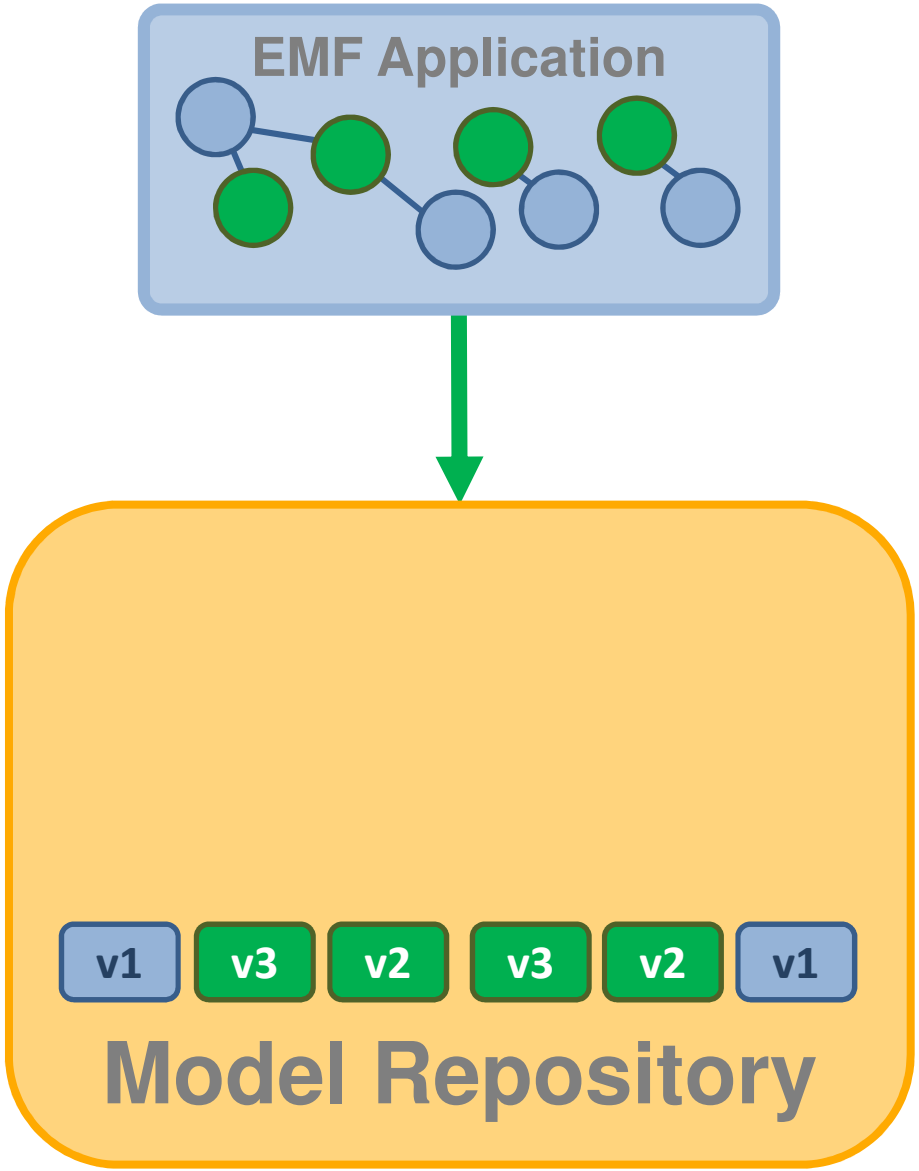


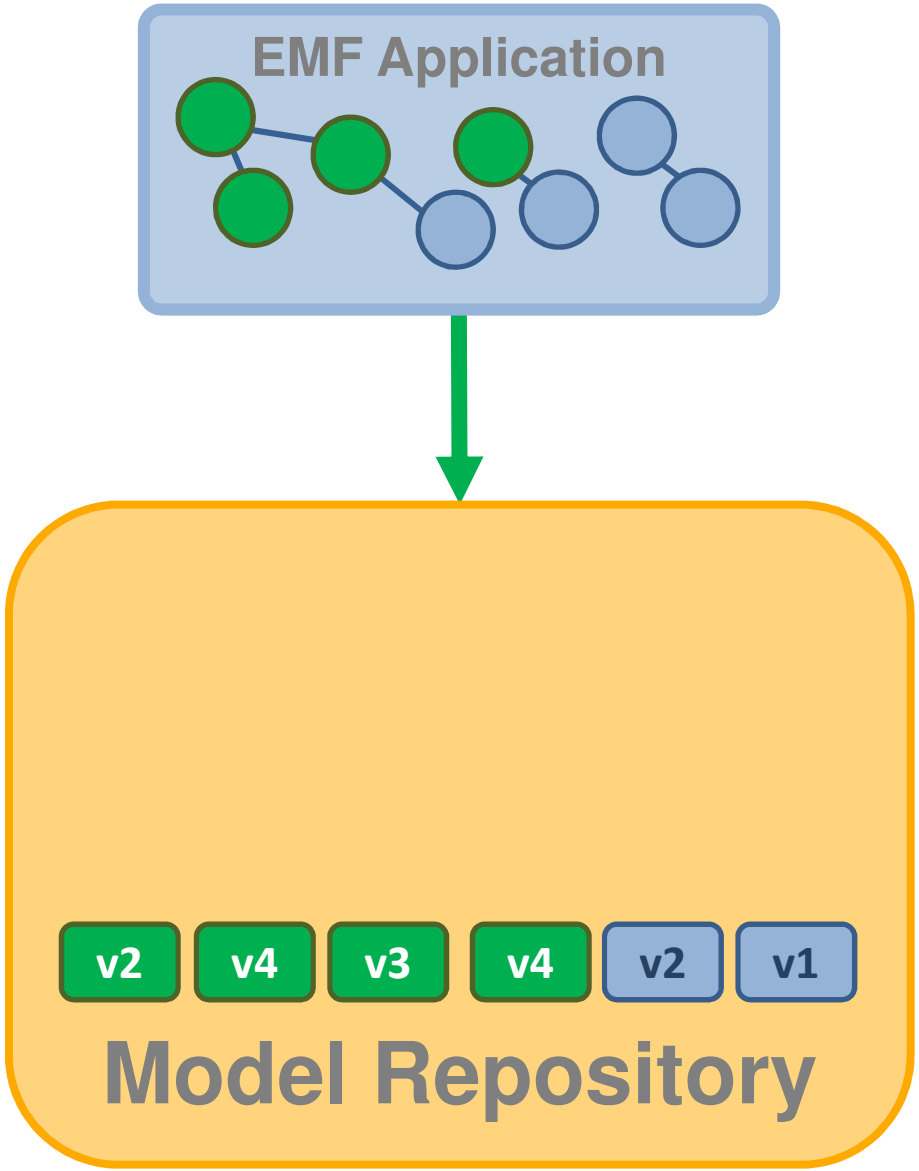


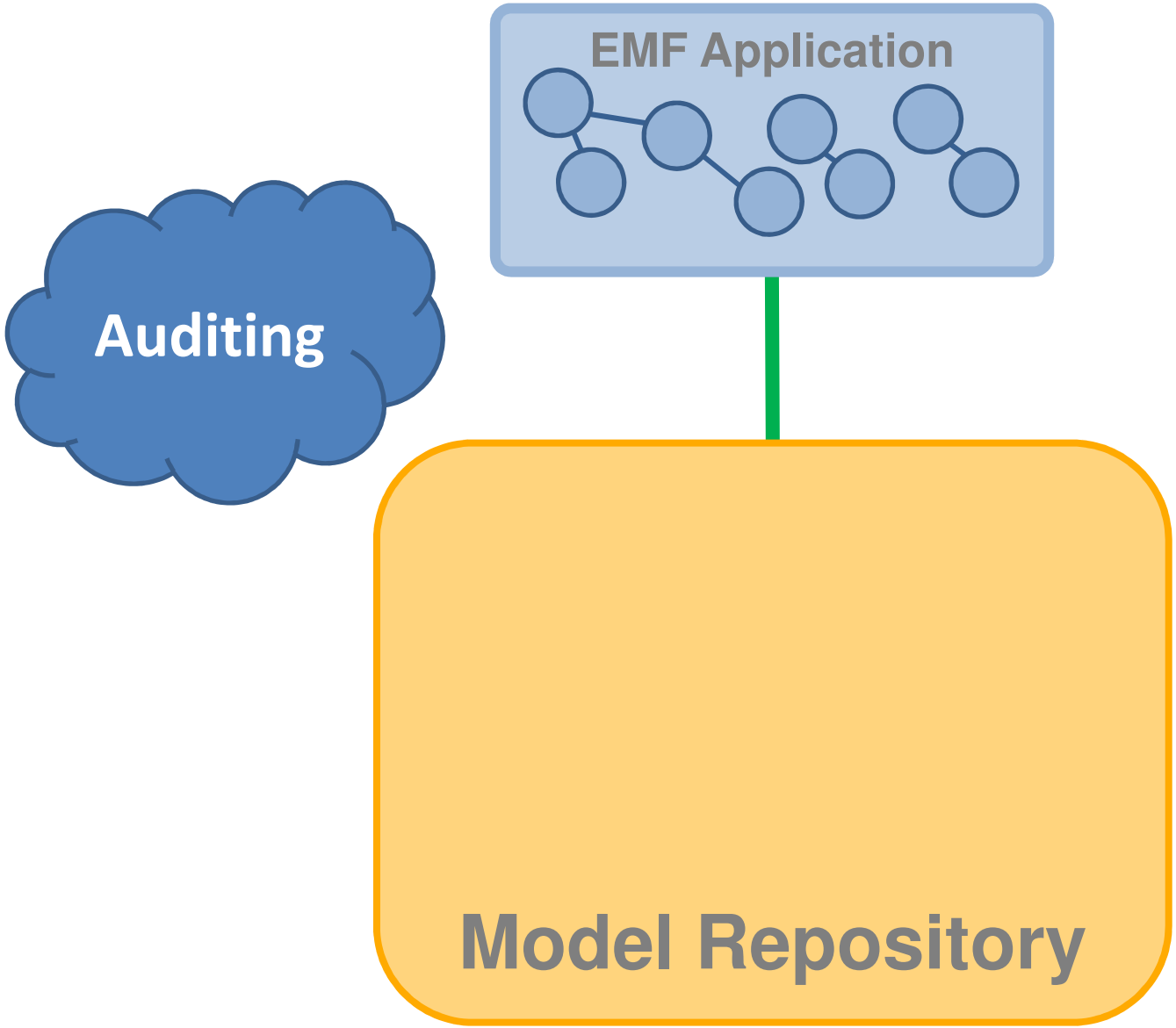


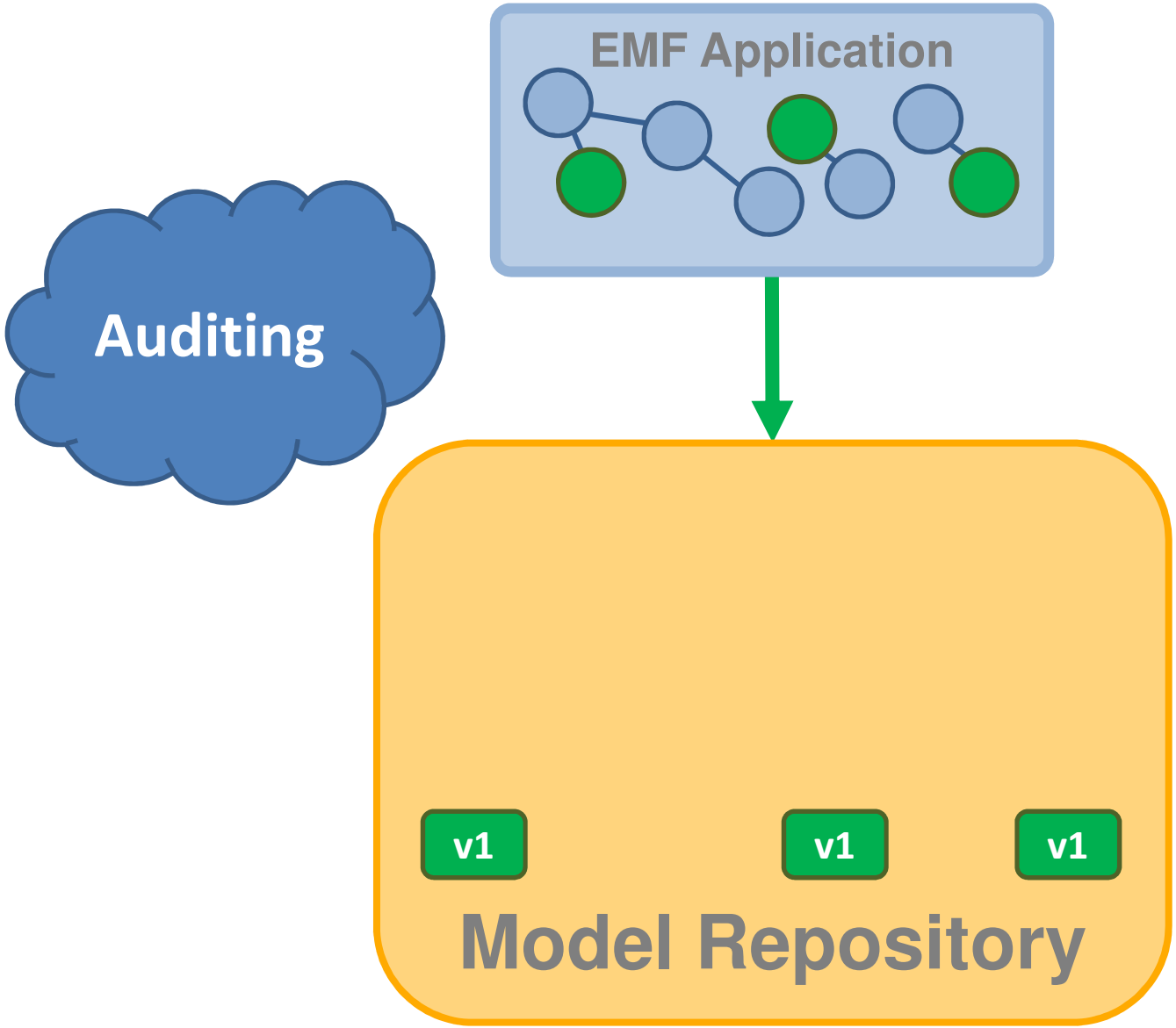


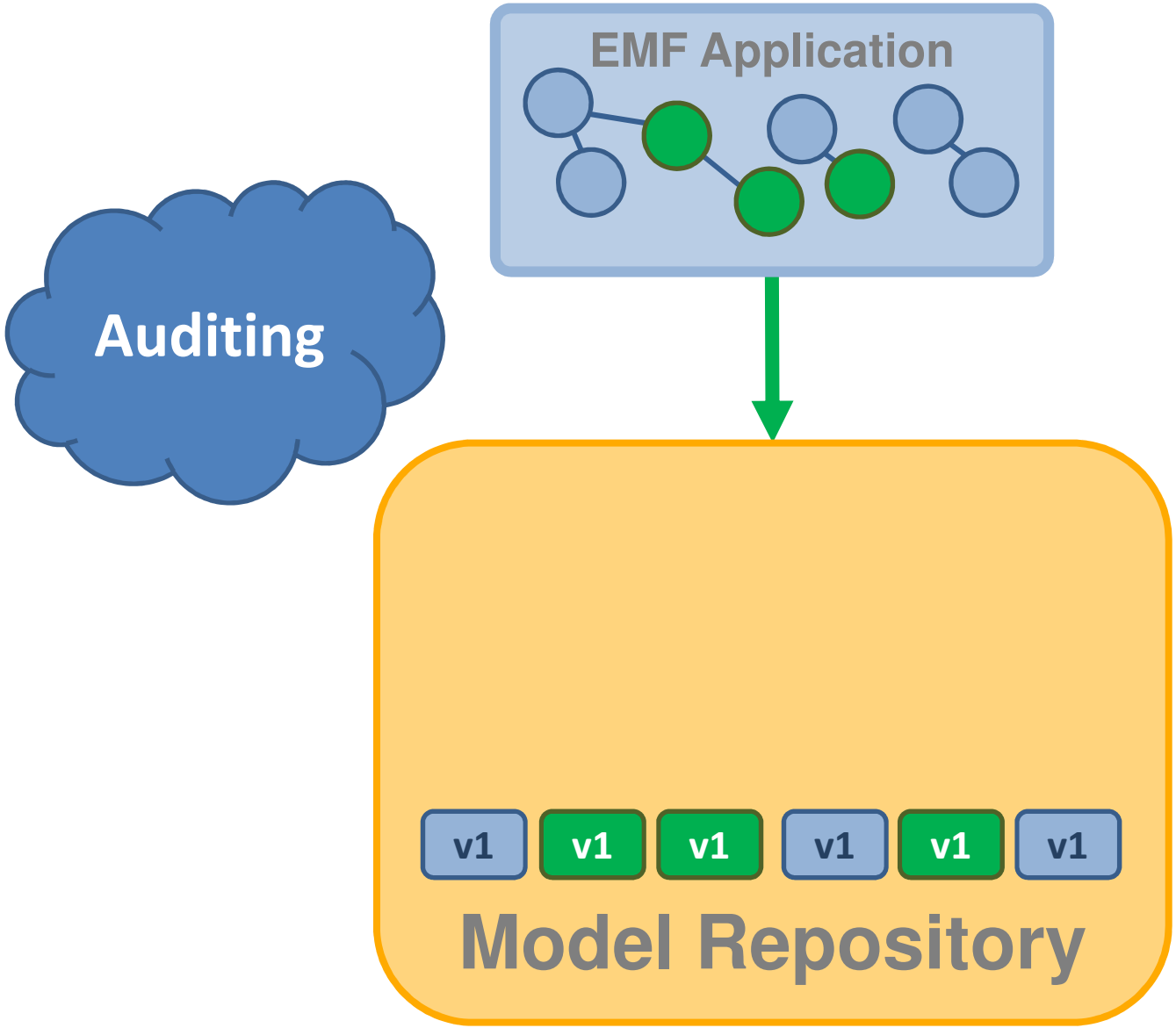


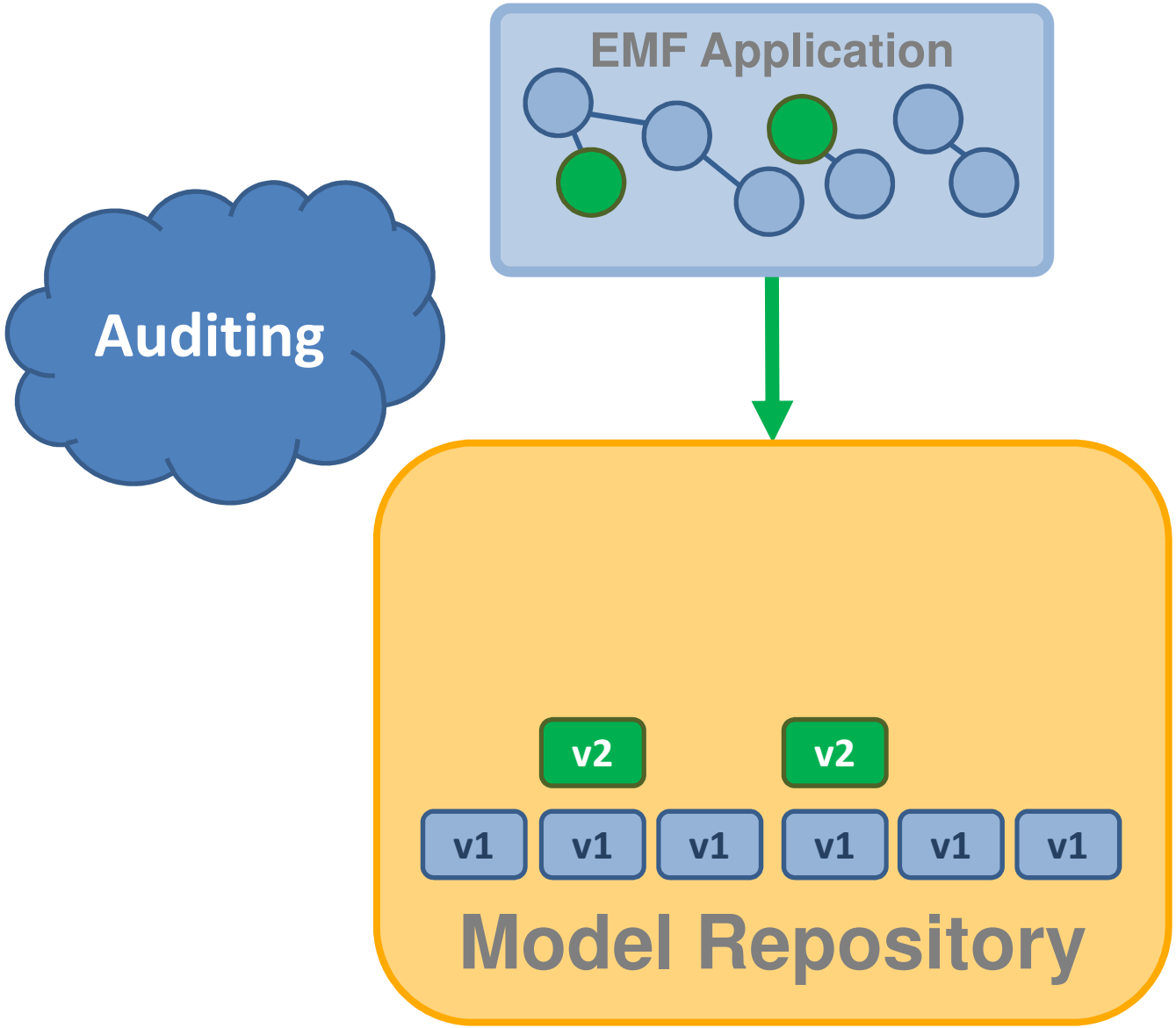


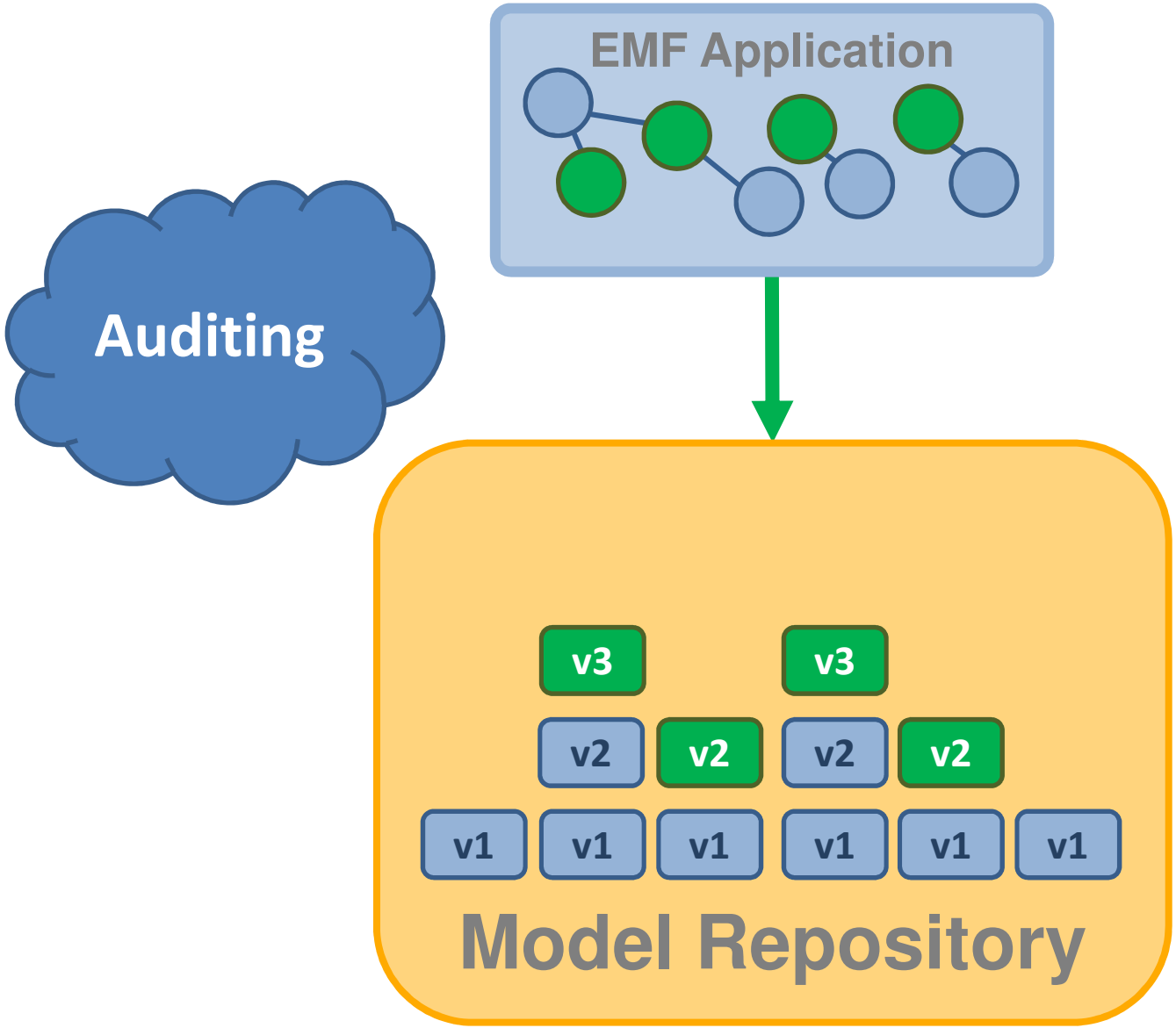


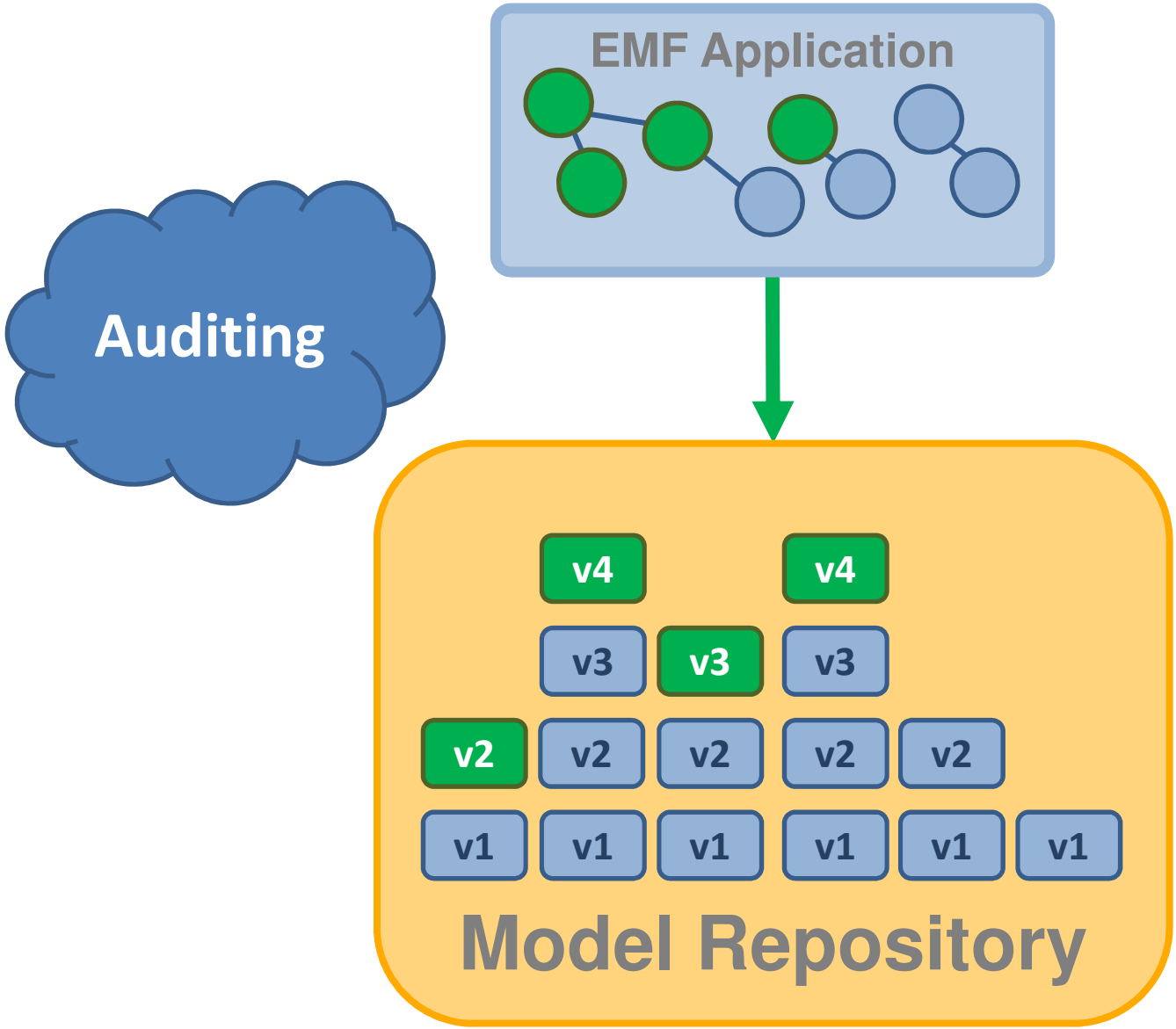


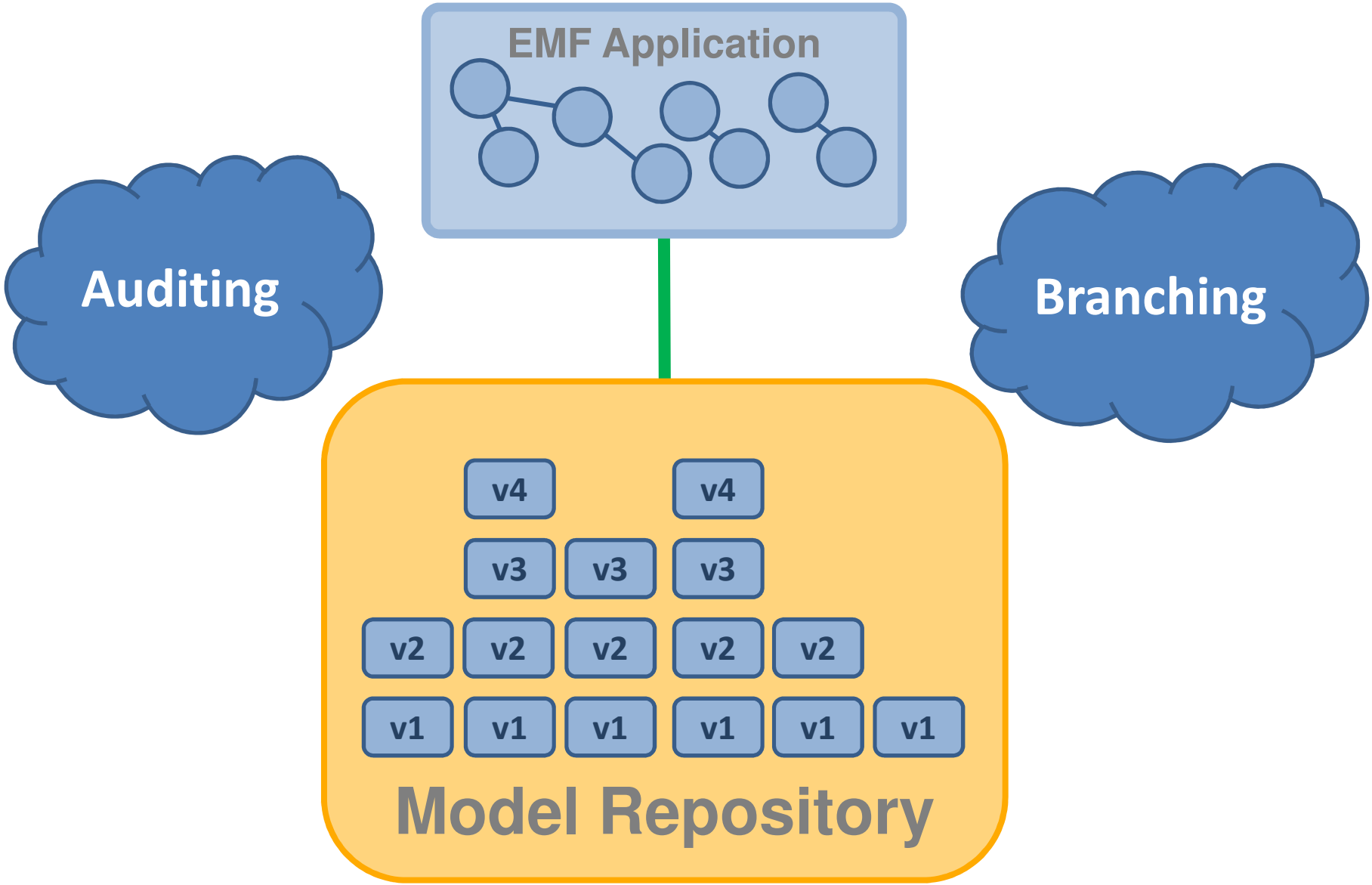


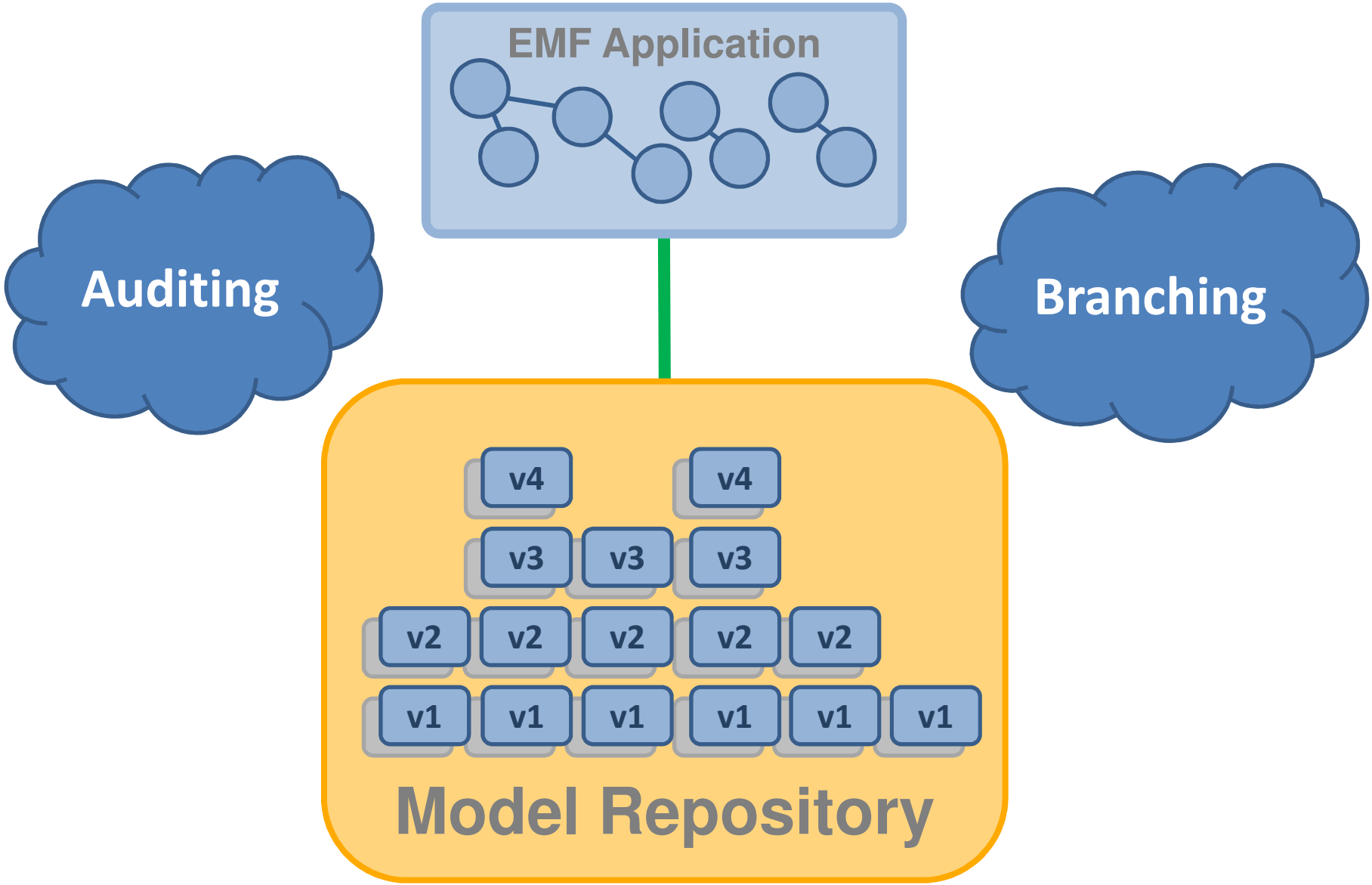


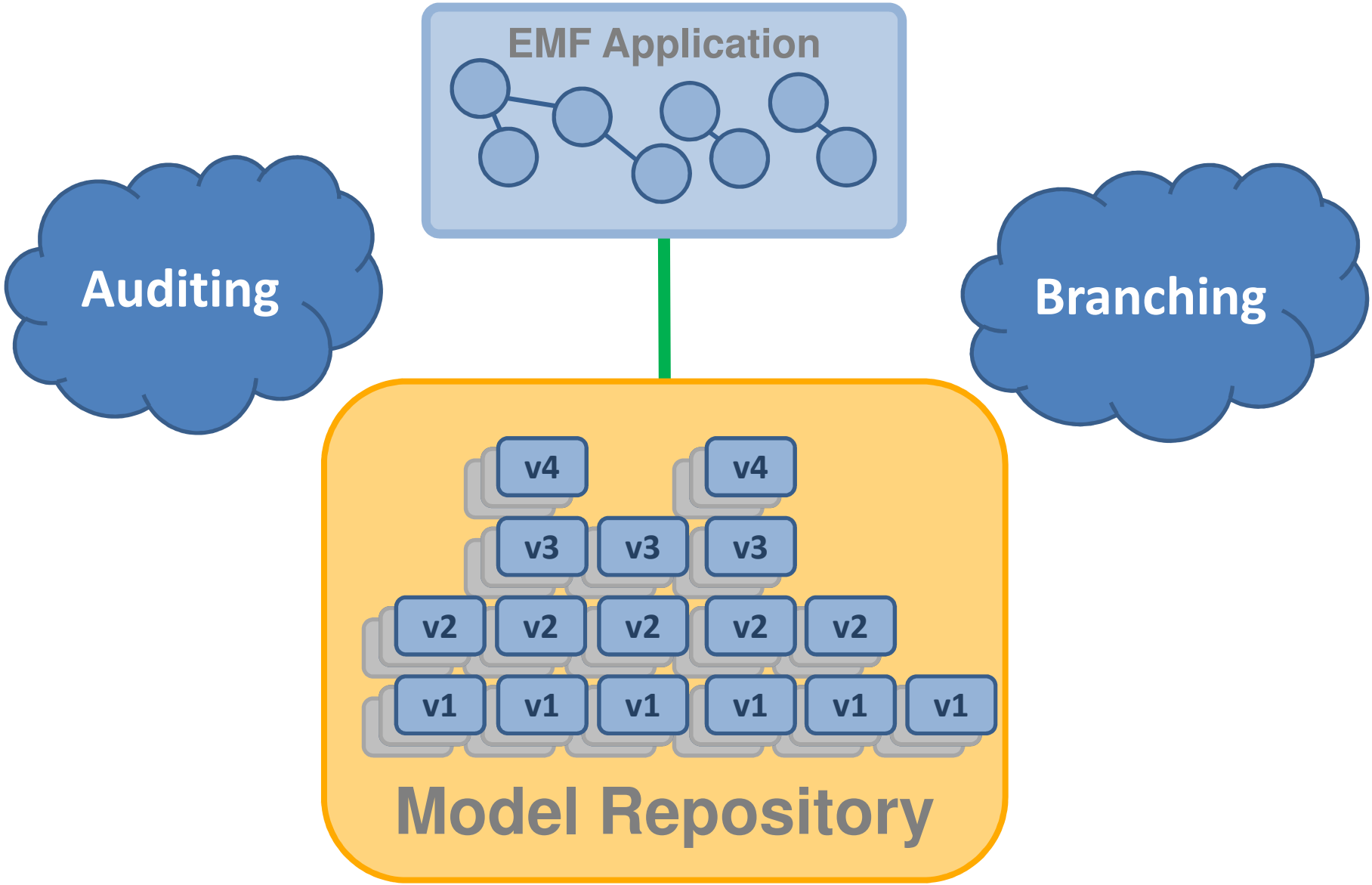


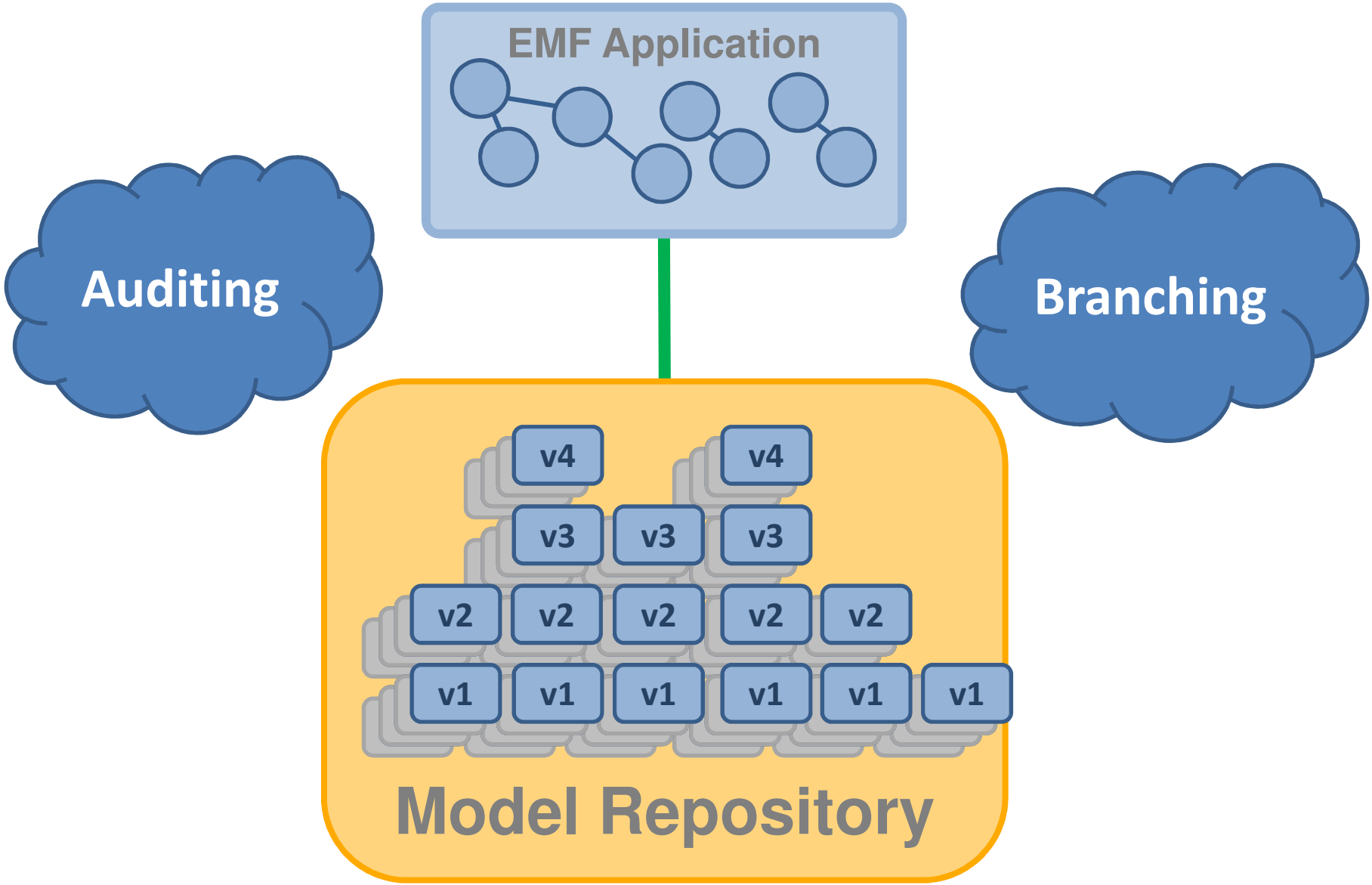


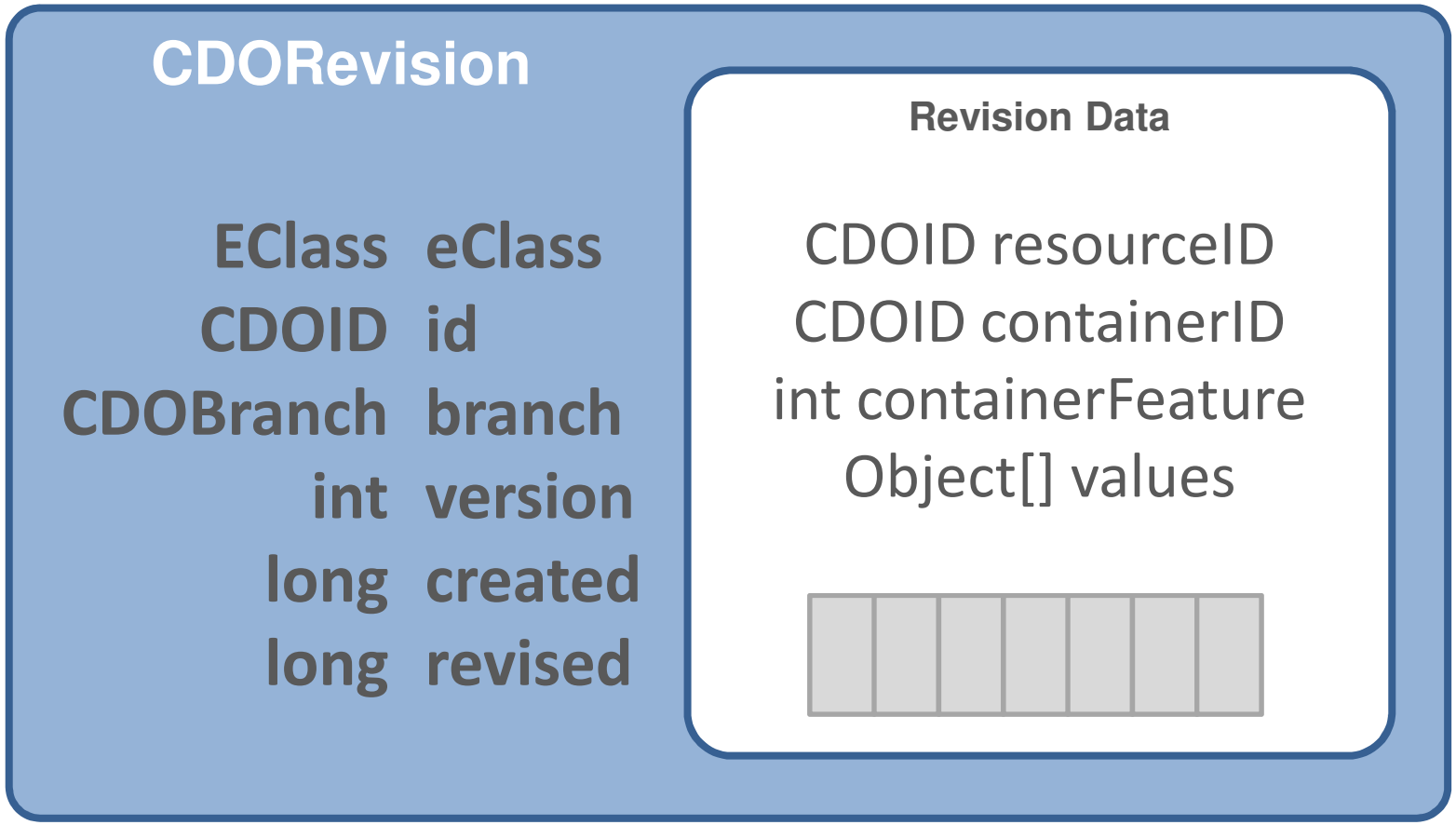


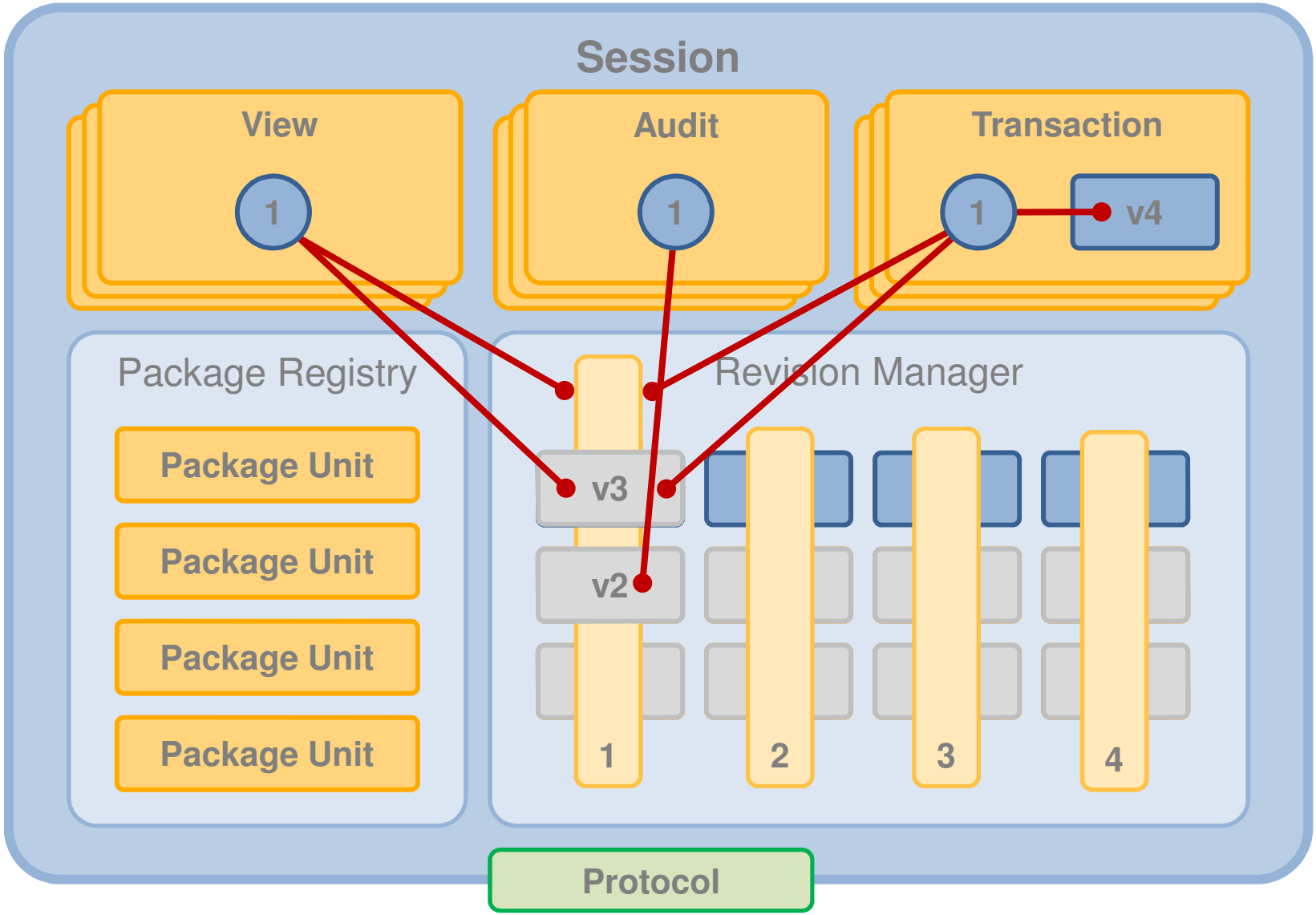






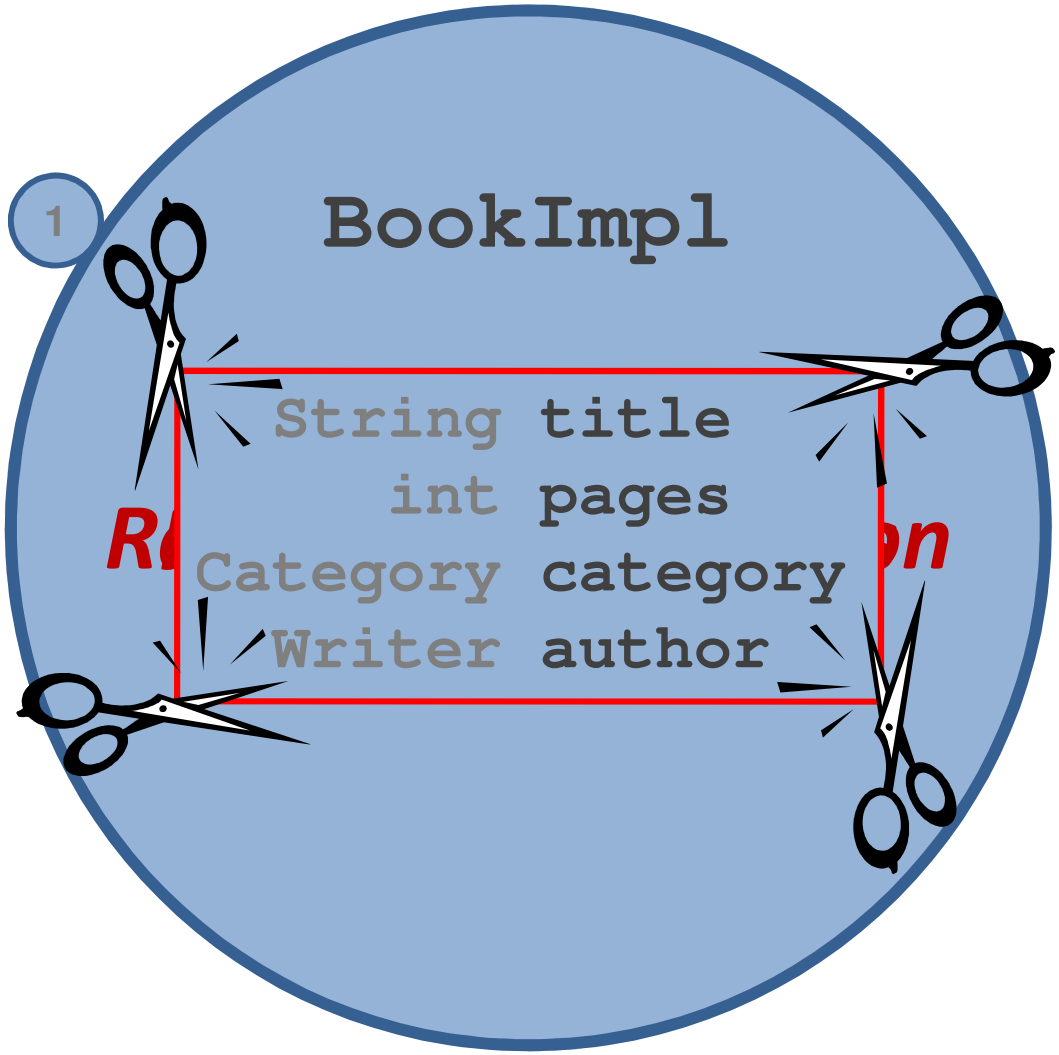


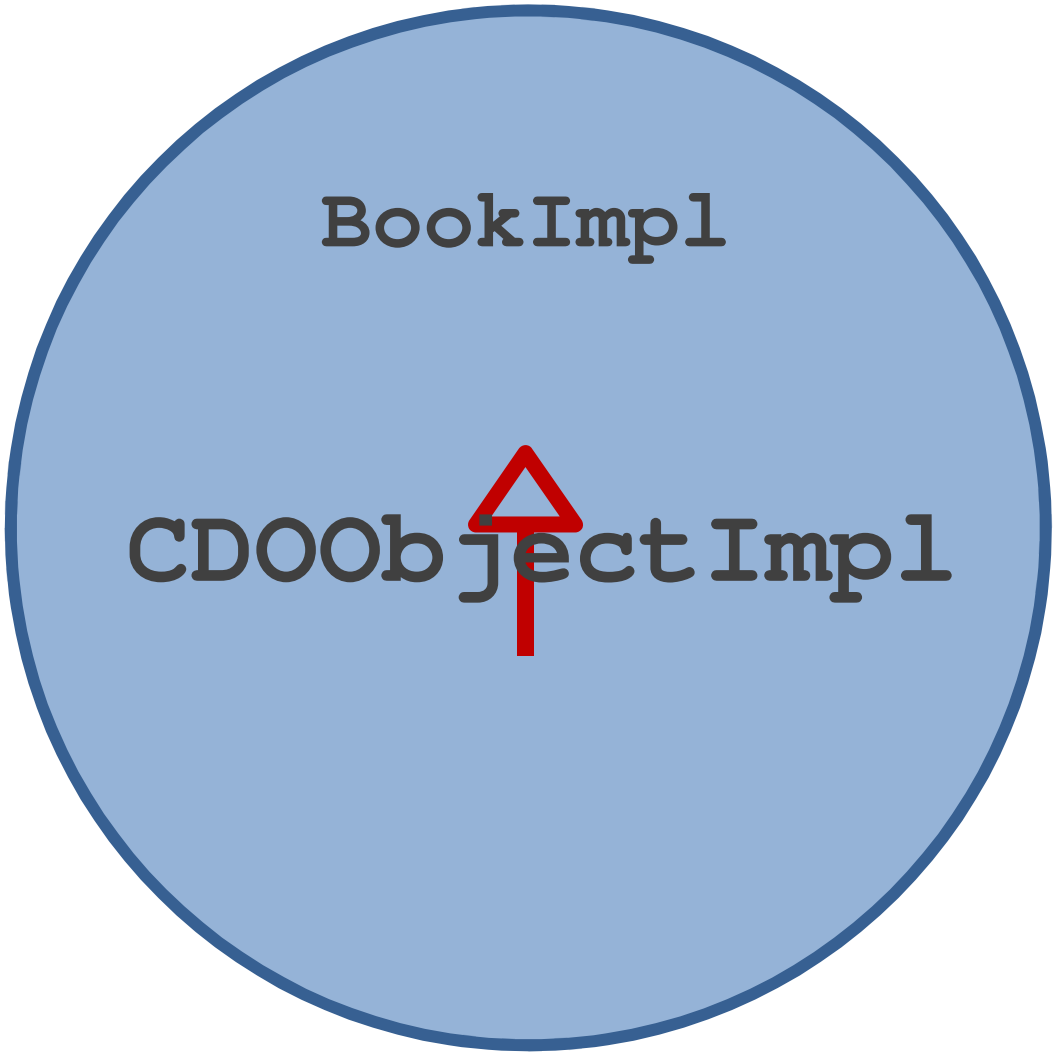


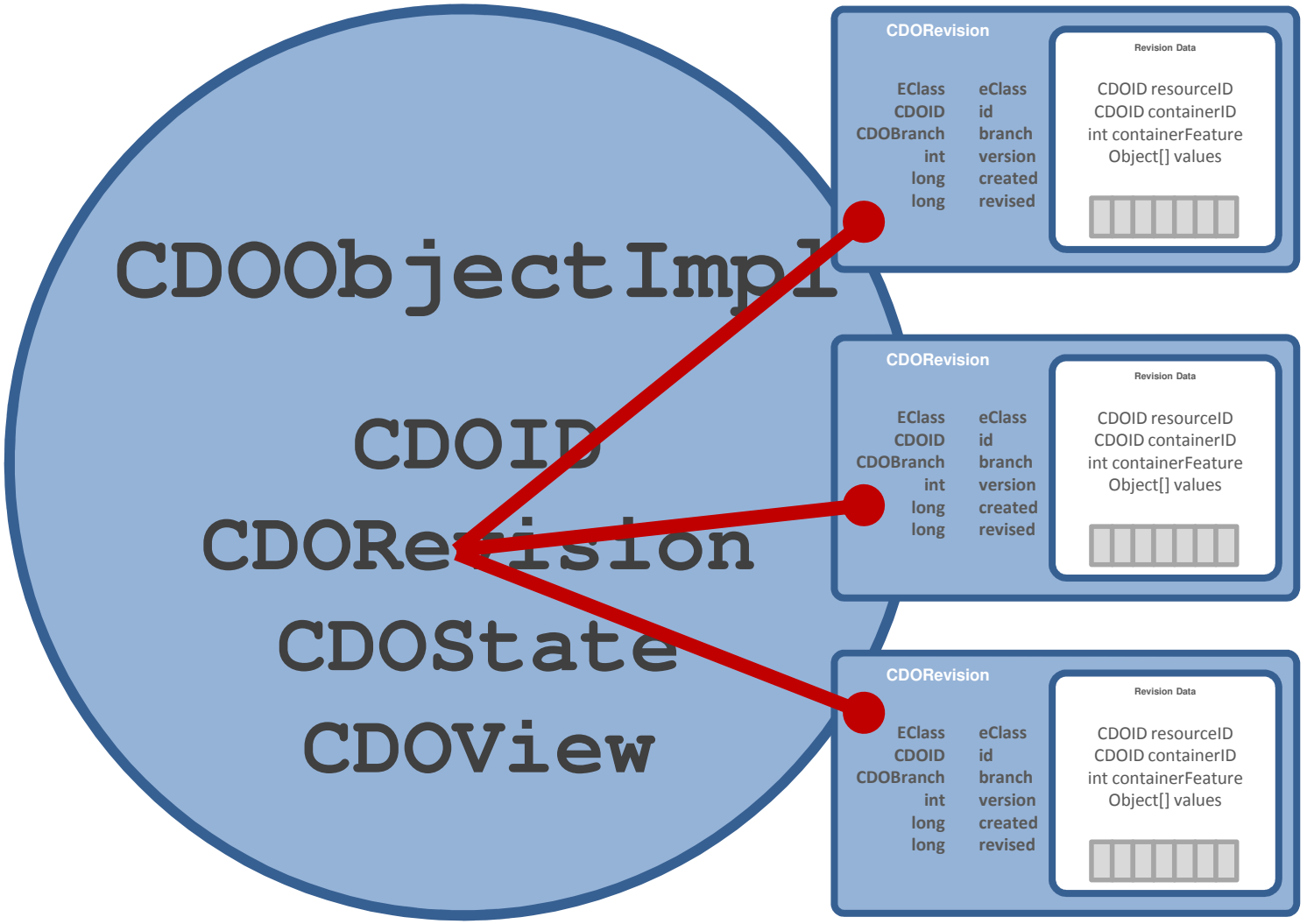


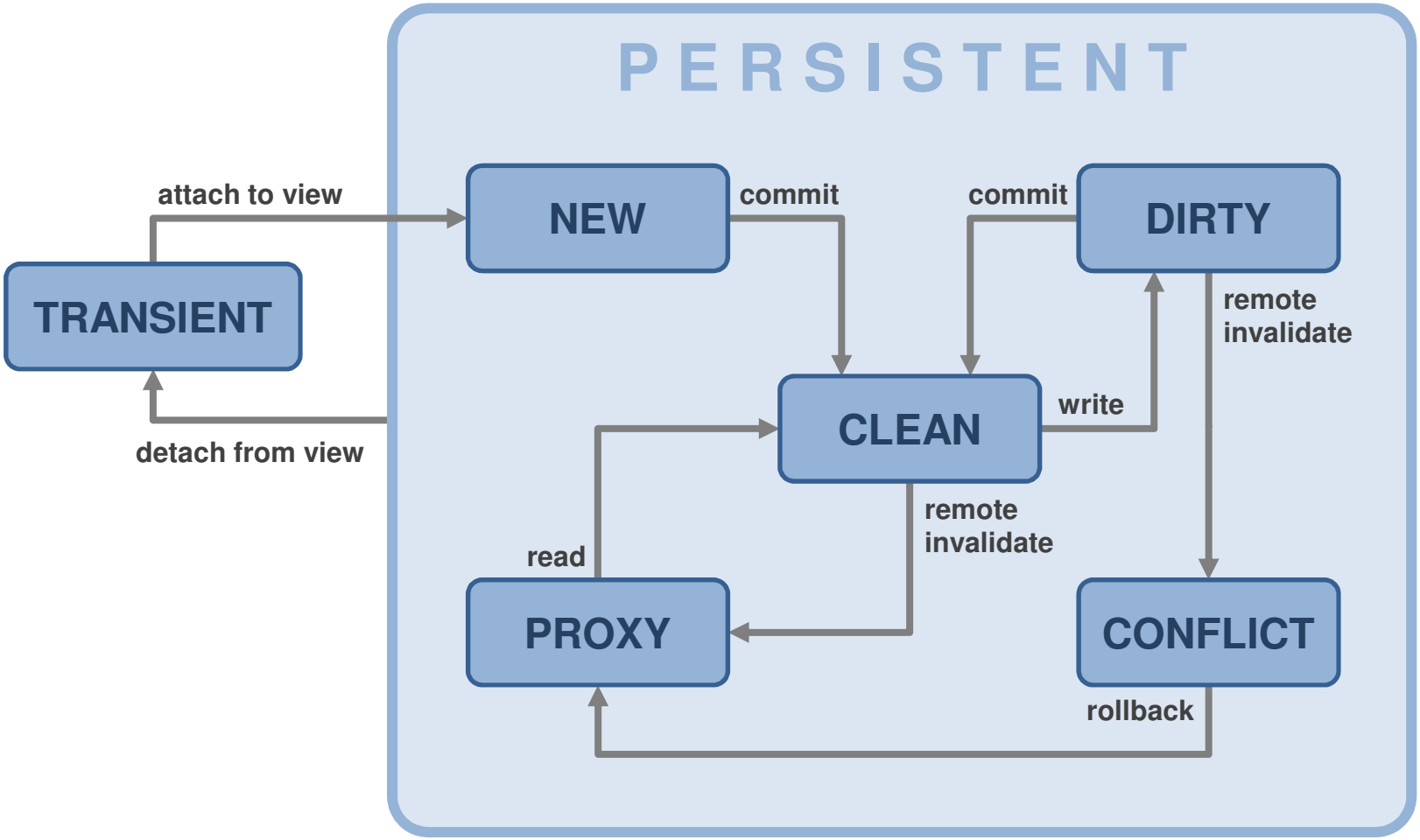
Technical Challenges:

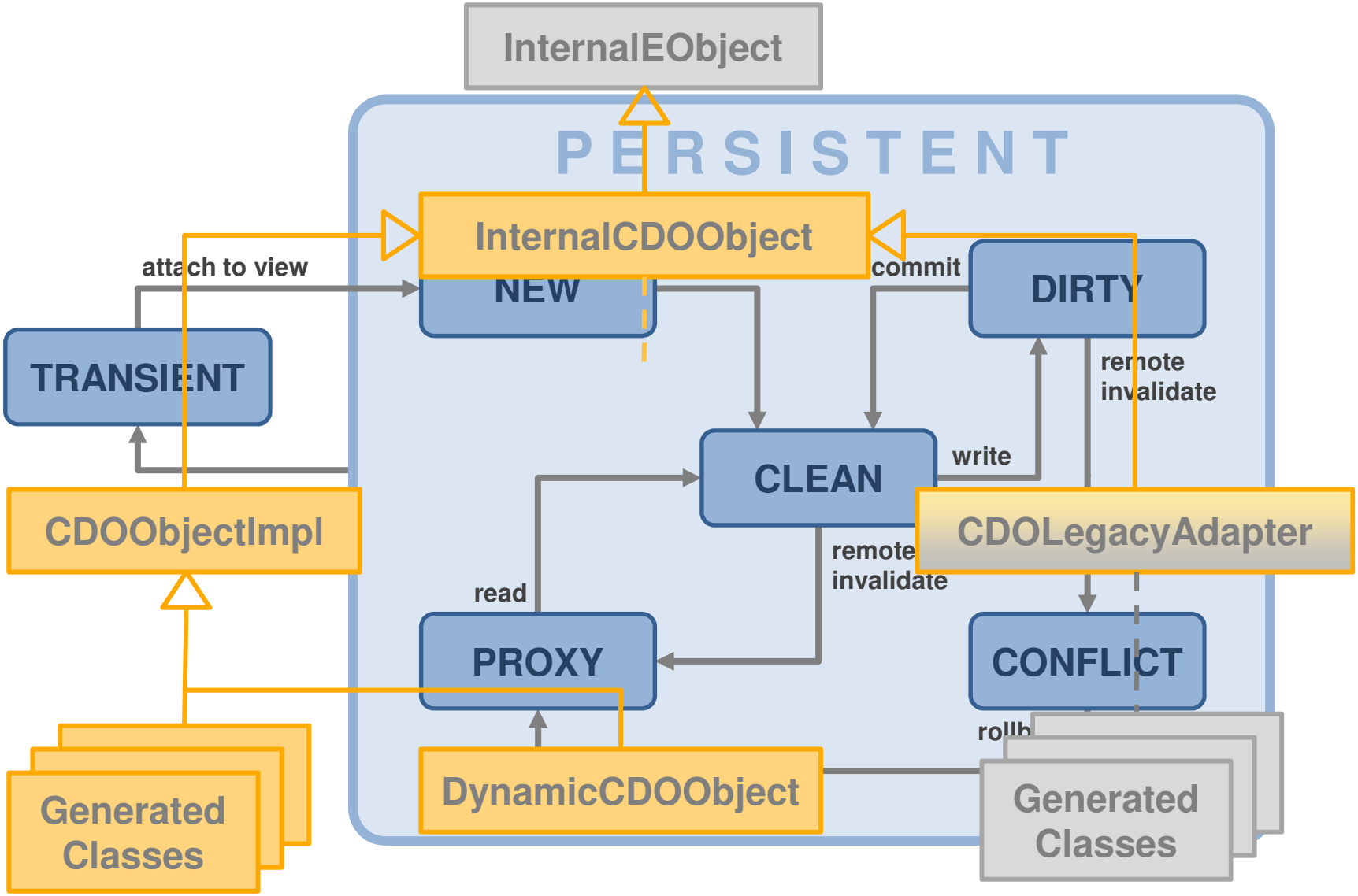
- Transfer revisions over the network
- Swap revisions on remote invalidation
- Swap revisions when changing view time
- Swap revisions when changing view branch
- Make objects reclaimable by GC

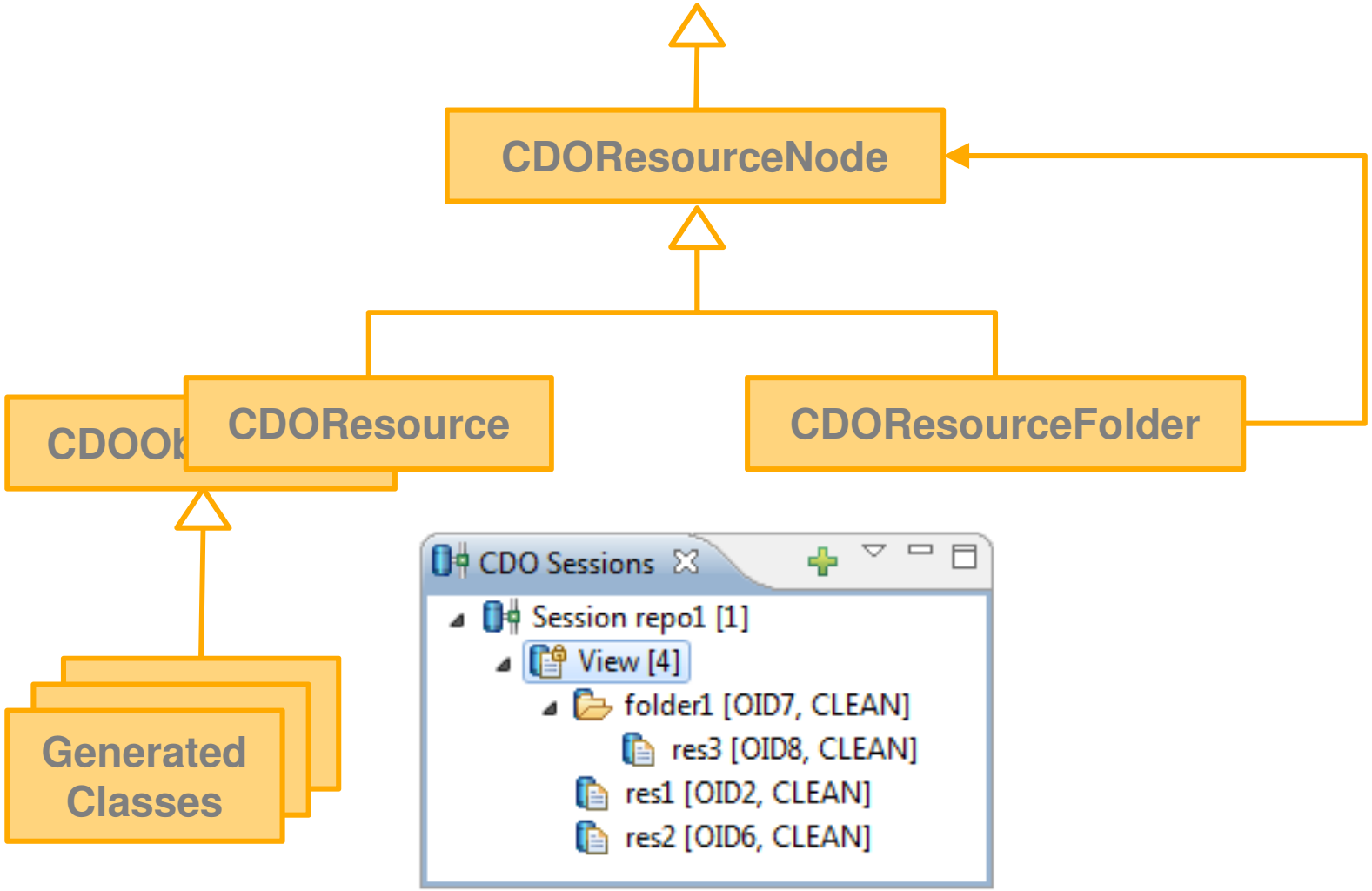


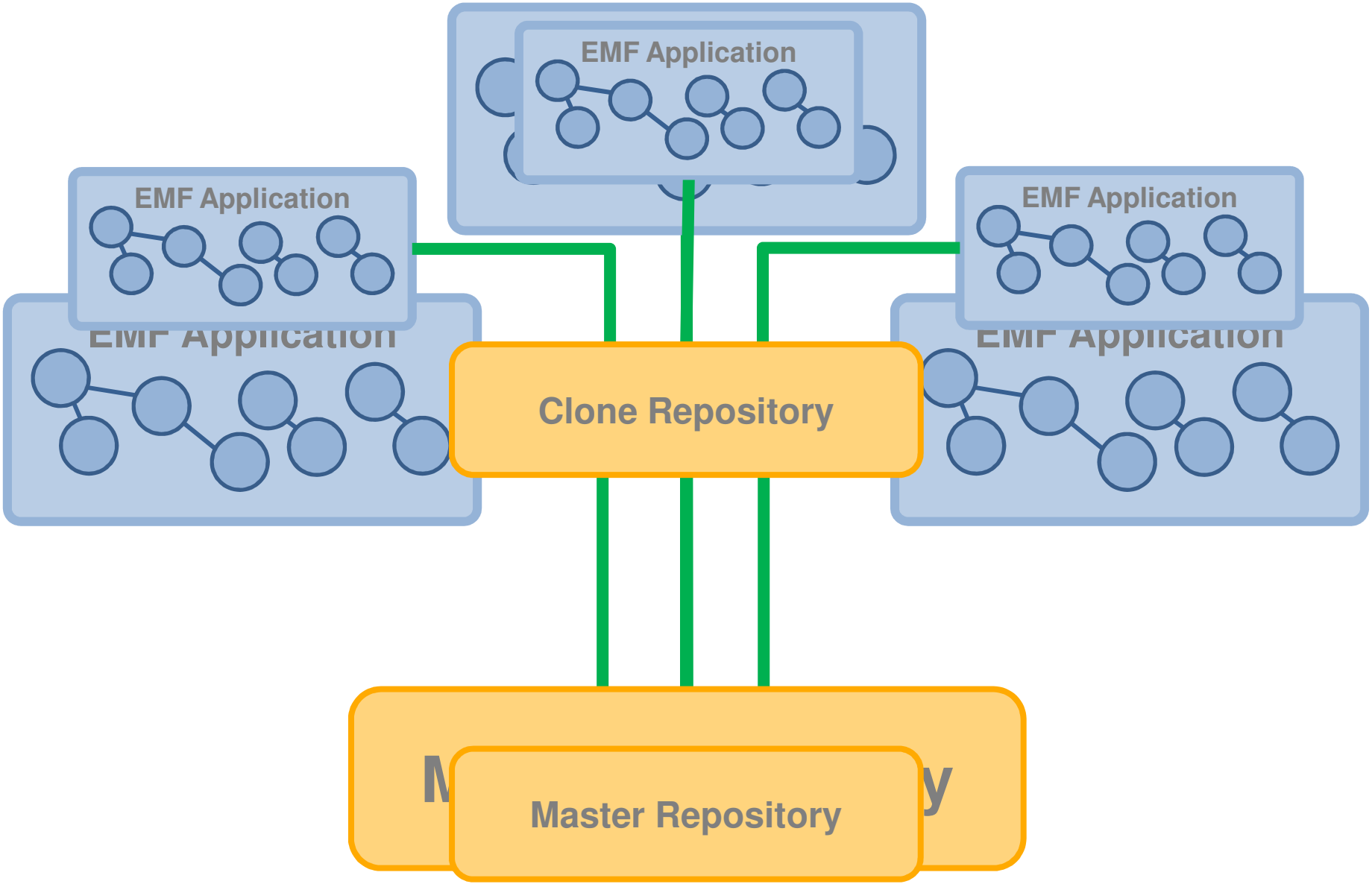


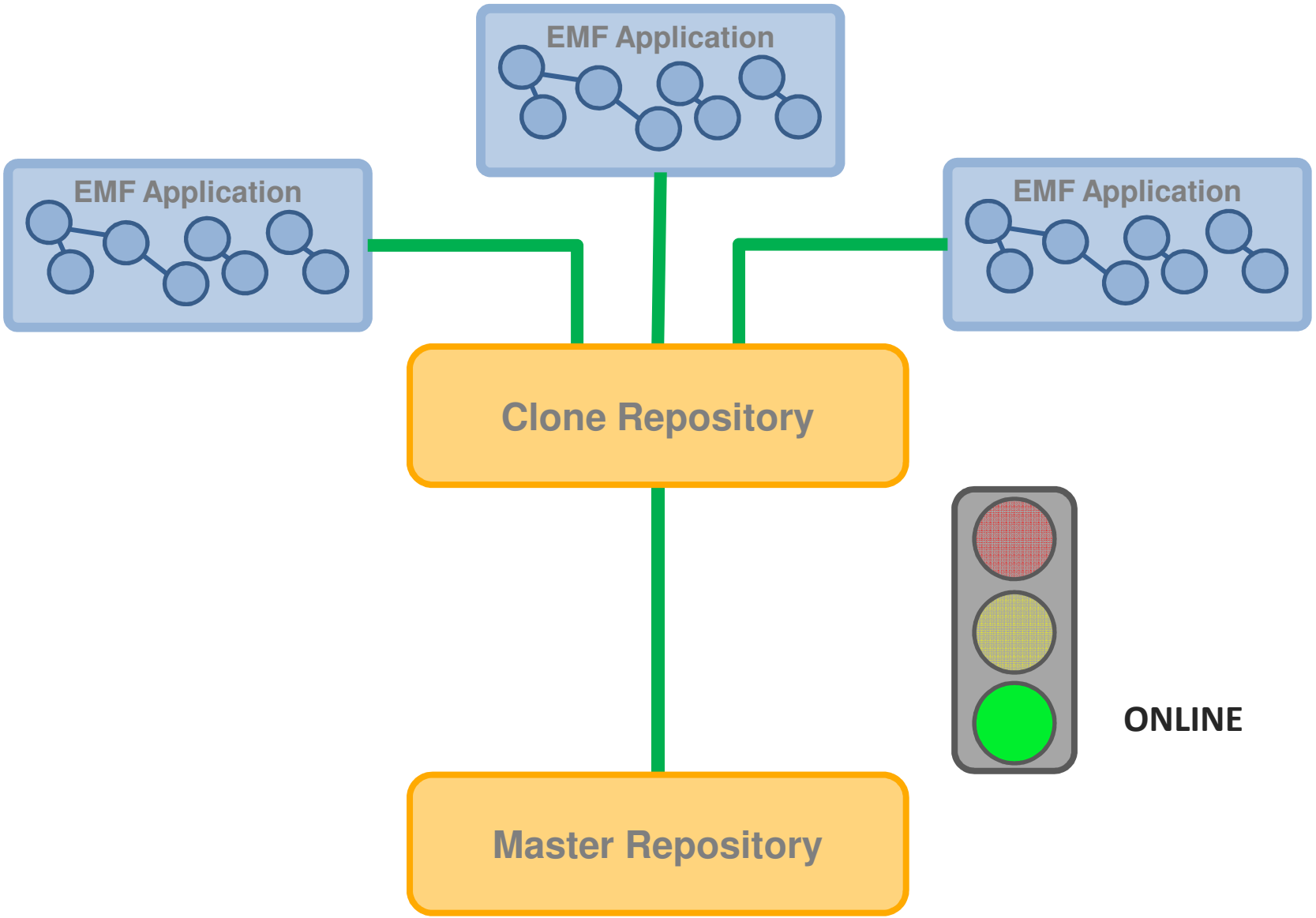


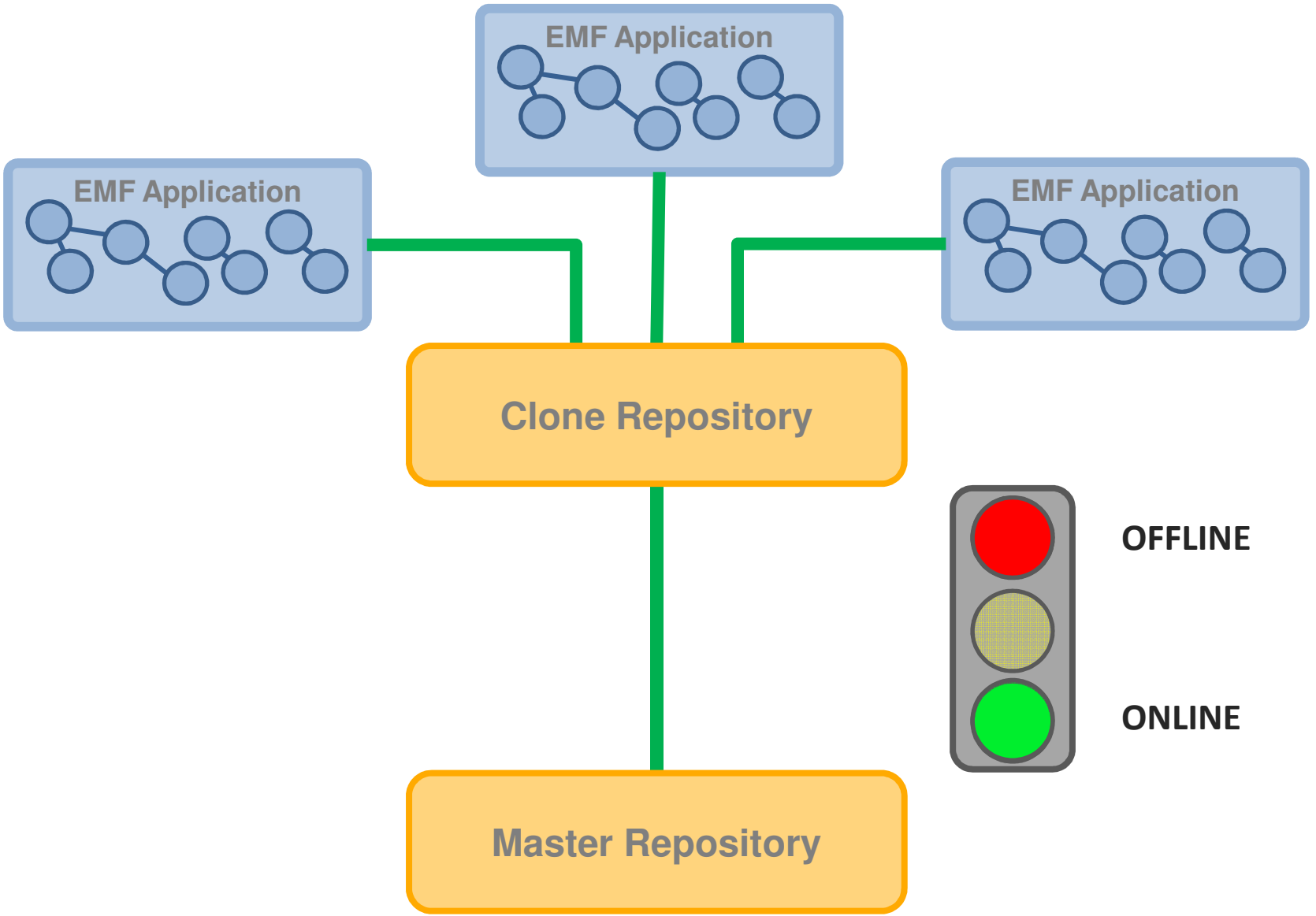


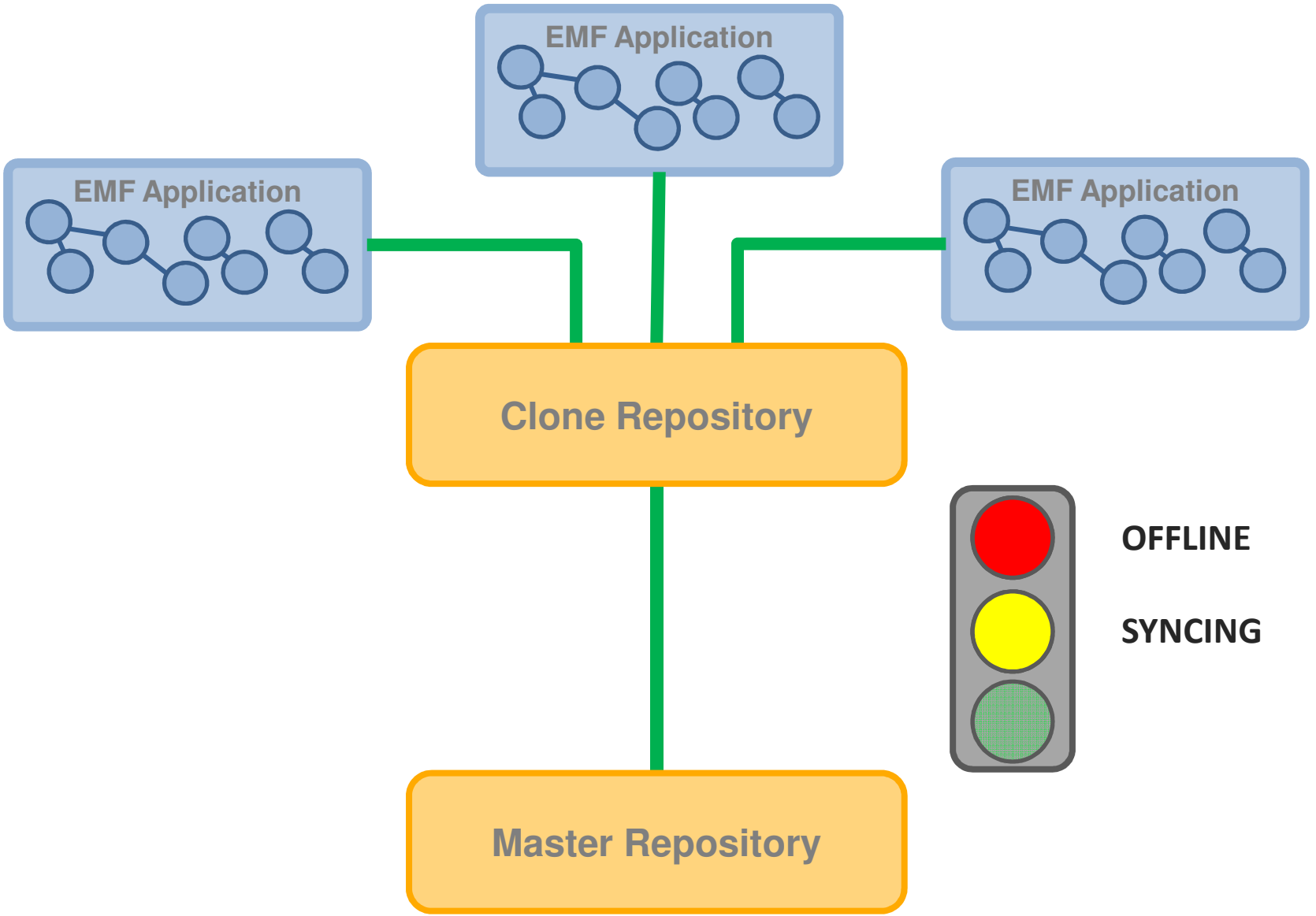


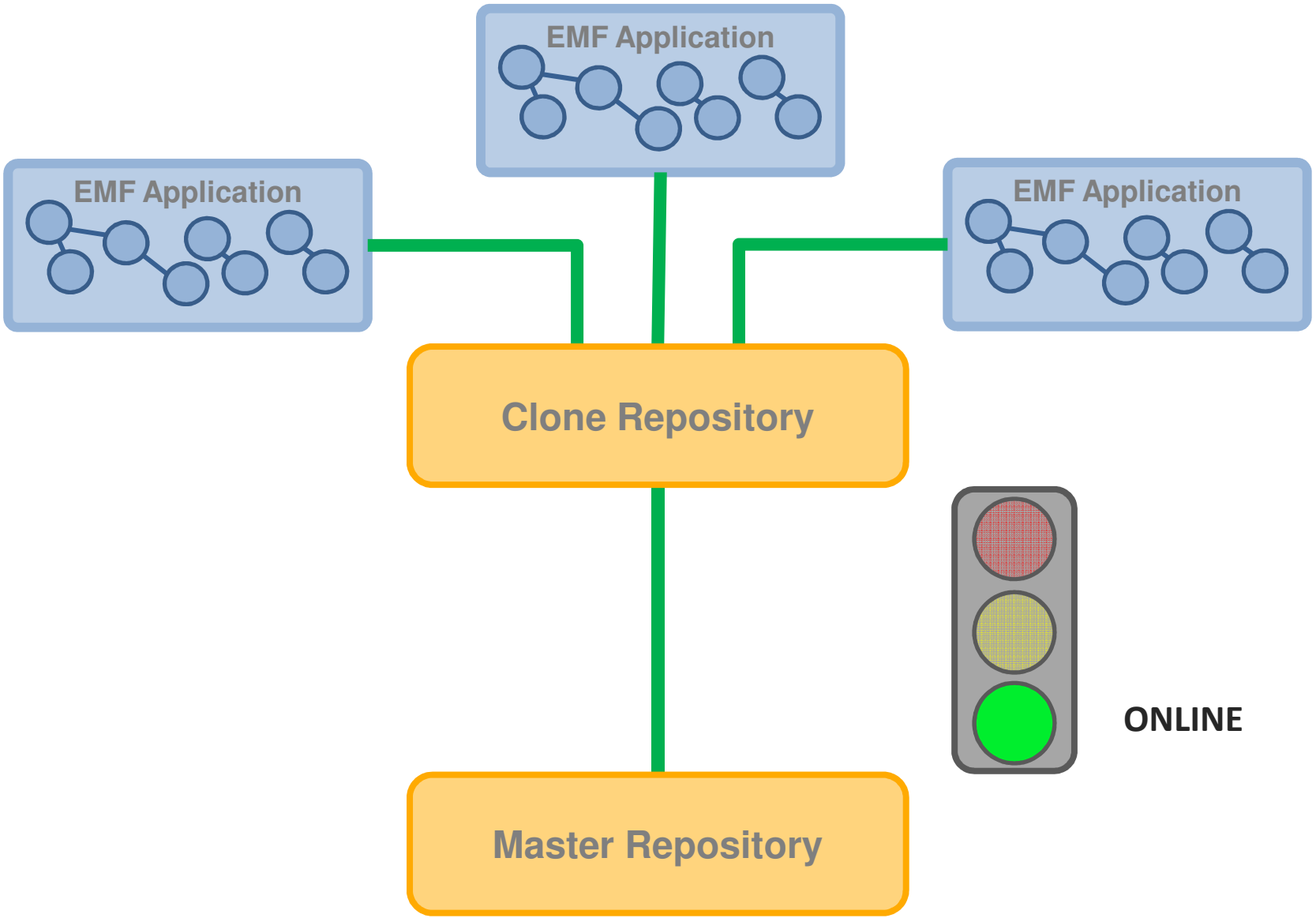


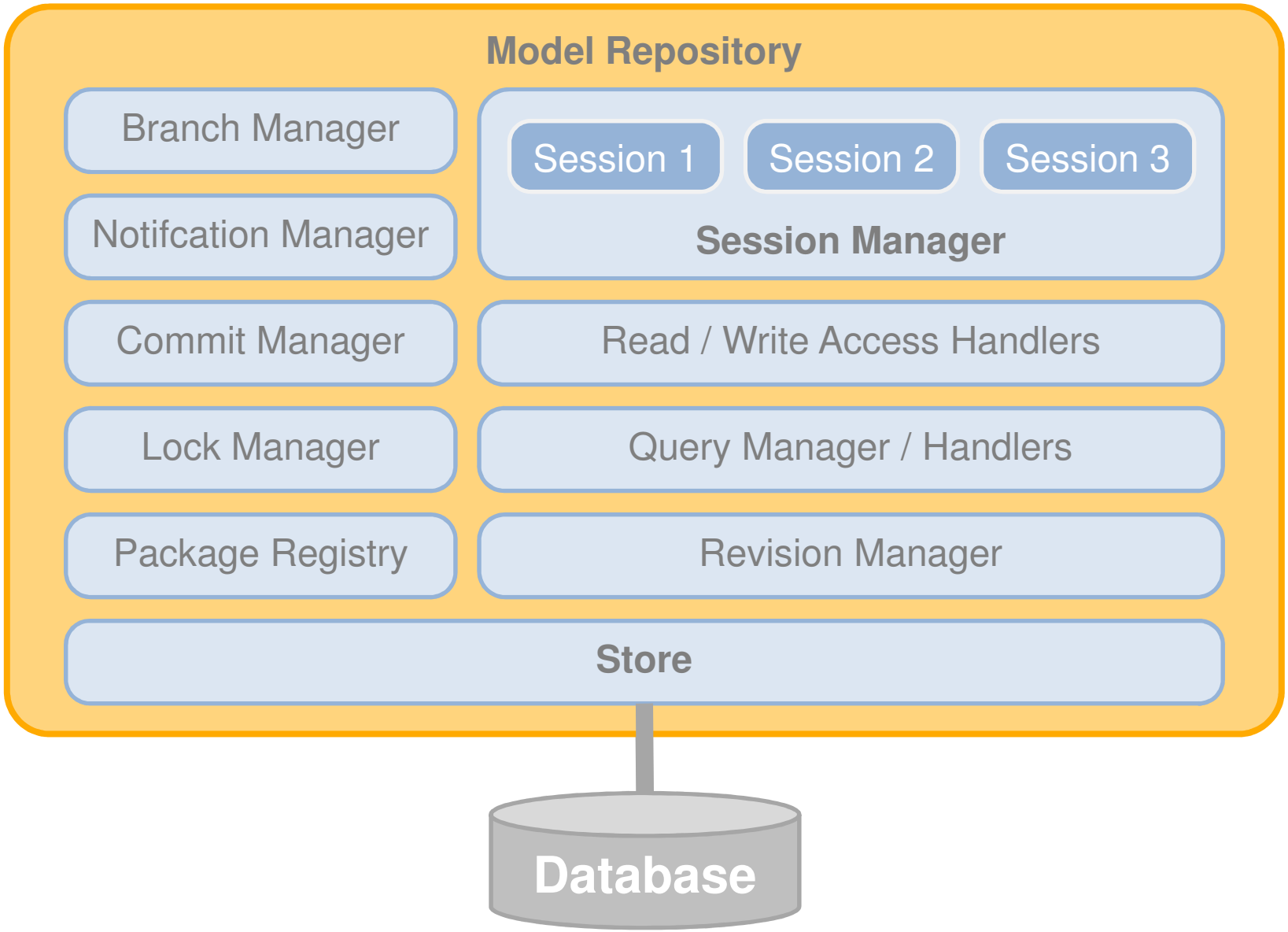


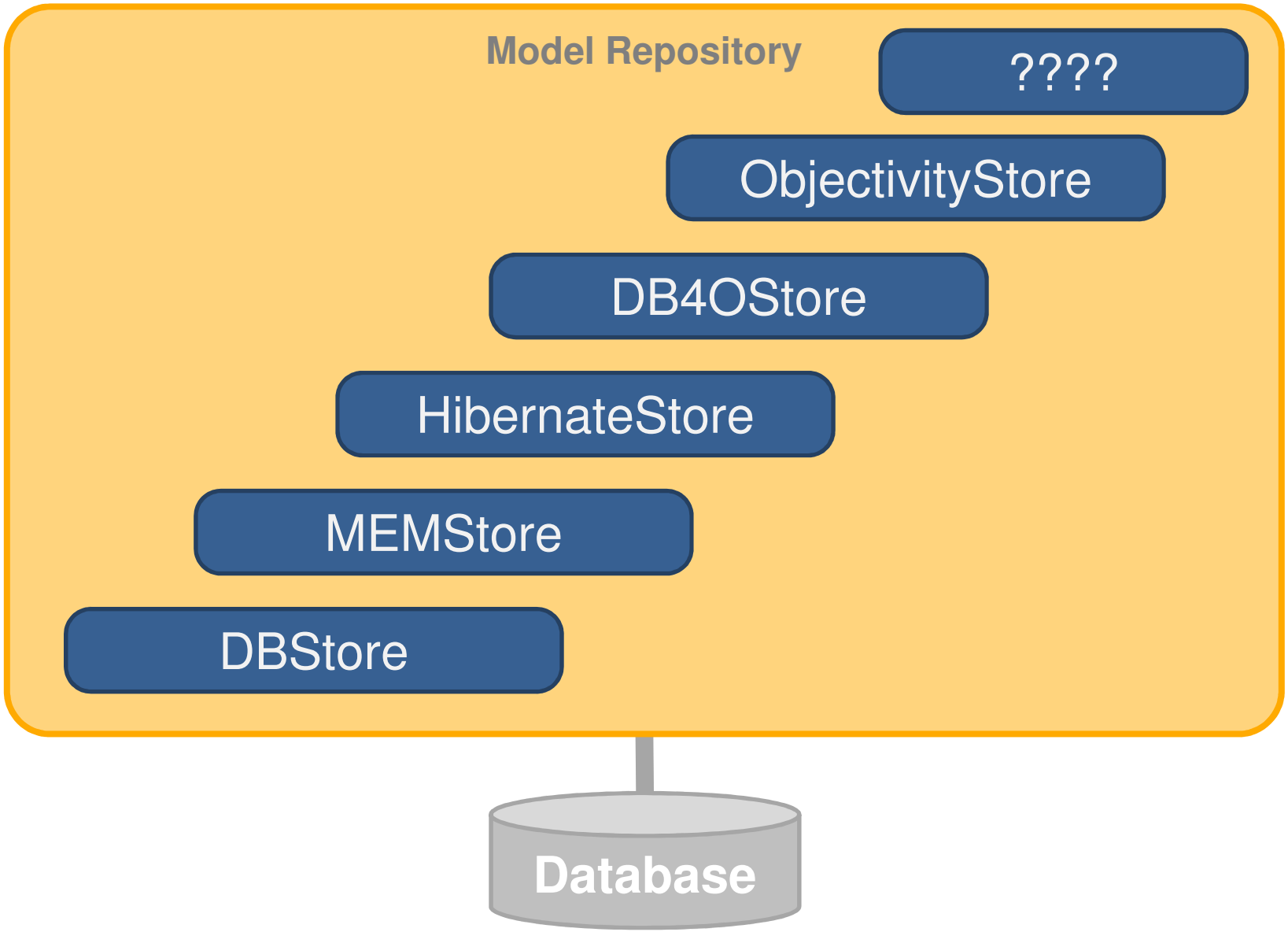












CDO Core Features

Distribution

- **Various ways to set up an IRepository**
  - XML config file, programmatically, Spring, …
  - OSGi, stand-alone, …
  - All components customizeable
- **Various ways to open a CDOSession**
  - Net4j: TCP, HTTP, embedded, …
  - CDO: embedded
  - Other transports possible
- **Offline mode coming soons**
  - Cloned and sync'ed repository, normal sessions

Persistence

- **Pluggable storage backend adapters (IStores)**
  - DBStore (CDO's own O/R mapper)
  - HibernateStore / Teneo
  - ObjectivityStore
  - DB4OStore
  - MEMStore
- **Changing the store type does not affect client applications!**

Resources

- **A CDOResource is an EObject**
- **A repository contains CDOResourceNodes**
  - CDOResourceFolders
  - CDOResources
- **The resource tree is**
  - Navigable through EMF
  - Queryable through CDO

Versioning

- **CDO supports record temporality**
  - Must be supported by IStore
  - Can be configured per IRepository
- **CDO supports branching**
  - Must be supported by IStore
  - Can be configured per IRepository
- **A CDOView provides consistent graphs**
  - From a particular branch
  - From a particular point in time

Scalability

- Lazy loading at object granule
- Lazy loading without container object
- Partial collection loading, chunking
- Adaptive prefetching
- Manual prefetching
- Automatic unloading at object granule

Queries

- **CDO includes a generic query framework**
  - Supports any query language
  - Supports named parameters
  - Supports synchronous execution
  - Supports asynchronous execution
- **Query language handlers can be**
  - plugged into an IRepository (OCL?, EMF-Q?, …)
  - implemented by an IStore (SQL, HQL, custom, …)

Transactionality

- Strong transactional safety at model-level
- Multiple transactions per session
- Multiple save points per transaction
- Rollback to any save point
- Commit with progress monitoring
- Hooks for custom transaction handlers
- Conflict detection and fail-early-transactions
- Pluggable conflict resolvers
- Explicit read/write locking on object granule
- XA transactions to multiple repositories

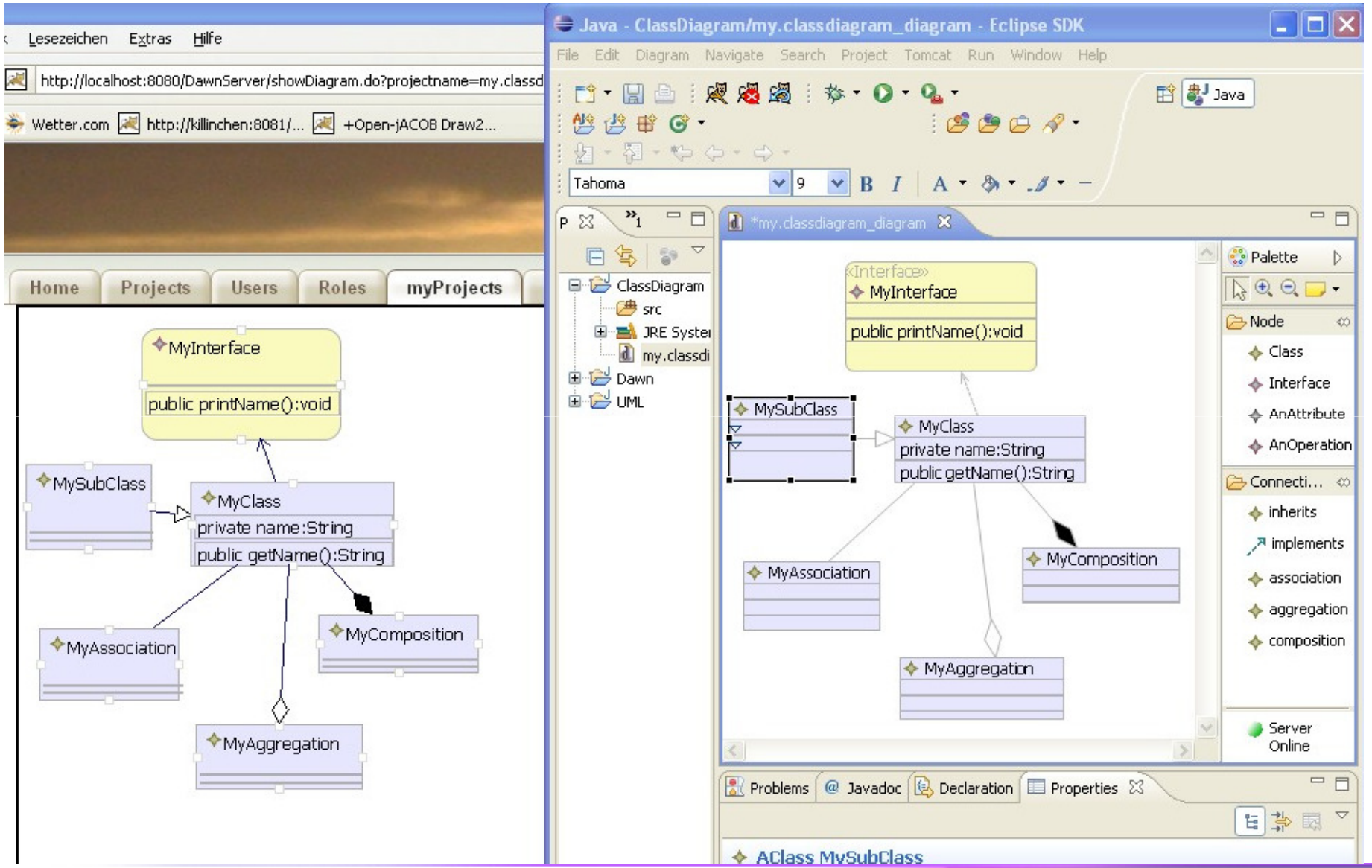
Collaboration

- **Passive Updates**
  - Asynchronous commit notifications
  - Invalidation of objects, lazy reload if needed
  - Can be switched off per session
- **Change subscriptions**
  - Asynchronous change delta delivery
  - Registration with repository per object
  - Automated through pluggable adapter policies
- **Remote session manager**
  - Notifies about state of other sessions
  - Supports sending/receiving of arbitrary messages

Integration

- Integrates with EMF at the model level, not at the edit- or UI-level.
- Uninvasive to the .ecore file.
- Best results with regenerated models (native)
- Regeneration not needed (legacy)
- Dynamic models supported
- Multiple repositories per ResourceSet
- External references

Dawn – Rise of Graphical Collaboration



Dawn – Rise of Graphical Collaboration

- Conflict handling
  - Dawn provides detection and handling mechanisms for conflicts
  - It will build on the CDO conflict mechanisms and provide flexible and intuitive UI to handle conflicts
  - Conflicts are displayed inside the diagram editor. Conflicts that cannot be visualized inside the editor will be show in a special view (Dawn Conflict View)
- Locking
  - Dawn will support locking on different hierarchy levels in the GMF diagram
  - Locked objects are marked with special visualisations
- WebViewer/WebEditor
  - Dawn provides a web viewer to view changes in the diagram while they are processed in Eclipse
  - It also will support changing the diagram (adding/deleting/manipulating) in a browser
  - Allows editing GMF-diagrams on mobile devices even if no Java platform is installed

Dawn – Rise of Graphical Collaboration

- Do not change existing code
  - A dynamic design and a flexible generator will make it possible to “collaborate” existing GMF editors even if the source is
  - Existing editor do not need to modified
- Firewall transparency mode
  - Allows to operate from within restricted networks
  - This mode will use a web-based protocol on CDO
- Network independence (Offline Mode)
  - Using one of the latest CDO features (offline support) Dawn will allow modifying GMF diagrams without a repository connection.
- Authentication/Authorization
  - Providing access rights on diagram level will allow to protect your model data
  - Additionally the use of the diagram (show, modify, view) will be restrictable. Locking behaviour can also be influenced.