



## **MidPoint 4.4 – Upgrade and migration**

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- Short overview of changes
- How to upgrade to midPoint 4.4
- How to migrate to PostgreSQL native repository

# | Changes since 4.0 affecting upgrade

- Java 8 platform is no longer supported
  - Java 11 or Java 17 is recommended
- MySQL and MariaDB are no longer supported,
  - there is upgrade path to 4.4 and then migration to native repository
- Many deprecated elements were removed from schema
- Jasper-based reports are no longer supported
- Tasks should be reimported / updated

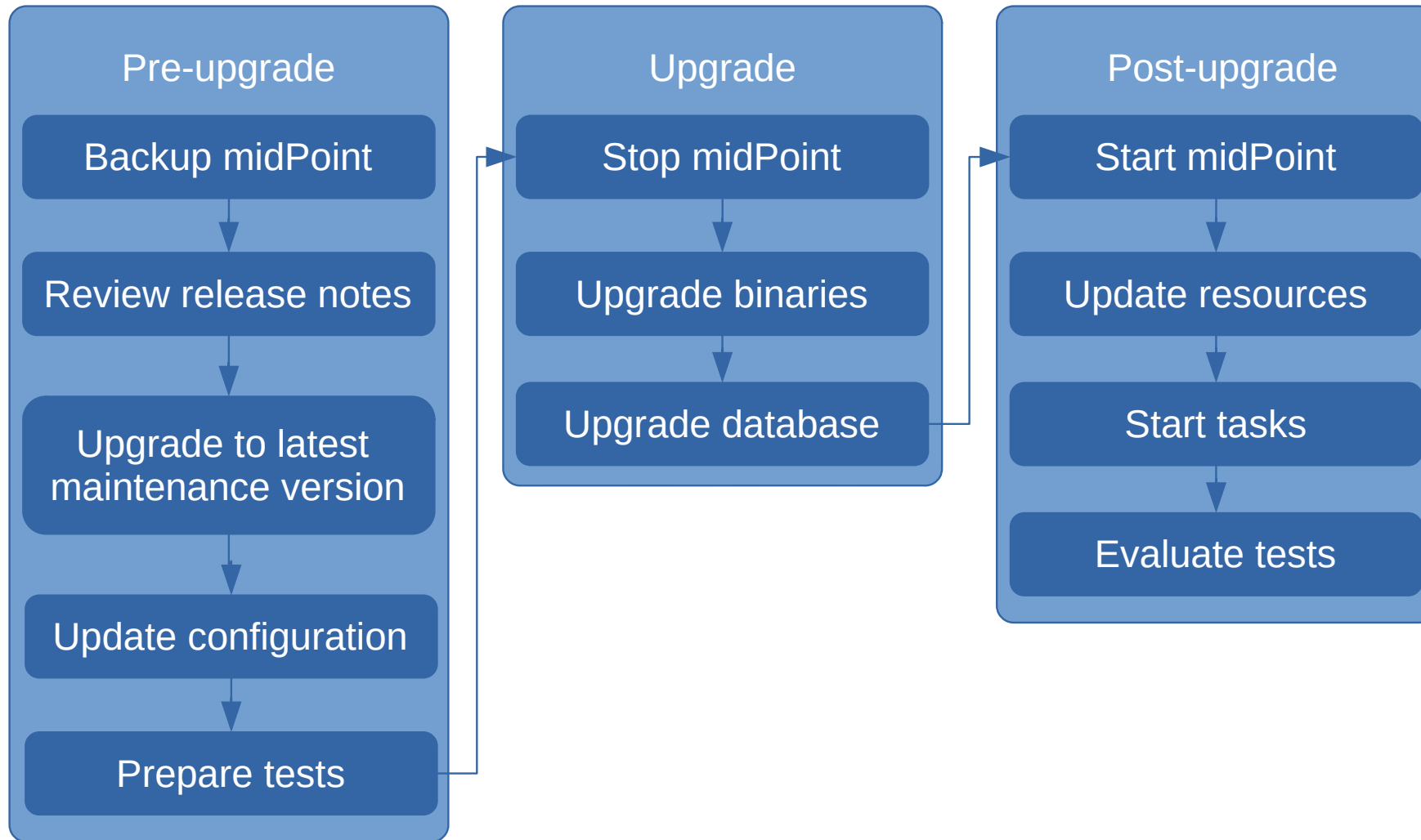


# **How to upgrade to midPoint 4.4**

# | How to upgrade to midPoint 4.4

- Supported upgrade paths are:
  - midPoint 4.0.4 to midPoint 4.4.1
  - midPoint 4.3.2 to midPoint 4.4.1
  - midPoint 4.4.1 with generic repository to midPoint 4.4.1 PostgreSQL Native repository
- Upgrade process may require changes in your tasks, mappings, etc. so it is strongly recommended to perform upgrade in testing / staging environment first to get a good estimate of changes required and time needed.

# | Upgrade Process Overview



# | Pre-upgrade steps

- Download 4.4.1 release

<https://evolveum.com/download/4-4-lts-tesla/>

- Create fresh backup of your midPoint and database
- Review release notes for 4.4.1
  - Pay attention to changes, upgrade sections and deprecated / removed features
- Upgrade to latest maintenance version
  - Latest maintenance version contains pre-upgrade checks (e.g. deprecations)

- All paths are relative to midPoint installation (home) directory
  - Usually this is /opt/midpoint
- Use ninja tool to check for deprecated / removed functionality

```
bin/ninja.sh verify -w plannedRemoval
```
- If you are using functionality planned for removal adjust system configuration to not use that functionality (if possible)
  - Data in removed elements are not accessible after upgrade, if you need to remap them to other properties, this needs to happen before upgrade.



```
tony@tdm-box: /opt/midpoint
tony@tdm-box:/opt/midpoint$ bin/ninja.sh verify -w plannedRemoval
Initializing repository using midpoint home
Starting verify
Processed: 0, error: 0, skipped: 0, avg: ,0obj/s
WARNING user:5c61ff17-5a99-412f-b389-05ce09da6054(tonyadm) employeeType planned for removal in version 4.4
WARNING task:00000000-0000-0000-0000-000000000006(Validity Scanner) workState planned for removal in version 4.4
WARNING task:00000000-0000-0000-0000-000000000007(Trigger Scanner) workState planned for removal in version 4.4
WARNING node:e8a977c5-6dd8-4c33-9505-653ffb5e3002(DefaultNode) jmxPort planned for removal in version 4.4
WARNING node:e8a977c5-6dd8-4c33-9505-653ffb5e3002(DefaultNode) operationalStatus planned for removal in version 4.4
WARNING node:e8a977c5-6dd8-4c33-9505-653ffb5e3002(DefaultNode) running planned for removal in version 4.4
WARNING report:00000000-0000-0000-0000-000000000009(Audit logs report) reportEngine planned for removal in version 4.4
WARNING report:00000000-0000-0000-0000-000000000100(Reconciliation report) reportEngine planned for removal in version 4.4
WARNING report:00000000-0000-0000-0000-000000000110(Users in MidPoint) reportEngine planned for removal in version 4.4
WARNING report:00000000-0000-0000-0000-000000000130(Certification definitions report) reportEngine planned for removal in version 4.4
WARNING report:00000000-0000-0000-0000-000000000140(Certification campaigns report) reportEngine planned for removal in version 4.4
WARNING report:00000000-0000-0000-0000-000000000150(Certification cases report) reportEngine planned for removal in version 4.4
WARNING report:00000000-0000-0000-0000-000000000160(Certification decisions report) reportEngine planned for removal in version 4.4
WARNING objectCollection:00000000-0000-0000-0001-000000000002(Modification audit records) auditSearch planned for removal in version 4.4
WARNING objectCollection:00000000-0000-0000-0001-000000000004(Error audit records) auditSearch planned for removal in version 4.4
Finished verify in 2,77s. Processed: 399, error: 0, skipped: 0, avg: 99,75obj/s
tony@tdm-box:/opt/midpoint$
```

- Some of removed schema elements
  - **objectType**, **employeeType**, **roleType**, **orgType** and **serviceType**. The functionality was replaced by **subtype** property, which was later replaced by archetypes.
  - **subtype** property still remains, however it is deprecated. It is strongly recommended migrating all object subtyping functionality to archetypes.
- More exhaustive list is present in release notes

# | Stop the system

- Suspend all scheduled and automatic tasks
  - this prevents any unexpected behavior which may happen after upgrade
- Shutdown midPoint server processes
  - in cluster deployment all nodes must be shut down

- Usual location of midPoint installation is **/opt/midpoint**
- Replace binaries with new binaries from distribution package
  - **bin** and **lib** directories must be replaced
  - it is strongly recommended to upgrade **doc** and **README**
- **var** directory should be left untouched, since it contains deployment specific files
- Make sure all cluster nodes contains same upgraded binaries

# | Upgrade binaries

```
tony@tdm-box: /opt/midpoint
tony@tdm-box:/opt/midpoint$ mkdir backup
tony@tdm-box:/opt/midpoint$ ls
backup/      doc/         lib/         LICENSE.AL   NEWS         README      tmp/
bin/         INSTALL     LICENSE     LICENSE.EUPL NOTICE      RELEASE-NOTES var/
tony@tdm-box:/opt/midpoint$ mv -t backup bin lib doc README RELEASE-NOTES
tony@tdm-box:/opt/midpoint$ ls
backup  INSTALL  LICENSE  LICENSE.AL  LICENSE.EUPL  NEWS  NOTICE  tmp  var
tony@tdm-box:/opt/midpoint$ mv -t . tmp/midpoint-4.4.1/{bin,lib,doc,README,RELEASE-NOTES}
tony@tdm-box:/opt/midpoint$ ls
backup  bin  doc  INSTALL  lib  LICENSE  LICENSE.AL  LICENSE.EUPL  NEWS  NOTICE  README  RELEASE-NOTES  tmp  var
tony@tdm-box:/opt/midpoint$
```

- Upgrade scripts are located in **doc/config/sql/generic-old**
  - Naming pattern is database type, original version – target version  
(eg. postgresql-upgrade-4.0-4.4.sql )
- Use appropriate tool for your database to run these scripts

PostgreSQL:

```
psql --host=localhost --username=midpoint  
midpoint -f doc/config/sql/postgresql-upgrade-  
4.0-4.4.sql
```

# | Upgrade database structure

```
tony@tdm-box: /opt/midpoint/doc/config/sql/generic-old
tony@tdm-box:/opt/midpoint$ cd doc/config/sql/generic-old/
tony@tdm-box:/opt/midpoint/doc/config/sql/generic-old$ ls
h2-upgrade-4.0-4.4.sql      mysql-upgrade-4.0-4.4-utf8mb4.sql  oracle-upgrade-4.3-4.4.sql      postgresql-4.4-all.sql
h2-upgrade-4.3-4.4.sql      mysql-upgrade-4.3-4.4.sql          oracle-4.4-all.sql            sqlserver-upgrade-4.0-4.4.sql
h2-4.4-all.sql            mysql-upgrade-4.3-4.4-utf8mb4.sql  postgresql-upgrade-4.0-4.4.sql  sqlserver-upgrade-4.3-4.4.sql
mysql-upgrade-4.0-4.4.sql   oracle-upgrade-4.0-4.4.sql          postgresql-upgrade-4.3-4.4.sql  sqlserver-4.4-all.sql
tony@tdm-box:/opt/midpoint/doc/config/sql/generic-old$ psql --host=localhost --username=midpoint webinar40 -f postgresql-upgrade-4.0
-4.4.sql
Password for user midpoint: 
```

- Start upgraded midPoint and monitor midPoint logs for any errors
- 4.4.1 upgrade provides newer versions of connector, so resources are probably not working
- In 4.4.1 some of the initial objects changed, but these changes are not applied automatically if you have an older version



- Upgrade Resources to point to new connector versions
  - delete old connector objects in midPoint repository
- Review changes in initial objects and default system configuration
  - Initial objects are located in doc/config/initial-objects
- If your upgrade path was upgrade to 4.4, switch to native repository, then upgrade to 4.4.1 with Native repository, you **need to run reindex task** to ensure shadow attributes indexes are constructed properly.

# Upgrade connectors to point to new connector versions

The screenshot displays the midPoint web interface in a browser window. The address bar shows the URL: `localhost:8080/midpoint/admin/config/debug?36&objectId=ec4067d0-50a5-11e9-a660-f763d51427b7&objectType=ResourceType&showAllItems=true`. The page title is "'ExAmPLE, Inc. HR Organization Structure Source' raw details". The left sidebar contains navigation links under 'SELF SERVICE' (Home, Profile, Credentials, Request a role) and 'ADMINISTRATION' (Dashboards, Users, Org. structure, Roles, Services, Resources, Cases, Certification, Server tasks). The main content area has a breadcrumb trail: 'Repository objects > All objects > 'ExAmPLE, Inc. HR Organization Structure Source' raw details'. Below the breadcrumb, there are 'Options' with checkboxes: 'Protected by encryption' (checked), 'Validate schema' (unchecked), 'Save in raw mode' (checked), 'Reevaluate search filters' (checked), and 'Switch to plain text' (unchecked). A tabbed interface shows 'XML', 'JSON', and 'YAML' views. The 'XML' view is active, displaying an XML snippet for a connector configuration. The XML includes namespaces for midPoint, prism, and xsd, and defines a connector of type 'CsvConnector' with various configuration properties like field delimiters, file paths, and encoding.

Options

☒ Protected by encryption ☐ Validate schema ☒ Save in raw mode ☒ Reevaluate search filters ☐ Switch to plain text

XML JSON YAML

```
1 <resource xmlns="http://midpoint.evolveum.com/xml/ns/public/common/common-3" xmlns:c="http://midpoint.evolveum.com/xml/ns/public/common/common-3" xmlns:icfs="http://midpoint.evolveum.com/xml/ns/public/common/common-3" xmlns:prism="http://prism.evolveum.com/xml/ns/public/common/common-3" xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:a="http://prism.evolveum.com/xml/ns/public/annotation-3" xmlns:ra="http://midpoint.evolveum.com/xml/ns/public/annotation-3" />
2 <name>ExAmPLE, Inc. HR Organization Structure Source</name>
3 <operationalState>
4   <lastAvailabilityStatus>up</lastAvailabilityStatus>
5 </operationalState>
6 <connectorRef relation="org:default" type="c:ConnectorType">
7   <filter>
8     <q:equal>
9       <q:path>c:connectorType</q:path>
10      <q:value>com.evolveum.polygon.connector.csv.CsvConnector</q:value>
11    </q:equal>
12  </filter>
13 </connectorRef>
14 <connectorConfiguration xmlns:icfc="http://midpoint.evolveum.com/xml/ns/public/connector/icf-1/connector-schema-3">
15   <icfc:configurationProperties xmlns:gen618="http://midpoint.evolveum.com/xml/ns/public/connector/icf-1/bundle/com.evolveum.polygon.connector-csv/com.evolveum.polygon.connector-csv">
16     <gen618:fieldDelimiter>,</gen618:fieldDelimiter>
17     <gen618:quote>"</gen618:quote>
18     <gen618:filePath>/opt/training/midpoint-labs/flatfiles/source-orgs.csv</gen618:filePath>
19     <gen618:quoteMode>ALL</gen618:quoteMode>
20     <gen618:readOnly>true</gen618:readOnly>
21     <gen618:encoding>utf-8</gen618:encoding>
22     <gen618:ignoreSurroundingSpaces>true</gen618:ignoreSurroundingSpaces>
23     <gen618:uniqueAttribute>orgName</gen618:uniqueAttribute>
24   </icfc:configurationProperties>
25 </connectorConfiguration>
26 <schema>
27   < cachingMetadata>
28     < retrievalTimestamp>2020-04-21T13:09:55.974+02:00</retrievalTimestamp>
29     < serialNumber>bb56e96e5969a20c-fa6e9d6e095a7c</serialNumber>
30   </ cachingMetadata>
31   < definition>
32     < xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:a="http://prism.evolveum.com/xml/ns/public/annotation-3" xmlns:ra="http://midpoint.evolveum.com/xml/ns/public/annotation-3" />
33     < xsd:import namespace="http://prism.evolveum.com/xml/ns/public/annotation-3"/>
34     < xsd:import namespace="http://midpoint.evolveum.com/xml/ns/public/annotation-3"/>
```

# Review changes in existing imported initial objects

```
tony@tdm-box: /opt/midpoint
tony@tdm-box:/opt/midpoint$ ls doc/
config/  samples/  schema/
tony@tdm-box:/opt/midpoint$ ls doc/config/
config-native.xml  checkstyle/  initial-objects/  sql/
tony@tdm-box:/opt/midpoint$ ls doc/config/initial-objects/
000-system-configuration.xml      130-report-certification-definitions.xml      501-archetype-task-reconciliation.xml
010-value-policy.xml              140-report-certification-campaigns.xml         502-archetype-task-recomputation.xml
015-security-policy.xml           150-report-certification-cases.xml             503-archetype-task-import.xml
020-archetype-system-user.xml      160-report-certification-decisions.xml         504-archetype-task-live-sync.xml
021-archetype-system-role.xml      200-lookup-languages.xml                     505-archetype-task-async-update.xml
022-archetype-business-role.xml    210-lookup-locales.xml                      506-archetype-task-cleanup.xml
023-archetype-manual-provisioning-case.xml  220-lookup-timezones.xml                   507-archetype-task-report.xml
024-archetype-operation-request.xml  230-lookup-lifecycle-state.xml              508-archetype-task-single-bulk-action.xml
025-archetype-approval-case.xml     240-lookup-state.xml                       509-archetype-task-iterative-bulk-action.xml
026-archetype-trace.xml             250-object-collection-resource-all.xml       510-archetype-task-report-import-classic.xml
030-role-superuser.xml             251-object-collection-resource-up.xml         511-archetype-task-report-export-classic.xml
040-role-enduser.xml               260-object-collection-task-all.xml          511-archetype-task-report-export-distributed.xml
041-role-approver.xml              261-object-collection-task-active.xml        520-archetype-task-certification.xml
042-role-reviewer.xml              262-object-collection-task-report.xml        521-archetype-task-approval.xml
043-role-delegator.xml             270-object-collection-audit.xml              528-archetype-task-util.xml
050-user-administrator.xml         271-object-collection-audit-24h.xml          529-archetype-task-system.xml
059-archetype-report.xml           272-object-collection-audit-errors-24h.xml    550-task-cleanup.xml
060-archetype-report-dashboard.xml  273-object-collection-audit-modifications-24h.xml  560-task-validity.xml
061-archetype-report-collection.xml  280-object-collection-certification-campaign-all.xml  570-task-trigger.xml
090-report-audit.xml               290-object-collection-shadow-all.xml        600-origin-internal.xml
100-report-reconciliation.xml       310-dashboard-admin.xml
110-report-user-list.xml           330-object-collection-my-cases.xml
tony@tdm-box:/opt/midpoint$
```

- Deleting working state of server tasks is recommended
- Update server tasks definitions if necessary
  - Apply server task archetypes if missing
  - Configuration of advanced distribution features was changed and needs to be migrated
    - e.g. buckets, worker tasks, and task partitions
    - See <https://docs.evolveum.com/midpoint/reference/tasks/activities/migration/> and midPoint Studio, which provides tooling for tasks conversion.

# | Post-upgrade testing

- Before testing we recommend to restart system
- Evaluate updated system and run your post-upgrade tests
  - Monitor logs for possible errors
- If there are no critical errors, your system is ready for use.

- Review release notes again and use **ninja verify** to determine which functionality is deprecated and you may need to plan migration to newer mechanisms.
- Consider and plan for migration to PostgreSQL native repository.



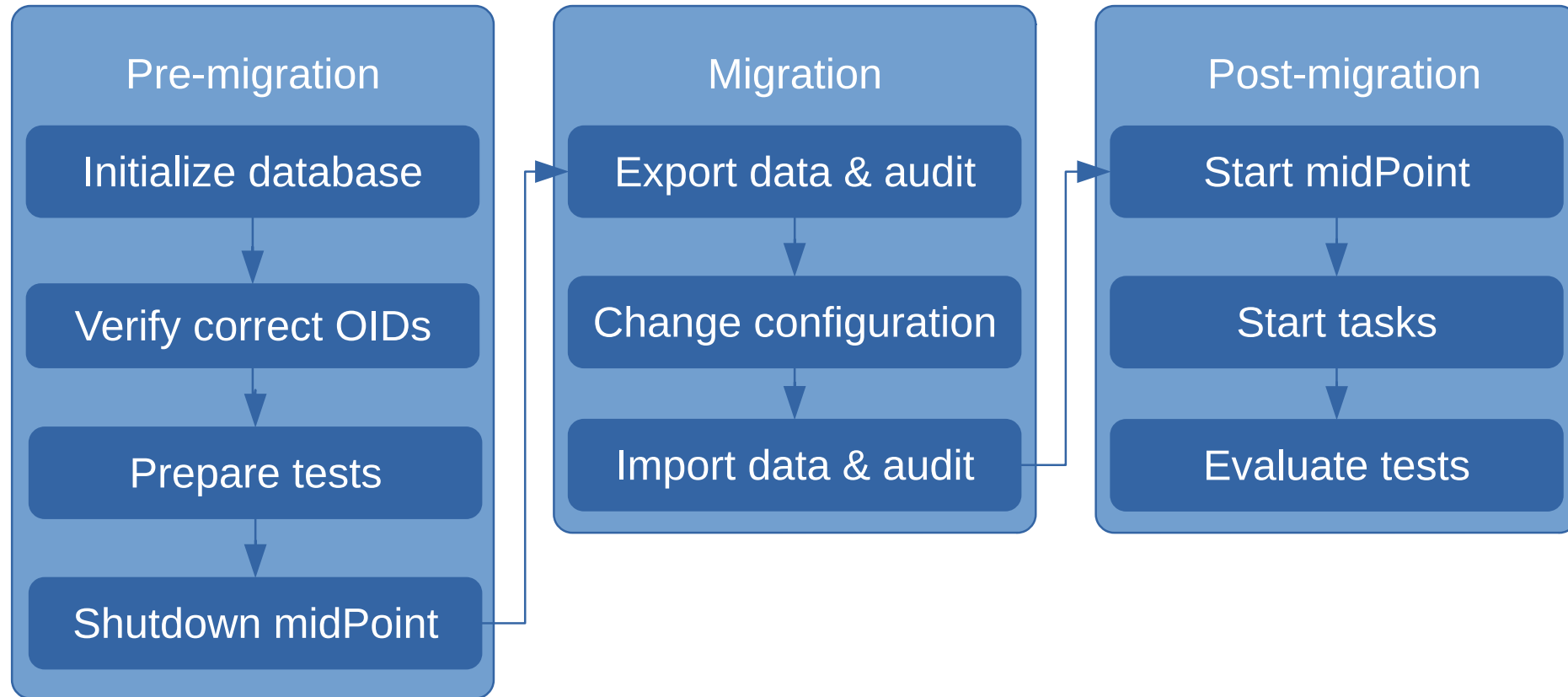
# How to migrate to PostgreSQL Native repository

# | Migration to PostgreSQL Native Repository

- Prerequisites
  - midPoint updated to 4.4.1
  - PostgreSQL database of version 13 and later
- Familiarize yourself with Native Repository design
- Decide if midPoint and midPoint audit database is same or will be two different databases
- Repository migration process should be treated similar as upgrade process with separate testing in test environment, planned downtime



# | Migration to PostgreSQL Native Repository



# | Initialize Native PostgreSQL database

- Database schema and creation scripts are present in **doc/config/sql/native-new/**
- For midPoint database use following scripts:
  - postgres-new.sql
  - postgres-new-quartz.sql
- For midPoint audit database (could be same as midPoint DB) use following scripts
  - postgres-new-audit.sql

# | Initialize Native PostgreSQL database

```
tony@tdm-box: /opt/midpoint/doc/config/sql/native-new
tony@tdm-box: /opt/midpoint$ cd doc/config/sql/native-new/
tony@tdm-box: /opt/midpoint/doc/config/sql/native-new$ psql --host=localhost --username=midpoint webinar44 -f postgres-new.sql -f postgres-new-quartz.sql -f
postgres-new-upgrade.sql
Password for user midpoint:
tony@tdm-box: /opt/midpoint/doc/config/sql/native-new$ psql --host=localhost --username=midpoint webinar44 -f postgres-new-audit.sql -f postgres-new-upgrade-
audit.sql
```

# | Verify that only UUIDs are used

- Native repository requires oids to be valid UUIDs
  - objects generated by midPoint always use UUIDs, only manually created objects may use invalid UUIDs
- Use ninja verify for detecting incorrect oids  
**bin/ninja.sh verify -w uuid**
- midPoint does not allow for oid modifications, you need to export objects with broken oids, remove them from midPoint, fix oids to be UUIDs and reimport them
- You also need to update references to use new correct oids

# | Verify that only UUIDs are used

```
tony@tdm-box: /opt/midpoint$ bin/ninja.sh verify -w uuid
Initializing using midpoint home; with repository connection
Starting verify
Processed: 0, error: 0, skipped: 0, avg processed: 0obj/s
WARNING user:tony(tony-0ID) OID 'tony' is not valid UUID
Finished verify in 2,84s. Processed: 422, error: 0, skipped: 0, avg processed: 148,64obj/s
tony@tdm-box: /opt/midpoint$
```

# | Shutting down midPoint

- It's recommended to suspend all server tasks and shutdown midPoint instances before migration / exporting data to simplify process
- It is possible to migrate midPoint to new repository with old instances running, but you need to carefully plan migration and its execution.
  - Exporting data could be done while midPoint is running, but you may need reexport any changes, that happened after initial export
  - midPoint with old repository and midPoint with new repository using same data should never be running at same time

- Migration does not support direct database operations and must be done using **ninja**.
- MidPoint data needs to be exported using **ninja** to file system
- Depending on your deployment complete export may take few minutes to few hours and may result in file size of several GB
- Audit data needs to be exported using **ninja** to file system

```
bin/ninja.sh -v export -r -z -0 export.zip
```

```
bin/ninja.sh -v exportAudit -z -0 audit-export.zip
```

# | Exporting existing data

```
tony@tdm-box: /opt/midpoint
tony@tdm-box:/opt/midpoint$ bin/ninja.sh -v export -r -z -O export.zip
2022-01-18 19:23:59,563 [main] INFO (SYSOUT): Initializing using midpoint home; with repository connection
2022-01-18 19:24:05,429 [main] INFO (SYSOUT): Starting export
2022-01-18 19:24:05,429 [main] DEBUG (SYSOUT): Operation: started
2022-01-18 19:24:07,452 [pool-1-thread-2] INFO (SYSOUT): Processed: 0, error: 0, skipped: 0, avg processed: 0obj/s
2022-01-18 19:24:08,397 [pool-1-thread-1] DEBUG (SYSOUT): Operation: producer finished
2022-01-18 19:24:08,475 [pool-1-thread-3] DEBUG (SYSOUT): Operation: finished
2022-01-18 19:24:09,455 [main] INFO (SYSOUT): Finished export in 3,05s. Processed: 421, error: 0, skipped: 0, avg processed: 138,21obj/s
tony@tdm-box:/opt/midpoint$
tony@tdm-box:/opt/midpoint$ bin/ninja.sh -v exportAudit -z -O audit-export.zip
2022-01-18 19:24:26,333 [main] INFO (SYSOUT): Initializing using midpoint home; with repository connection
2022-01-18 19:24:32,119 [main] INFO (SYSOUT): Starting exportAudit
2022-01-18 19:24:32,120 [main] DEBUG (SYSOUT): Operation: started
2022-01-18 19:24:34,149 [pool-1-thread-2] INFO (SYSOUT): Processed: 0, error: 0, skipped: 0, avg processed: 0obj/s
2022-01-18 19:24:34,384 [pool-1-thread-1] DEBUG (SYSOUT): Operation: producer finished
2022-01-18 19:24:34,539 [pool-1-thread-3] DEBUG (SYSOUT): Operation: finished
2022-01-18 19:24:36,152 [main] INFO (SYSOUT): Finished exportAudit in 2,42s. Processed: 217, error: 0, skipped: 0, avg processed: 89,71obj/s
tony@tdm-box:/opt/midpoint$
```



# | Changing midPoint configuration

- Shutdown your midPoint instance
- Modify var/config.xml to enable new native repository and configure its connection to PostgreSQL
  - Replace repository and audit sections with configuration for new native repository
  - See **doc/config/config-native.xml** for quick reference and <https://docs.evolveum.com/midpoint/reference/repository/native-postgresql/> for more details
- **Do not start midPoint after configuration change** – it would initialize as fresh install

# | Example native repository section

```
<?xml version="1.0"?>
<configuration>
  <midpoint>
    <repository>
      <type>native</type>
      <jdbcUrl>jdbc:postgresql://localhost:5432/midpoint</jdbcUrl>
      <jdbcUsername>midpoint</jdbcUsername>
      <jdbcPassword>password</jdbcPassword>
    </repository>
    <audit>
      <auditService>
        <auditServiceFactoryClass>com.evolveum.midpoint.audit.impl.LoggerAuditServiceFactory</
auditServiceFactoryClass>
      </auditService>
      <auditService>
        <auditServiceFactoryClass>com.evolveum.midpoint.repo.sqale.audit.SqaleAuditServiceFactory</
auditServiceFactoryClass>
      </auditService>
    </audit>
  </midpoint>
</configuration>
```

# | Importing existing data

- Use ninja import to import production data to new repository  
`bin/ninja.sh -v import -l 4 -z -i export.zip`
- Import will fail fast on schema problems (missing definitions for extensions)
- Observe / review output of command for potential problems
  - Objects with invalid UUIDs will not be imported and will be reported
- Use ninja importAudit to import audit data to new repository  
`bin/ninja.sh -v importAudit -l 4 -z -i audit-export.zip`
- Run ninja import multithreaded using -l option.

# | Importing existing data (with invalid OIDs)

```
tony@tdm-box: /opt/midpoint
tony@tdm-box: /opt/midpoint$ bin/ninja.sh -v import -z -i export.zip
2022-01-18 19:00:02,853 [main] INFO (SYSOUT): Initializing using midpoint home; with repository connection
2022-01-18 19:00:08,797 [pool-1-thread-1] INFO (SYSOUT): Starting import
2022-01-18 19:00:08,798 [pool-1-thread-1] DEBUG (SYSOUT): Operation: started
2022-01-18 19:00:08,798 [pool-1-thread-1] INFO (SYSOUT): Processing file export.zip.xml
2022-01-18 19:00:10,813 [pool-1-thread-2] INFO (SYSOUT): Processed: 0, error: 0, skipped: 0, avg processed: 0obj/s
2022-01-18 19:00:12,601 [pool-1-thread-3] ERROR (SYSERR): Couldn't add object user:tony(tony-0ID), reason: Cannot convert oid 'tony' to UUID
2022-01-18 19:00:12,603 [pool-1-thread-3] ERROR (SYSERR): Exception details
com.evolveum.midpoint.util.exception.SystemException: Cannot convert oid 'tony' to UUID
    at com.evolveum.midpoint.repo.sqale.SqaleServiceBase.handledGeneralException(SqaleServiceBase.java:88)
    at com.evolveum.midpoint.repo.sqale.SqaleRepositoryService.addObject(SqaleRepositoryService.java:334)
    at com.evolveum.midpoint.ninja.action.worker.ImportRepositoryConsumerWorker.run(ImportRepositoryConsumerWorker.java:59)
    at java.base/java.util.concurrent.ThreadPoolExecutor.runWorker(ThreadPoolExecutor.java:1128)
    at java.base/java.util.concurrent.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.java:628)
    at java.base/java.lang.Thread.run(Thread.java:829)
Caused by: java.lang.IllegalArgumentException: Cannot convert oid 'tony' to UUID
    at com.evolveum.midpoint.repo.sqale.SqaleUtils.oidToUuid(SqaleUtils.java:62)
    at com.evolveum.midpoint.repo.sqale.qmodel.object.QObjectMapping.toRowObjectWithoutFullObject(QObjectMapping.java:210)
    at com.evolveum.midpoint.repo.sqale.qmodel.focus.QFocusMapping.toRowObjectWithoutFullObject(QFocusMapping.java:143)
    at com.evolveum.midpoint.repo.sqale.qmodel.focus.QUserMapping.toRowObjectWithoutFullObject(QUserMapping.java:79)
    at com.evolveum.midpoint.repo.sqale.qmodel.focus.QUserMapping.toRowObjectWithoutFullObject(QUserMapping.java:23)
    at com.evolveum.midpoint.repo.sqale.update.AddObjectContext.addObjectWithOid(AddObjectContext.java:106)
    at com.evolveum.midpoint.repo.sqale.update.AddObjectContext.execute(AddObjectContext.java:78)
    at com.evolveum.midpoint.repo.sqale.update.AddObjectContext.execute(AddObjectContext.java:56)
    at com.evolveum.midpoint.repo.sqale.SqaleRepositoryService.executeAddObject(SqaleRepositoryService.java:351)
    at com.evolveum.midpoint.repo.sqale.SqaleRepositoryService.addObject(SqaleRepositoryService.java:331)
    ... 4 common frames omitted
Caused by: java.lang.IllegalArgumentException: Invalid UUID string: tony
    at java.base/java.util.UUID.fromString(UUID.java:215)
    at com.evolveum.midpoint.repo.sqale.SqaleUtils.oidToUuid(SqaleUtils.java:60)
    ... 13 common frames omitted
2022-01-18 19:00:12,814 [pool-1-thread-2] INFO (SYSOUT): Processed: 71, error: 1, skipped: 0, avg processed: 17,68obj/s
2022-01-18 19:00:14,814 [pool-1-thread-2] INFO (SYSOUT): Processed: 240, error: 1, skipped: 0, avg processed: 39,89obj/s
2022-01-18 19:00:16,814 [pool-1-thread-2] INFO (SYSOUT): Processed: 293, error: 1, skipped: 0, avg processed: 36,55obj/s
2022-01-18 19:00:17,496 [pool-1-thread-1] DEBUG (SYSOUT): Operation: producer finished
2022-01-18 19:00:18,814 [pool-1-thread-2] INFO (SYSOUT): Processed: 406, error: 1, skipped: 0, avg processed: 40,54obj/s
2022-01-18 19:00:18,977 [pool-1-thread-3] DEBUG (SYSOUT): Operation: finished
2022-01-18 19:00:20,815 [main] INFO (SYSOUT): Import finished in 10,18s. Processed: 421, error: 1, skipped: 0, avg processed: 41,36obj/s
tony@tdm-box: /opt/midpoint$
tony@tdm-box: /opt/midpoint$
tony@tdm-box: /opt/midpoint$
```

- Migration of data to native PostgreSQL repository is finished
- Make sure same configuration changes are applied to all nodes in cluster deployment
- You may start your migrated instance
- You should observe logs and resume all suspended tasks
- Verify that migration happened successfully.

- Audit data may be too large to be migrated at single planned downtime window
- It's possible to migrate audit at later date, but you need to plan for that from beginning of migration
- See Native Audit section in documentation for more information about postponed audit migration  
<https://docs.evolveum.com/midpoint/reference/repository/native-audit/#audit-migration-from-other-database>

# | Migration performance numbers

- midPoint with 20k users, 40k shadows, 100k audit records
- Test machine
  - Intel i8700 6-core
  - 32GB RAM
  - HDD WD Blue 5400rpm
  - PostgreSQL running on same machine

Operation	Average objects / sec	Total time
Export data	859	73s
Import data (12 threads)	196	320s
Export audit	380	286s
Import audit (12 threads)	309	350s

- midPoint 4.4 Release notes

<https://docs.evolveum.com/midpoint/release/4.4/>

- midPoint Upgrade Guide

<https://docs.evolveum.com/midpoint/reference/upgrade/upgrade-guide/>

- PostgreSQL native repository

<https://docs.evolveum.com/midpoint/reference/repository/native-postgresql/>

- Native PostgreSQL Audit Trail

<https://docs.evolveum.com/midpoint/reference/repository/native-audit/>



- Target:
  - Tens of millions of identities
- Key results:
  - Improved scalability of midPoint
  - Improved visibility, diagnostic and reliability of midPoint
  - Improved performance and user experience of midPoint user interface



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- Tasks, February 3, 2022 by Pavol Mederly
- Customizing GUI, February 10, 2022 by Katarína Bolemant
- Native reports, February 16, 2022 by Lukáš Škublík

# Thank you for your time!

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