4.2 Data System - Data Blocks

Data-Blocks

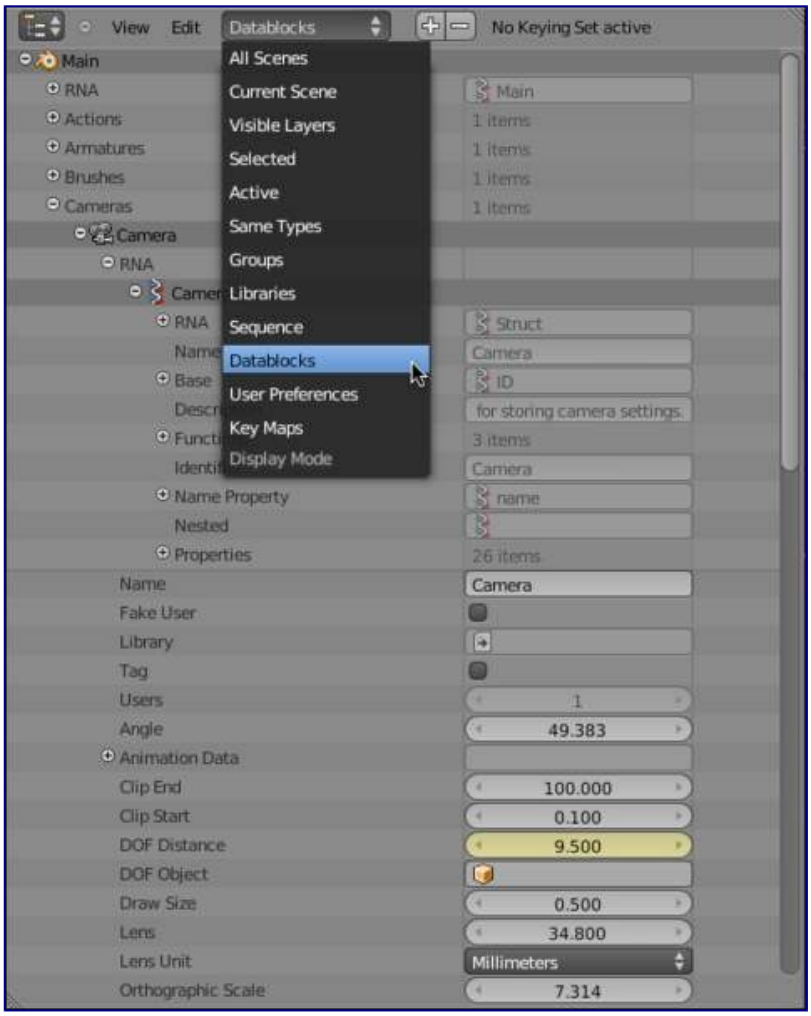
The base unit for any Blender project is the data-block. Examples of data-blocks include: meshes, objects, materials, textures, node-trees, scenes, texts, brushes and even screens.

For clarity, bones, sequence strips and vertex groups are **not** data-blocks, they belong to armature, scene and mesh types respectively.

Some common characteristics:

- They’re the primary contents of the `.blend` file.
- They can link to each other, for reuse and instancing. *(child/parent, object/object-data, with modifiers and constraints too).*
- Their names are unique.
- They can be added/removed/edited/duplicated.
- They can be linked between files *(only enabled for a limited set of data-blocks)*
- They can have their own animation data.
- They can have custom properties.

When doing more complex projects managing data-blocks becomes more important, especially when inter-linking `.blend` files.



Data-blocks view

Users (Garbage Collection)

It’s good to be aware of how Blender, handles data-blocks life-time, when they are freed and why.

Blender follows the general rule where unused data is eventually removed.

Since its common to add and remove a lot of data while working, this has the advantage of not having to manually manage every single data-block.

This works by skipping zero user data-blocks when writing `.blend` files.

In some cases you want to save a data-block even when its unused *(typically for re-usable asset libraries).* see Fake User.

Fake User

Since zero user data-blocks aren’t saved. There are times when you want to force the data to be kept irrespective of its users.

If you’re building a `.blend` file to serve as a library of things that you intend to link-to from *other* files, you’ll need to make sure that they don’t accidentally get deleted from the library file.

Do this by giving the data-blocks a *Fake User,* by pressing the *F* button next to the name of the data-block. This

prevents the user count from ever becoming zero: therefore, the data-block won't be deleted. (since Blender doesn't keep track of how many other files link to this one.)

Users (Sharing)

Many data-blocks can be shared among other data-blocks,

Examples where sharing data is common.

- Sharing textures among materials.
- Sharing meshes between objects (instances).
- Sharing animated actions between objects, for example to make all the lights dim together.

You can also share data-blocks between files, see.

- *linked libraries*.

Removing Data-Blocks

As covered in Users (Garbage Collection), data-blocks are typically removed when they're no longer used.

There are some exceptions to this however.

The following data-blocks can be removed directly: Scene, Text, Group and Screen.

Other data-blocks such as groups and actions can be *Unlinked* from the *Outliner* context menu.

Tip

Some data (images especially) is hard to keep track of, especially since image views are counted as users.

For data-blocks that can be unlinked - hold `Shift` while pressing on the *X* button, This force-clears the user-count, so the data-block will be removed on reload.

Data-Block Types

For reference, here is a table of data-blocks types stored in `.blend` files.

Link: Library Linking, *supports bing linked into other blend files*.

Pack: File Packing, *supports file contents being packed into the blend file*.

Type	Link	Pack	Description
Action	✓	✗	Stores animation FCurves. Used as data-block animation data, and the Non-Linear-Editor.
Armature	✓	✗	Skeleton used to deform meshes. Used as object-data & by the Armature Modifier.
Brush	✓	✗	Used by paint tools.

Type	Link	Pack	Description
Camera	✓	✗	Used as object-data.
Curve	✓	✗	Used by camera, font & surface objects.
Font	✓	✓	References font files. Used by Font object-data.
GreasePencil	✓	✗	2D/3D sketch data. Used as overlay *helper* info, by the 3D-View, Image, Sequencer & MovieClip editors.
Group	✓	✗	Reference object's. Used by dupli-grous & often library-linking.
Image	✓	✓	Image files. Used by textures & shader nodes.
Lamp	✓	✗	Used as object-data.
Lattice	✗	✗	Grid based lattice deformation. Used as object-data and by the Lattice Modifier.
Library	✗	✓	References to external `.blend` files. Access from the outliner's *Blendfile* view.
LineStyle	✓	✗	Used by the FreeStyle render-engine.
Mask	✓	✗	2D animated mask curves. Used by compositing nodes & sequencer strip.
Material	✓	✗	Set shading and texturing render properties. Used by objects, meshes & curves.
Mesh	✓	✗	Geometry verts/edges/faces. Used as object-data.
MetaBall	✓	✗	An isosurface in 3D space. Used as object-data.
MovieClip	✓	✗	Reference to an image sequence or video file. Used in the motion-tracking editor.
NodeGroup	✓	✗	Collections of re-usable nodes. Used in the node-editor.
Object	✓	✗	An entity in the scene with location, scale, rotation. Used by scenes & groups.
Particle	✓	✗	Particle settings. Used by particle systems.
Palette	✓	✗	Store color presets. Access from the paint tools.
Scene	✓	✗	Primary store of all data displayed and animated. Used as top-level storage for objects & animation.
Screen	✗	✗	Screen layout.

Type	Link	Pack	Description
			Used by each window, which has its own screen.
ShapeKeys	✗	✗	Geometry shape storage, which can be animated. Used by mesh, curve and lattice objects.
Sounds	✓	✓	References to sound files. Used by speaker objects and the game-engine.
Speaker	✓	✗	Sound sources for a 3D scene. Used as object-data.
Text	✓	✗	Text data. Used by Python scripts and OSL shaders.
Texture	✓	✗	2D/3D textures. Used by materials, world and brushes.
World	✓	✗	Used by scenes for render environment settings.