

# Administering Your Microsoft SQL Server Geodatabase

Chet Dobbins

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# Intended Audience

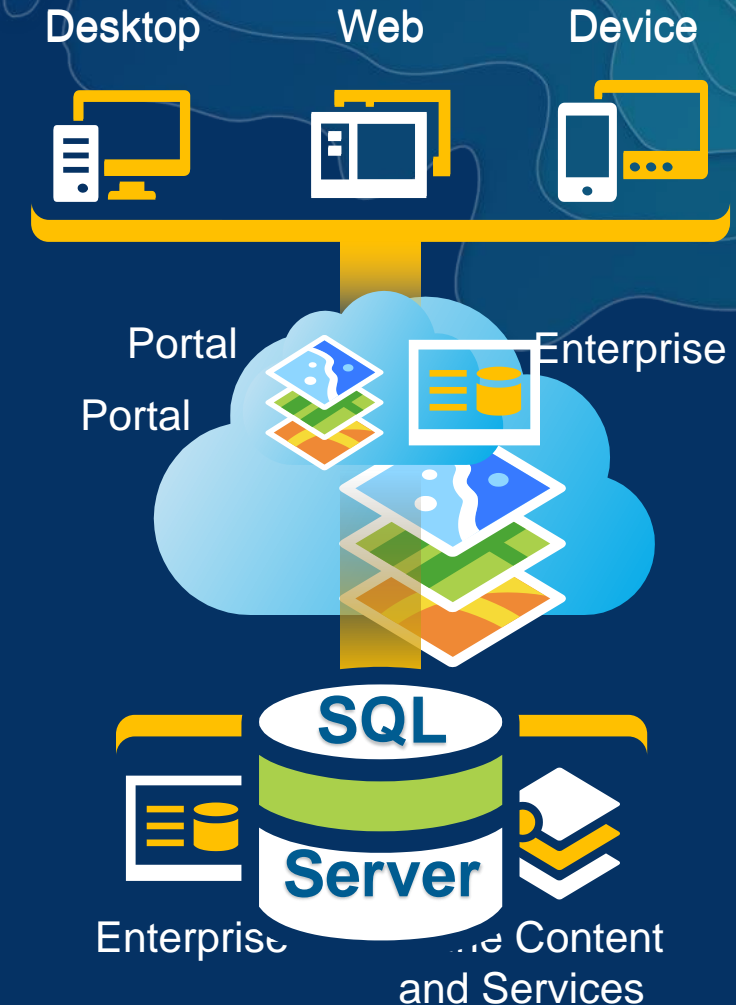
**You are.....**

- A geodatabase administrator
- An accidental DBA
- A deliberate DBA
- Not sure what DBA means

**And you...**

- Store your data in a SQL Server database
- Are thinking about using SQL Server

**This is your session!**



# Agenda

## News since the last UC

### How do I ...

- Configure SQL Server to support geodatabases?
- Create geodatabases?
- Control access to my data?
- Make sure that my data is safe?
- Maintain good performance?



# News

ArcGIS and Microsoft changes since last year

# What's new in ArcGIS

- **Applies to:**
  - ArcGIS 10.5.0 and 10.5.1
  - Pro 1.4 and 2.0
- **New storage method for geometry attributes in geodatabases in SQL Server**
- **Log file tables**
  - When you use an ArcGIS client with a geodatabase, log file tables are always created as temporary tables.
- **Register views with the geodatabase**
  - The Register with Geodatabase geoprocessing tool has been extended to allow you to register views.

# New storage replaces SDE\_GEOMETRY## tables

- Business table has new column
  - GDB\_GEOMATTR\_DATA field
- Stores geometry attributes
  - True curves, circular arcs, point IDs, multi-patch shapes etc.
- Better performance
- Run the Migrate Storage geoprocessing tool to move the geometry attributes into the business table
- Available in 10.5.0 and higher geodatabases
- Readable by ArcGIS clients **10.3.1** and higher

# Registering views with the geodatabase

- **Register with Geodatabase GP tool has been expanded**
  - Register view with the geodatabase
  - Additional parameters to control ObjectID field, geometry type, spatial reference & extent
  - Registration of empty tables/views
- **Registered views**
  - Read-only
  - Single geometry field, single geometry type, ObjectID field required

# Supported SQL Server versions

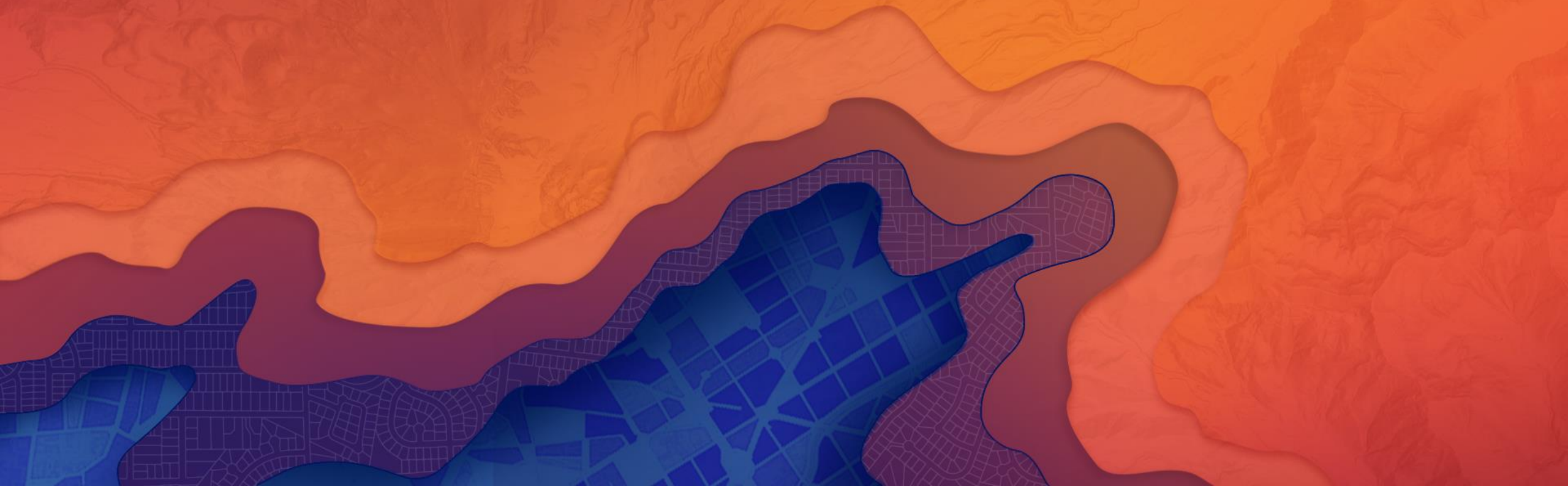
- **10.3.x** last release to support SQL Server 2008 & 2008 R2
- **10.4.x & 10.5.x** releases support SQL Server 2016
- **ODBC 13 driver** – supported with 10.4.1 and higher only
  - 10.4 use ODBC 11 driver
- **SQL Server 2016**
  - Native Spatial Implementation(s)
  - Spatial Index Builds Faster
- **SQL Server 2017 & SQL Server Linux**
  - Will be certified and supported with next release



# How do I...?

Common questions when working with SQL Server  
databases and geodatabases

**How do I...**  
**configure SQL Server to support geodatabases?**



# How do I configure SQL Server to support geodatabases?

- **Install a supported version of SQL Server**
  - Microsoft SQL Server database requirements for ArcGIS
  - Must use a Case-Insensitive (CI) collation
- **Can use Windows or Mixed-mode authentication**
- **SQL Server Browser not required**
  - Must provide static TCP port on connection



# Connecting to SQL Server from ArcGIS

- **Requires a Microsoft stand-alone DLL**
  - Microsoft ODBC Driver 13 for SQL Server – ArcGIS 10.4.1 and higher
  - Microsoft ODBC Driver 11 for SQL Server – ArcGIS 10.3.x and 10.4
  - SQL Server Native Client – ArcGIS 10.2.x and earlier
    - SQL Server 2012 is last release to ship the Native Client
- **Install on every single client**
- **Must be same or newer version than SQL Server**



SQL Server 2016

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Management Studio

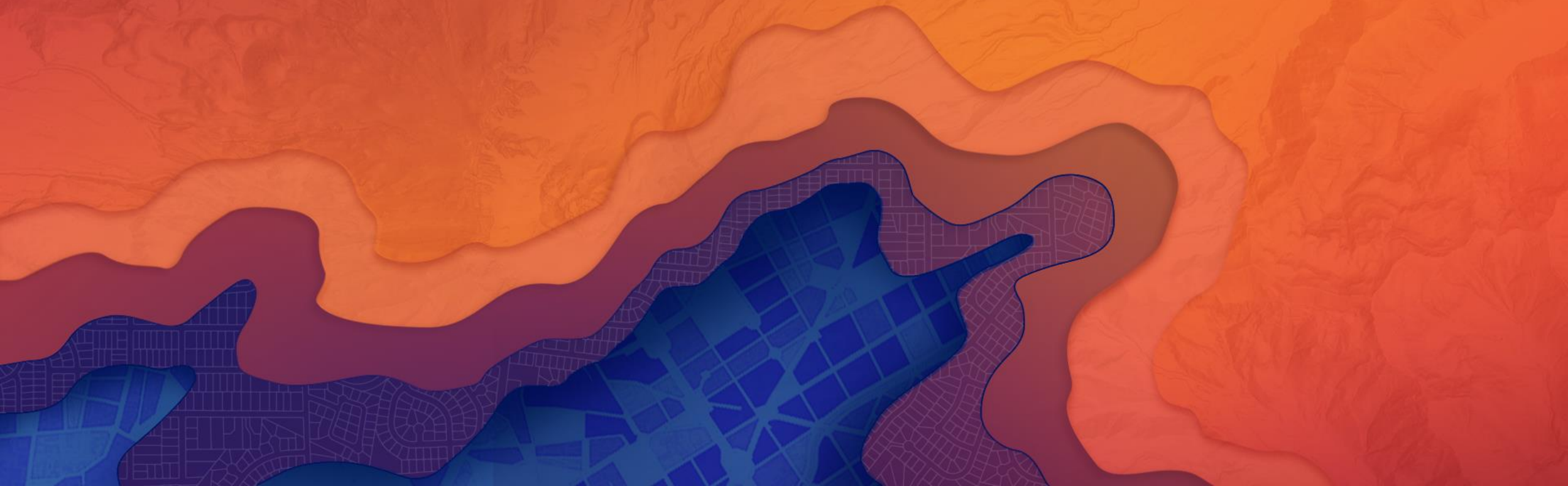
Powered by Visual Studio

# Connecting to SQL Server

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**How do I...**  
**create geodatabases?**



# Databases and Geodatabases

- A **database** is a SQL Server object
  - There can be many per SQL Server instance
- A **geodatabase** is an ArcGIS construct hosted in a database
  - One allowed in each database
- Options for creating geodatabases
  - Use a GP tool to create a new geodatabase from scratch
  - Use a GP tool to create a new geodatabase in an existing database



# Creating a geodatabase

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# Points to remember

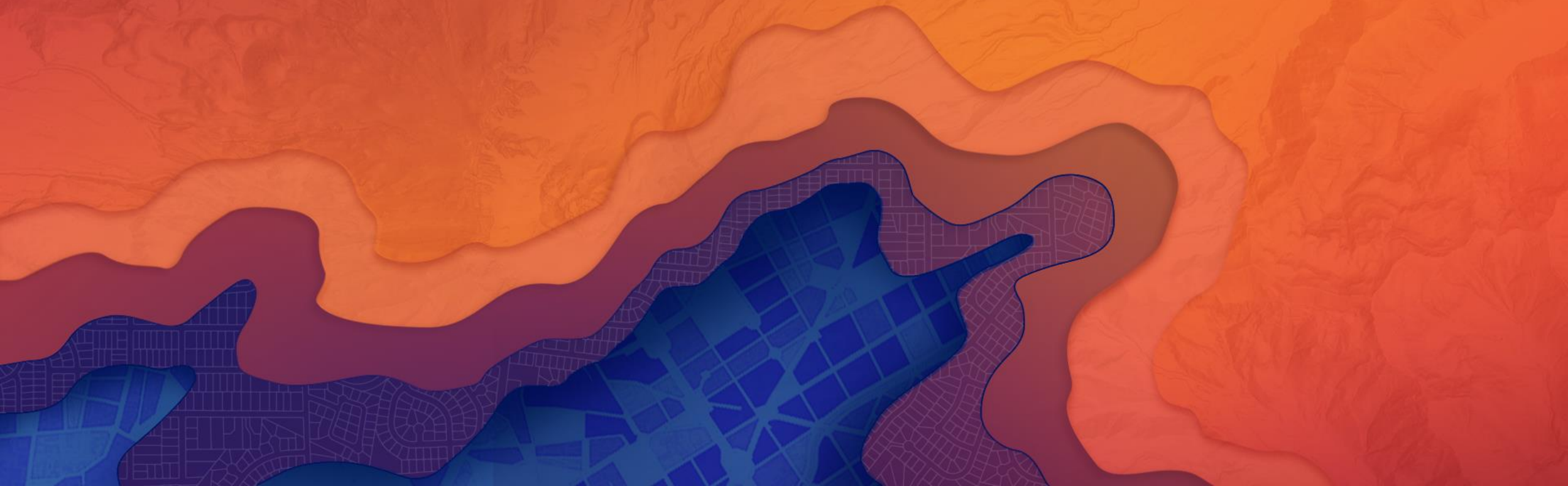
- **Use GP Tools to create geodatabases**
  - Default size of 500MB data file & 125MB logfile
- **More control over storage?**
  - Use SQL Server tools to create database first
- **Enable geodatabase tool**
  - Create a geodatabase in an existing database, without sysadmin privileges
- **Do not rename a database that contains a geodatabase**

# Upgrading a geodatabase

- **Permissions**
  - Requires DBO, SysAdmin or db\_owner
- **Order of operations when upgrading both geodatabase and SQL Server**
  - One at a time
  - **SQL Server needs to be at supported release for upgraded version**
    - **Applies to geodatabase AND connecting clients**
- **Upgrading SQL Server**
  - Does not upgrade compatibility level of your database



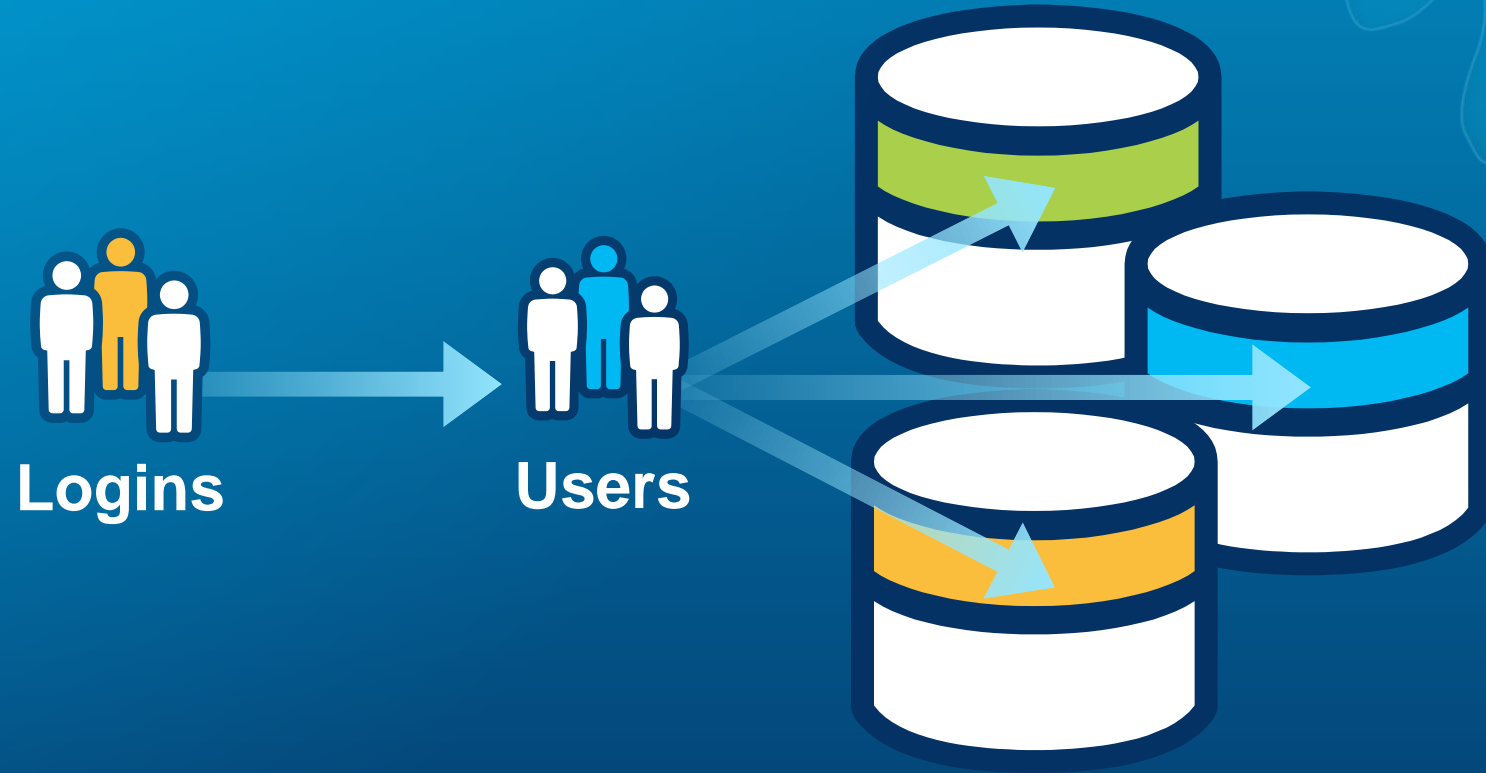
**How do I...**  
**control access to my data?**



# SQL Server Principals

- **Logins = Authentication**
  - Who is connecting?
- **Users = Authorization**
  - What can this person do in the database?
- **Schemas = Containers**
  - What are logical groups of database objects that should be managed as a whole?

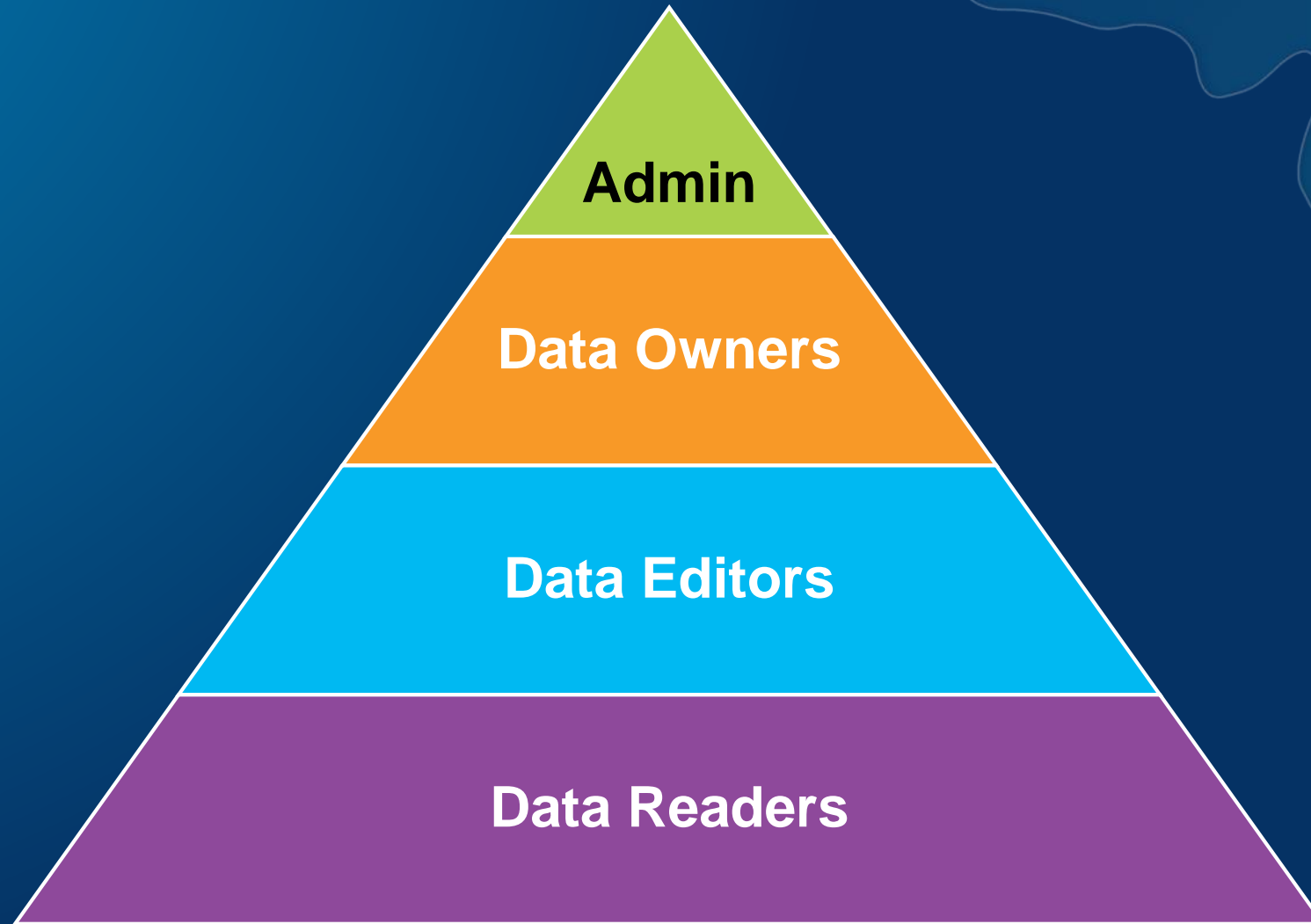
# SQL Server Instance



# User-schema relationship

- For users that create data, ArcGIS requires that
  - **user name = default schema name**
    - Not a SQL Server rule
- Users that are DBO all create data in the DBO schema
- Data readers & editors do not need a same-named schema

# Limit Permissions for Most Users





# Who is DBO?



*Sysadmin* fixed-server role members are **DBO** in every database



Database owner  
Is **DBO** in single  
database



*Db\_owner* role members  
are **NOT** DBO

Have DBO-like permissions



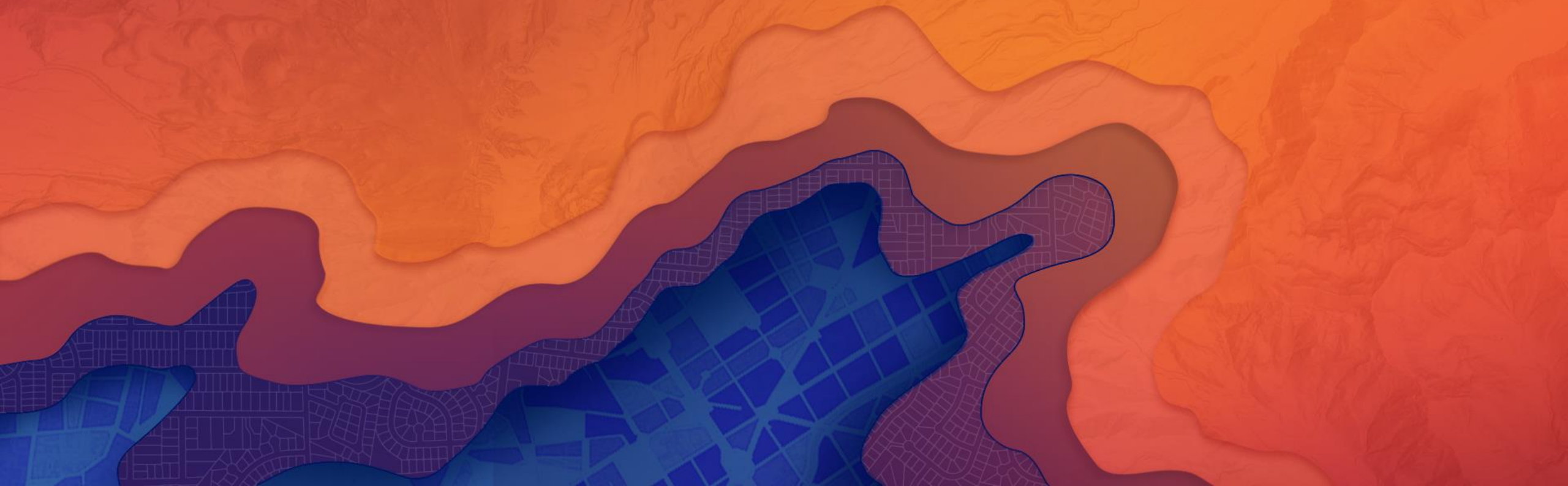
# Managing Permissions

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## Points to remember

- **Creating a user does not give access to data in the database**
  - It must be granted by the data owner
- **ArcGIS tools manage permissions on all parts of a feature class**
- **Creating a user with the Create User tool will grant permissions sufficient for creating data**

**How do I...**  
**make sure my data is safe?**







# **BACKUP YOUR DATA NOW!!!!**

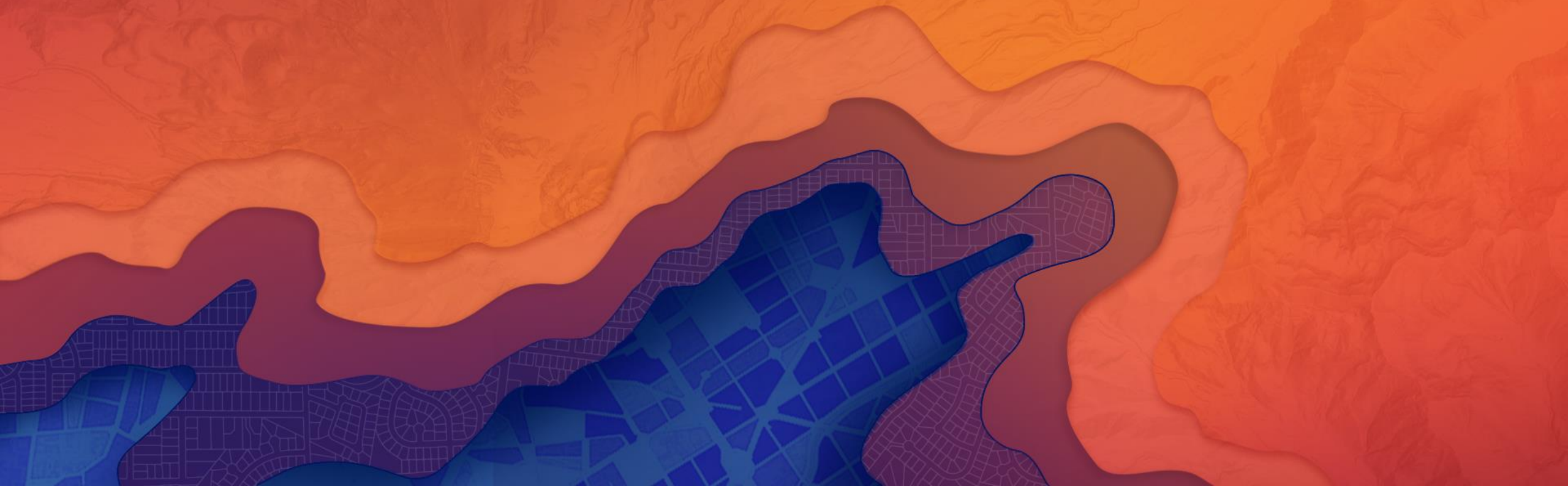
(and practice restoring it)



# Points to remember

- Backups are the only way to reliably protect your data
  - Decide how much time you can afford to lose when disaster strikes and data must be restored
  - Create a restore plan that will achieve that goal
  - Create a backup plan that supports your restore plan
  - Implement your plan
  - **Test your recovery plan regularly by using real backup media to restore to a system capable of being used in production**

**How do I...**  
**maintain good performance?**



# How do I maintain good performance?

- **Standard maintenance**
  - Reconcile/Post/Compress
  - Rebuild Indexes
  - Update Statistics
- **Layer scale dependencies**
- **Spatial data performance - Spatial Index**
  - Is it being used?
  - Is it the right index?
  - Manual grid vs Auto grid



# Spatial Indexes

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# Spatial index performance

- Use Auto grid indexes
  - Default spatial index type for ArcGIS 10.3.x and higher
  - Points – test using Manual grid with High on all 4 levels
- Extents
  - Make your spatial index extent is  $\geq$  feature class extent
- **Keep SQL Server current**
  - Apply Service Packs & Cumulative Update Patches



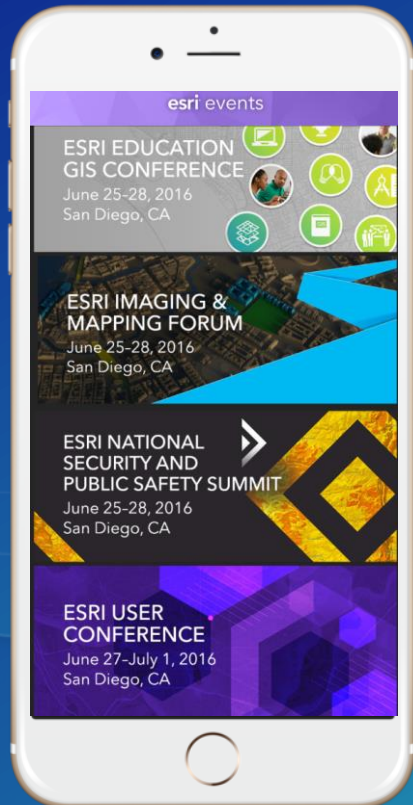


**Thank you**  
**Questions?**

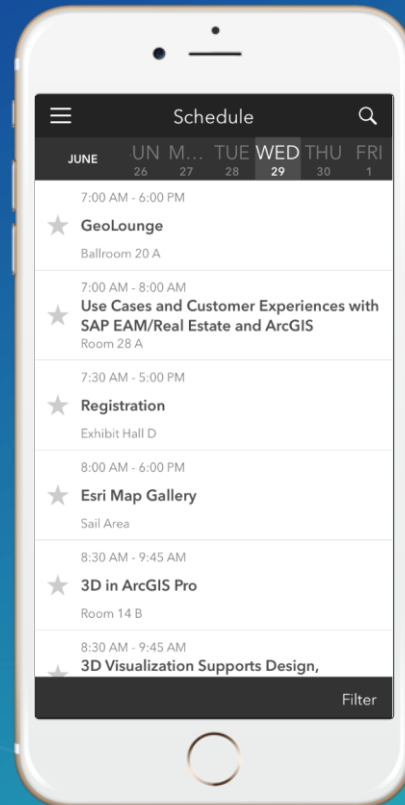
# Please take our Survey

Your feedback allows us to help maintain high standards and to help presenters

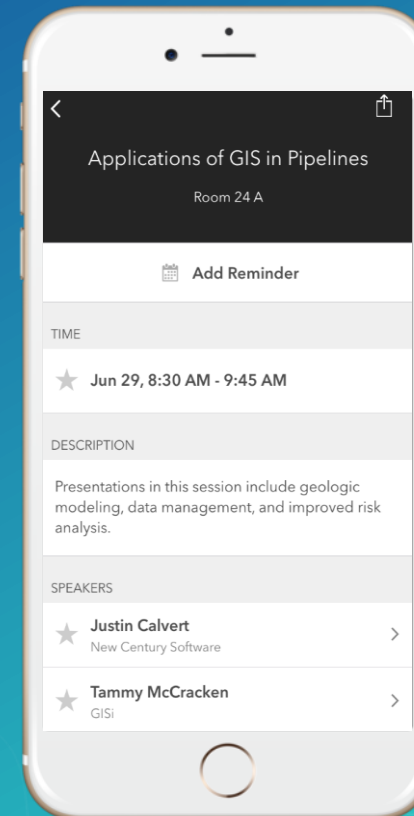
Find your event in the  
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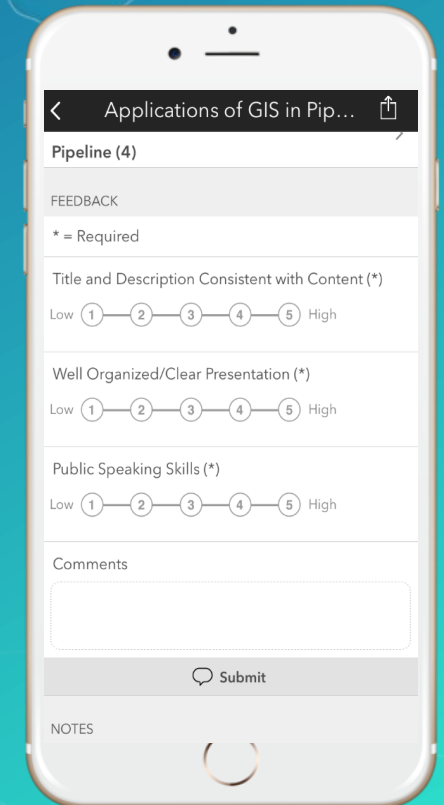
Find the session  
you want to review



Scroll down to the  
bottom of the session



Answer survey  
questions and submit







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