How I Implement Power BI in Enterprises

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Who is Greg?

CEO and Principal Mentor at SDU, CDU
Long term Data Platform MVP
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Certified Master for SQL Server
Author

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What we'll cover

- The end game
- Security and identity
- Loading / transforming ?
- Project management

Unsplash image by Avi Creative

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Deciding what to Implement

- Key decisions
  - Where is their current data ?
  - How cloud-tolerant are they?
- Cannot use a single approach

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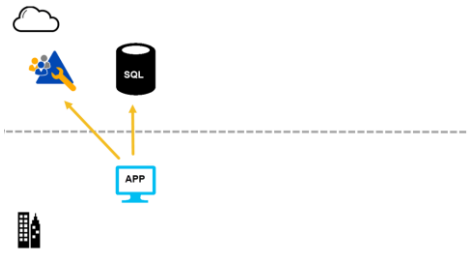
Cloud Native



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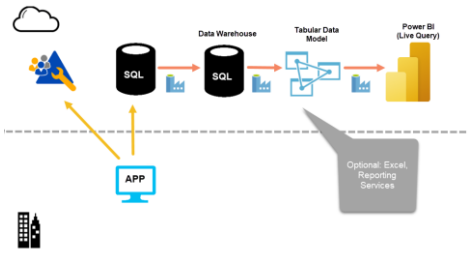
Cloud Native Implementation



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Cloud Friendly

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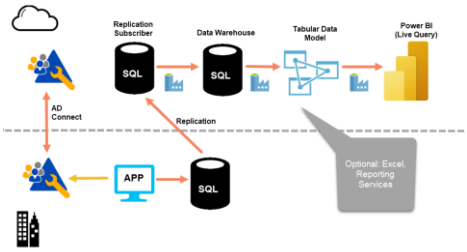
Cloud Friendly Implementation



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Cloud Conservative

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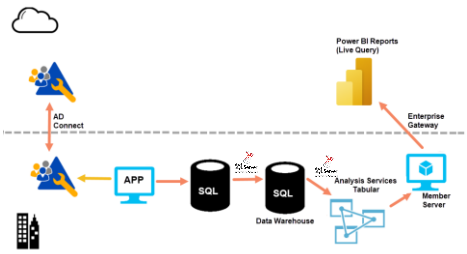
Cloud Conservative Implementation



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Cloud Unfriendly

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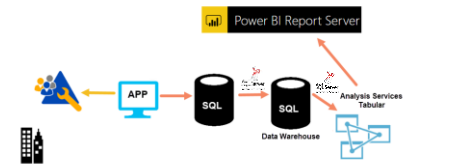
Cloud Unfriendly Implementation



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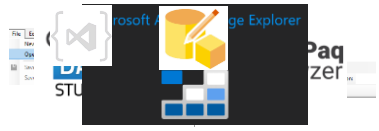
Other Tools We Use - General

- SQL Server Reporting Services
- SQL Server Data Tools
- Tabular Editor (2 and 3)
- DAX Studio (& Vertipaq Analyzer)
- Azure Storage Explorer



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Identity Aims

- Must haves
  - Single consistent identity for staff
  - Hybrid identity: on-premises and cloud
  - Work with in-house and SaaS offerings
  - Avoid password proliferation
  - Role based not just user-based
- Might also need
  - Integration with identity of partners
  - Identity system for consumers / members

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Azure AD Core Objects

- Users, Groups, Devices
- Multi-factor Authentication (MFA)
- Single Sign-on (SSO)
- RBAC
- Conditional Access
- Supports Branding

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Synchronizing with AD Connect

- Microsoft tool for synchronizing directories
- Options
  - Password hash sync (hash from on-premises sent to cloud)
  - Pass-through (auth passed from cloud to on-premises AD)
  - Federation (usually not needed but adds onto existing AD FS)
- Sync Options
  - Choose what to sync (users, groups, other objects)

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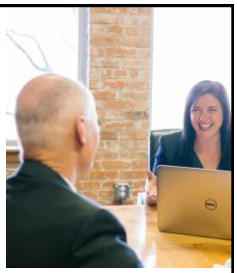
Azure AD – B2B

- Identities from partner organizations
- Partners added to groups and teams
- Avoid duplicating identities
- Branding from inviting organization



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Azure AD – B2C

- Full-featured identity system
- For consumers, patients, customers
- Any email address or username
- Supports industry standard social identity providers

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Managed Service Identities (MSIs)

- Services often need to authenticate
  - To databases
  - To other services (AS, Key Vault, etc.)
- Some services expose MSIs
  - Identity managed by Azure
  - Is an Azure AD identity and can be assigned permissions
  - ADF has one, Azure AS does not

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Unsplash image by Mikołaj Kuhar

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Q: Should you build a DW database?

- Contrary to Betteridge's law:
- Yes !

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Analytics over existing relational systems

- Sounds good in theory
- Generally lousy outcomes
- Often leads to poor transformation code
- Often leads to lack of code re-use
  - & inconsistent outcomes
- Can lead to performance issues

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What's needed?

- Must haves:
  - Clean model for building analytics
  - Focused on analytics, not relational
  - Directly human readable/presentable output
  - Data cleansing / validation
- Might also need:
  - Multiple source systems
  - Data versioning

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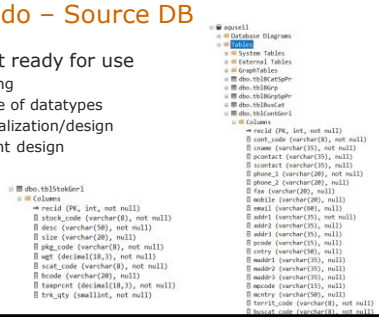
What we do – Source DB

- Usually not ready for use
  - Poor naming
  - Poor choice of datatypes
  - Poor normalization/design
  - Inconsistent design



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What we do – Prefer cloud-based DB

- Establish replica of source DB tables in cloud
  - Not essential but if customer comfortable
  - Typically a subset of tables
- Azure SQL Database
- Often connect via Transactional Replication
  - Supported on-premises SQL Server to Azure SQL Database
  - Push subscription
  - Great choice for centralizing corporate data

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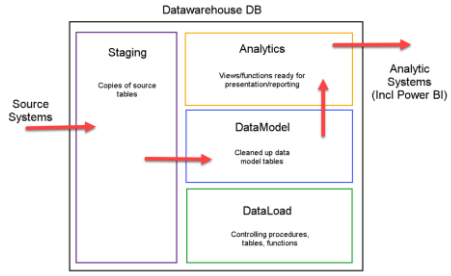
What we do – Datawarehouse Layers



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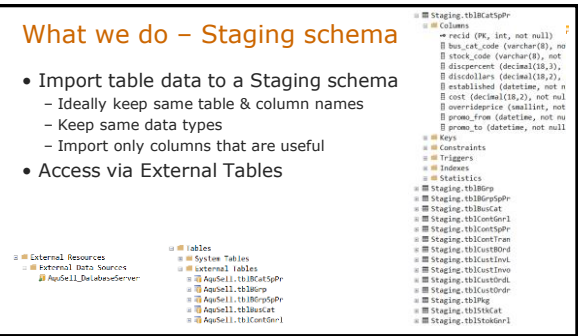
What we do – Staging schema

- Import table data to a Staging schema
  - Ideally keep same table & column names
  - Keep same data types
  - Import only columns that are useful
- Access via External Tables



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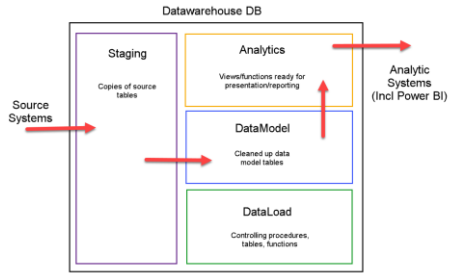

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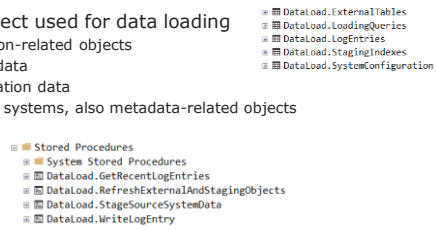
What we do – DataLoad schema

- Holds object used for data loading
  - Integration-related objects
  - No user data
  - Configuration data
  - On some systems, also metadata-related objects



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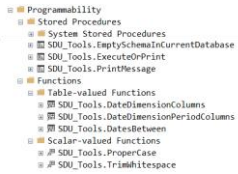
What we do – SDU_Tools schema

- https://sdutools.sqldownunder.com (free)
- Selected (or all) tools added to SDU_Tools schema
- Utility functions, procedures, and views



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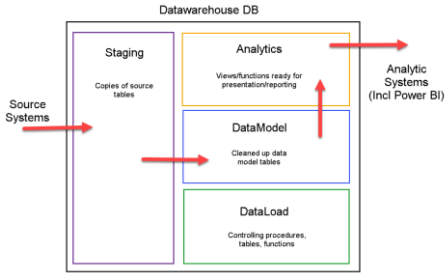
What we do – Datawarehouse Layers



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What we do – DataModel schema

- Cleaned up data model
  - No longer use Dimension/Fact schemas
  - Usually quite different to source system
  - Consistent naming, data types
- Relationships based on single column keys

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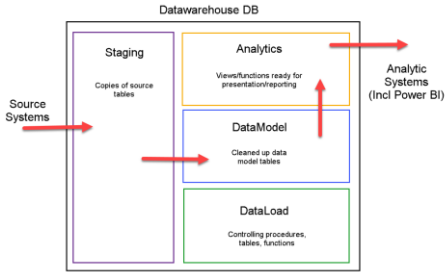
What we do – Datawarehouse Layers



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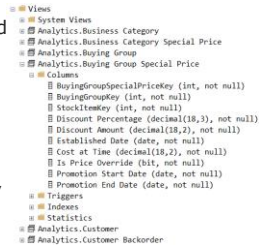
What we do – Analytics schema

- Human-presentable data mod
- Naming ready for use:
  - Reports
  - Tabular Models
  - Power BI
- Security boundary for analytic tools
  - SELECT/EXECUTE on schema only



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What we do – Tabular data model

- Prepare the model
  - Import the Analytics views
  - Create hierarchies
  - Create common measures
  - Hide key columns
  - Set formatting
  - Set column sort orders
  - Add empty table for report measures
- Implement row level security

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What we do – Power BI

- Use Live Query connections to Analysis Services
  - Or use Power BI Premium (often licensing-based decision)
- Add report specific measures
- Design the visualisations

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What's needed?

- Must haves:
  - Repeatable processes
  - Source control integration
  - Multiple environments
- Might also need:
  - DevOps integration (CI / CD)
  - Project management (Boards)
  - Testing frameworks

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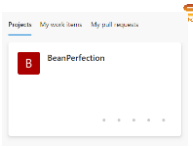
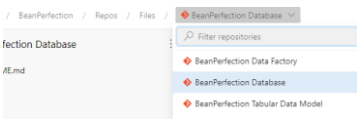
What we do

- Use Azure DevOps projects
- Three core repositories
  - Database
  - Data Factory
  - Tabular Data Model





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Resources to study more

https://blog.greglow.com/2021/06/18/book-implementing-power-bi-in-the-enterprise/

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Thank you

- Contact me: greg@sqldownunder.com
- Lots of free stuff: https://sqldownunder.com/free-stuff
  - SDU Tools, eBooks (SSMS Tips and Tricks, TDE, Snowflake), Podcast
- Blog: http://blog.greglow.com
- Free and paid online on-demand training: https://training.sqldownunder.com

(Enterprise PBI course soon)

- Stay online for my live Q&A sessions

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