



# Arangen Migration Service

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## Arangen Migration Solutions

Data migration is an important constituent of IT systems migration and integration. Systems migration replaces aging legacy applications and data sources with newer or updated versions running on newer, more modern platforms. Migration projects install new or legacy business applications and data sources into an existing IT system, or cross-integrate enterprise IT systems between different business units. The primary object of systems migration and integration is to reduce IT system complexity, enable separate business systems to share data and work together, streamline business operations, and reduce IT maintenance costs.

Arangen creates platform-independent custom migration solutions that incorporate data federation and consolidation solution components which are applied within a step-by-step migration process. A large migration project may have multiple instances of federation and consolidation solution components to perform separate federation/consolidation migration steps.

Arangen's platform-independent federation solutions liberate enterprise data from legacy data silos, removing roadblocks to IT system migration. Arangen technology applies metadata-driven virtual database technology that re-maps and re-engineers data in real-time from legacy silos to create a unified, global source for integrated enterprise data. Arangen federation technology restructures and re-purposes legacy data for enterprise-wide reuse.

Arangen's platform-independent consolidation solutions relocate federated enterprise data from legacy data silos to new or existing databases. Arangen consolidation technology extends the data federation virtual databases with metadata-driven consolidation engines. The consolidation engines read enterprise data from the virtual databases and copies the data into the consolidation databases. Consolidating the virtual databases preserves federated virtual data sources, compacts and simplifies the data, and increases performance.

The migration process incorporates new application development, legacy application re-development, and the installation of brand new applications. Applications are targeted (or re-targeted) to access unified enterprise data through the combination of the federated virtual database interfaces and newly consolidated databases. As new and updated applications shift business operations away from the aging legacy data sources, the legacy data sources can be shutdown and retired.

Typical migration objectives include:

- 1 Modernizing to eliminate obsolete legacy systems while preserving data and function.
- 2 Preserving some legacy systems while other parts of an IT system undergo modernization.
- 3 Cross-integrating legacy systems to enable them to share data and work together.
- 4 Streamlining IT operations by integrating/combining redundant legacy systems.



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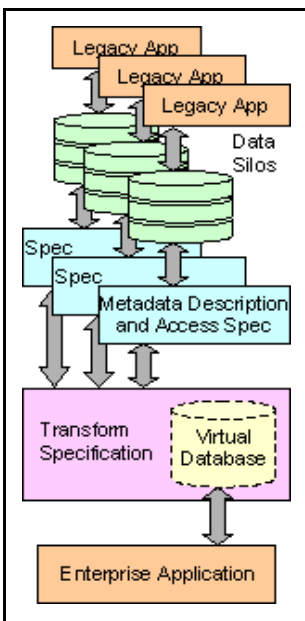
The Arangen migration process can be applied to continuously modernize enterprise IT systems. Migration and business operations proceed in parallel. Arangen migration solutions do not impede or interrupt the smooth operation of normal, ongoing business operations.

### Enterprise Migration Problems

Legacy data silos are the main obstacle to enterprise migration. Integrating, building, and/or installing new business applications (or updating old applications) can be blocked when access to data in isolated legacy silos is required. Besides being locked in legacy silos, needed data comes in the wrong format, is inconsistent, and is not organized according to new business application requirements. Designing and implementing data migration solutions can be risky, costly and time consuming. And... if read/write capabilities to the legacy silos is required, then data consistency problems become critical. These legacy data issues must be solved before IT systems migration and integration projects can be executed.

### Arangen Technology

Data migration procedures are central to IT systems migration and integration. A complex migration project may require several separate data migration sub-projects that work on different legacy data systems, to accomplish different outcomes. Arangen's custom data migration process employs flexible migration technologies that are applied to create custom data federation and consolidation solutions. Migration solutions include conventional federation, reverse federation, consolidation data movers, and consolidation query routers.

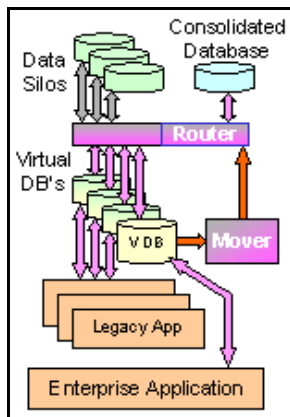


Arangen's platform-independent federation solutions re-map and re-engineer enterprise data in real-time to create new restructured data sources from data retrieved from legacy silos. The new, restructured data sources are implemented using Arangen's virtual database technology and behave as ordinary databases able to execute standard SQL in real-time. Applications use standard SQL to query the virtual databases and receive results in the standard form. Arangen virtual database technology uses metadata configured query engines to transcribe calling queries for execution on the back-end legacy data sources.

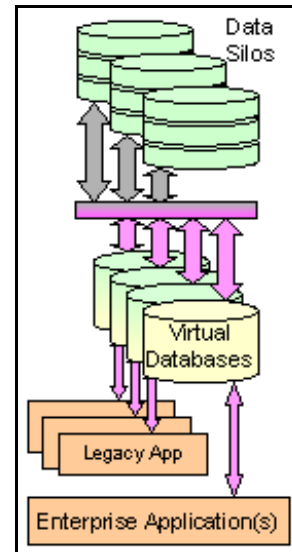


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Arangen federation technology can create multiple virtual databases where each combines, reorganizes, and restructure data from legacy sources in a different way for different requirements. Different virtual databases may share the same legacy data sources, yet can all run in parallel at the same time without cross interference. Where required, each virtual database can see all updates made in the legacy data sources by all the other virtual databases and their respective legacy applications.



Arangen consolidation is simple in concept. Consolidation reads all available data from a virtual database and copies the data to a new database. Consolidation converts a virtual database to an actual database. In practice, consolidation is more complex because of the need to consolidate in parallel with normal IT system operations without disrupting those operations. The consolidation engines read enterprise data from the virtual databases and move it to the designated new databases. The consolidation engines implement an application query router working as a read-through query cache overlaid on a synchronized bulk data mover.



The consolidation data mover does the heavy lifting in the background, copying re-engineered legacy data to new databases. The consolidation mover sequences through the re-engineered legacy data using order-by indexing to insure data synchronization between the new databases and the legacy data sources. The consolidation mover only runs (interleaves) when the system is idle and does not impede normal application operations.

The consolidation query router works with the virtual-database engines enabling them to behave as a read-through query cache, with the consolidated databases in the role of the cache. The consolidation query router intercepts and directs queries from running applications to the correct data source.

A little more about federation: Arangen federation technology is applied to the mix of legacy data sources and consolidated data sources. Virtual databases are created to support the data interfaces for old legacy applications with data retrieved from consolidated databases being reverse re-structured to match legacy data structures. This makes it possible to preserve and extend the service life of vital legacy applications. This is called reverse federation.

Reverse federation allows legacy data sources to be modernized, while keeping vital legacy applications operational. This is important in cross-integration migration projects where the legacy applications of one business unit must share data and work with the legacy systems of another business unit while the business systems are consolidated. The legacy data from an acquired business unit can be consolidated into the data systems of the parent business while



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not affecting the IT operations of the acquired business unit. When the migration to the preferred business application solution is complete the legacy application and its data silo can be retired.

See the Arangen Federation and Consolidation data sheets for more details.

### Arangen Migration Solutions

Arangen's platform-independent Migration Solutions support a wide range of IT system migration objectives. The primary objectives of migration projects are IT system modernization and integration. Modernization seeks to replace aging legacy systems with more up-to-date equivalents. Simple integration seeks to add new business functionality to existing IT systems. Cross-integration merges isolated IT systems enabling them to share data and work together, or to simply retire a redundant system.

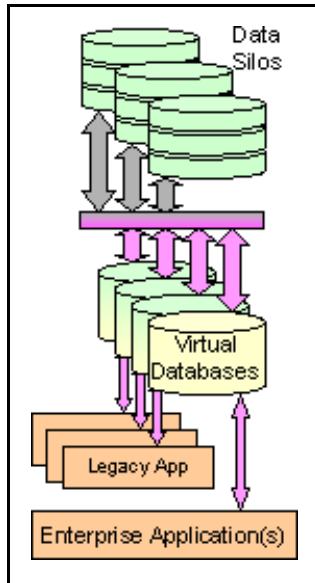
Arangen's platform-independent custom data migration solutions can apply multiple instances of data federation and consolidation actions throughout a migration project. During the execution of a migration project existing business systems must be fully operational at all times. This means that the existing IT applications must continue to run, non-stop, while legacy data is being federated and consolidated, and as new or updated applications are being developed, tested, and deployed. Intermediate migrations that switch business operations to new or upgraded applications must follow a well defined roll-over process. Arangen supplies custom solutions to handle the critical federation, consolidation, and business roll-over migrations.

A complex migration project modernizes and integrates legacy business applications and data sources. For example, when a company acquires a new business unit, the business applications must be cross-integrated to share data and work together. Legacy applications in the parent must be given access to enterprise data in the newly acquired business unit and visa-versa. Vital legacy applications on both sides must be kept operational after the supporting legacy data sources have been consolidated and modernized, and the legacy data silos retired.

For a general case complex migration project example, legacy applications in the parent business unit will need access to legacy data in the acquired business unit. New business applications in the parent will need access to all legacy data. Some legacy applications in the parent must be upgraded with new functionality and new data while legacy applications in the acquired business unit continue to function until they can be phased out – updated and migrated to the parent systems. Acquired unit legacy data must be consolidated and migrated to the parent business unit, and legacy applications in the new business unit re-targeted to consolidated data sources in the parent. Finally, those legacy data sources that have been idled or replaced are then shut down and retired. This example migration is accomplished with Arangen complex federation and consolidation.



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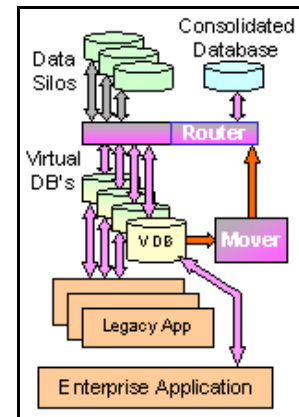


Arangen federation technology is applied to examine legacy data silos in the parent and acquired business units and to extract a metadata specification snapshot. One or more virtual databases are configured to implement any required new enterprise data sources and to replicate the legacy application data interfaces as needed. (This is where the acquired business unit's legacy data is opened to the parent unit's applications).

Business applications in the parent and acquired unit are re-targeted to the virtual databases that combine parent and new business unit enterprise data. At this point, the legacy applications in both business units are now operational with combined enterprise data. Business applications in the parent can now be upgraded and/or new applications can be developed (as desired) to better use combined enterprise data. Applications in both business units can remain unchanged and continue to run as before.

Arangen consolidation technology is applied to relocate enterprise data from some federated virtual databases into new or existing databases. Consolidation compacts and simplifies the data, and increases performance.

Arangen federation is again applied, in reverse federation mode this time, to build one or more new virtual databases that replicate and recreate some legacy data interfaces using the consolidated data sources. These new virtual databases provide legacy data interfaces to support ongoing operations for those vital legacy applications that will not be retired but whose legacy data silos are no longer needed.



When the new system is fully operational, the integration project is complete. Legacy systems that have been consolidated and are no longer needed can be shutdown and retired. Arangen technology remains in place to support those legacy applications still targeted (reverse-federated) to virtual database legacy data interfaces.

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Arangen Migration Solutions support IT system modernization, data and application integration, legacy system cross-federation, and consolidation. Arangen professionals build and deliver a related set of platform-independent custom data federation and consolidation solutions. The custom federation solutions implement virtual databases that integrate legacy data sources. Related custom consolidation solutions implement consolidation query routers and data movers to relocate federated, integrated legacy data. Arangen migration solutions enable normal, ongoing business operations to run without interruption throughout an entire migration project.