

## Notes for Windows 98 - Chapter 11

### Sharing and Exchanging Data Among Programs (OLE)

#### CHAPTER OVERVIEW

- The purpose and function of file formats and compound documents are discussed.
- The purpose and function of dynamic data exchange is explained.
- The three types of data exchange are listed, discussed, and compared and contrasted.
- The Clipboard is used to transfer data between applications.
- The purpose and function of the Clipboard Viewer is examined.
- The steps to capture and print an entire screen or just the active window are listed.
- The ways to alter a screen capture are listed and then a screen capture is altered using Paint.
- In the context of data exchange the purpose and function of server and client are compared and contrasted.
- The purpose and function of DDE, OLE, and OLE 2 is explained.
- The function of compound documents is defined.
- The purpose and function of object embedding and linking is explained.
- Linking and embedding objects is compared and contrasted.
- An existing object and a new object are embedded into a document.
- An embedded object is edited.
- If a sound card is available, a sound object is embedded into a document.
- An object is saved to a file, edited, and then linked to multiple documents.
- The purpose and function of scrap files is explained.
- A scrap is created and then dragged and dropped into a document.

#### AN INTRODUCTION TO DATA EXCHANGE

- Application program in specific format to read/write/display and print data.
- **File format** determines type of and arrangement of data in a file.
- Most applications have **proprietary file formats**.
- **Compound document**.
  - Contains elements from other programs
  - Contains its own data.

- Also has (minimum) two different types of data in it (text, graphics, sound, video).
- Data transfer managed by software. (Software creates compound document).
- **Object.**
  - *Principle behind data exchange is treating data as objects.*
  - Entity identified by its properties, operations, and relationships.
  - Can consist of single cell, picture, entire spreadsheet, or video clip.
  - Object is data.
- Three types of data exchange.
  - **(1)Static Exchange.**
    - Data created with one program then moved/copied to another program.
    - Data exchanged cannot be edited.
    - Cannot return to application that created data to edit it in that application.
    - To edit object - recreate it in original program/make changes/copy it to document second time.
  - **(2)Embedding an object.**
    - Embedded object remembers what program created it.
    - Data can be edited by returning to the program that created it.
    - To edit double-click object.
    - Breaks down barriers between objects and program that created them.
  - **(3)Linking an object.**
    - Object not in new document.
    - *Saved as separate file.*
    - Receiving document (container) - keeps information about where object came from.
    - Receiving document has pointer where object came from.
    - Object can be placed in many documents.
    - Data considered **dynamic** not static.
    - Data is live data - ever changing.
    - When object edited, changes reflected in all documents that contain it.

## WORKING WITH THE CLIPBOARD

- File format different.
  - One program cannot read another program's data.
  - **Standard formats** developed for exchanging data between programs.
  - Program **supports file format** - if program can read/write to standard file format - program supports file format.
  - Built-in file converters.
    - Permits file sharing.
    - Data.
      - Native (created by program).
      - Foreign (not created by program).
    - Converts foreign format into own format.
- **Clipboard.**
  - Has no icon.
  - Temporary holding area for data being working with.
  - All data cut/copied - placed on Clipboard.
    - Data converted into standard format (any program can read it).
    - Application can paste data from Clipboard into their documents.
  - Acts as intermediary between programs.
  - Permits static data exchange.
    - Converts data into standard format.
    - Other programs can read standard format.

## ACTIVITY - USING CLIPBOARD WITH WORDPAD AND PAINT

1. Open **WordPad**. Click **File**. Click **Open**.
2. In File name text box, key in:
  - i. **C:\XPROData\Frank.fil (H: at COD)**
3. Click **OK**. Paint should not be maximized.
4. Open **Paint**. Click **File**. Click **Open**.
5. In File name text box, key in:
  - i. **C:\XPROData\Plane.bmp (H: at COD)**
6. Using WordPad, click **File**. Click **Open**.
7. In File name text box, key in:
  - i. **C:\XPROData\Frank.fil (H: at COD)**
8. Type your name on the last line.
9. Select your name.
10. Right-click. Click **Copy**.

11. Click Paint window to make it active.
12. Click **Edit**. Click **Paste**.
13. Click **No**.
14. Open Paint toolbar, click **File**. Click **Open**. In File name text box, key in: **C:\XPROData\Plane.bmp (H: at COD)**
15. Click **No** in Paint dialog box.
16. Using Select tool, select the plane. Click **Edit**. Click **Copy**.
17. Make WordPad active.
18. Click **File**. Click **New**.
19. Click **Rich Text Document**. Click **OK**.
20. Click **No** in the Save Changes dialog box, if it appears.
21. Click **Edit**. Click **Paste**.
22. Close all open programs. Do not save any files.

## CLIPBOARD VIEWER

- Clipboard.
  - Can't see what's on it. (Can't see memory).
  - Used for data exchange.
  - Contents can be saved/deleted or changed to another format.
- Clipboard Viewer.
  - Used to view contents of Clipboard.
  - Accessory.
  - Not installed by default.

## PRINTING THE SCREEN

- Reasons to print screen.
  - Include picture of screen in document.  
(Called **screen capture** or **screen dump**.)
  - Have a hard copy of screen.
    - Useful if creating computer documentation to include picture of what the screen looks like.
    - Show expert how screen looks when computer problem occurred.
    - Creating programs, documentation, educational material, or promotional material about software.
- **Screen capture**.
  - Picture of entire screen or active window.
  - Either of the two actions send picture to Clipboard.

- **Entire screen** <PrintScreen> key.
- **Active window** <Alt> + <PrtScreen>
- **Screen dump.**
  - Transferring of data from Clipboard to printer or other hard copy device.
  - To print screen - must paste it into document created in a program.
  - Program must be able to accept graphics (pictures).

### **ACTIVITY - CREATING/PRINTING A SCREEN CAPTURE**

1. Click **Start**, point to **Programs**, point to **Accessories**, click **Calculator**.
2. Press <PrintScreen>key.
3. Open Notepad.
4. Click **Edit**. (No options available, Notepad cannot accept graphics.)
5. Click outside the menu to deselect it. Close **Notepad**.
6. Open WordPad.
7. Click **Edit**. Click **Paste**.
8. Press <Ctrl> + <Home>, or scroll to move to top of document.
9. Minimize WordPad.
10. Press <Alt + <PrtScreen>. Close My Computer.
11. Restore WordPad. Maximize it.
12. Click **New** icon on toolbar. Click **Rich Text Document**. Click **OK**.
13. In the dialog box that appears, click **No**.
14. Click **Paste** icon on toolbar. Scroll until you see top of document.
15. Restore WordPad. Close WordPad. Do not save file.

### **ALTERING A SCREEN CAPTURE**

- Can paste/edit screen capture into graphic package (such as PAINT).
- Editing includes changing colors and altering/**skewing** graphics.
- Cut/paste it to another document.
- Can save it as a file.

### **ACTIVITY - CREATING AND ALTERING A SCREEN CAPTURE**

1. Click **Start**, point to **Programs**, point to **Accessories**, click **Calculator**.
2. Press <Alt>+<PrtScreen>
3. Close all open windows.
4. Open Paint. Maximize it. Click **Edit**. Click **Paste**.
5. Click outside picture to deselect it.

6. Click **Select** tool. Select only the keyboard section of the calculator.
7. Click **Edit**. Click **Cut**.
8. Click **File**. Click **New**. In dialog box that appears, click **No**.
9. Click **Edit**. Click **Paste**.
10. Drag the keyboard to middle of screen.
11. Click the **Select** tool. Select the Backspace key. Drag it above the rest of the keyboard.
12. Click **Rectangle** tool and draw a frame around the Backspace key.
13. Click **Rectangle** tool again. Box in entire picture.
14. Left-click **red**. Click the **Fill with Color** tool. Click inside the large box.
15. Left-click blue. Click the point of **Fill with Color** tool inside the gray keyboard background.
16. Left-click **black**. Click the **Pencil** tool.
17. Close Paint. Do not save picture.

## INTRODUCTION TO OLE TECHNOLOGY

- Two parts to data exchange transaction:
  - Program supplying data and program receiving data.
  - Program supplying data.
    - **Server/source application.**
    - Program creates and edits data.
  - Program receiving data.
    - **Container, client, or destination application.**
    - Program contains or receives data.
- **Key concept in data exchange is objects.**
- Data exchange technology introduced in Windows in form of **DDE**.
- Microsoft, with others, developed **standard** used to support data exchange.
- DDE makes it easier to create **compound documents**.
- **DDE.**
  - Early form of data exchange technology.
  - Used to put elements from different programs into one document.
  - Can still be used as means of programs exchanging information.
  - Used to send message from one application to another asking the application to do something.
- **Object linking and embedding (OLE)** replaced DDE.
  - Introduced to improve data exchange.
  - Principle behind OLE is **objects**.

- In OLE world, object also includes one or more functions for creating, accessing, and using its data.
  - Data can have
    - Characteristics (animations).
    - Behavior (moving on screen when clicked)
  - Software considers data as an object.
  - Allows applications to embed or link data (objects).
    - Embed object in another document.
      - Data object within document.
      - Object remembers what program created it.
      - Embedded object can be edited in destination document.
      - Process called in-place editing.
    - Linking an object.
      - Object not actually in new document.
      - Object contains
        - **Registry key** = used to start server application.
        - **Metafile** = contains instructions on how to display object in container document.
        - **Pointer** = to server application file (source document) contains actual data.
      - **To link object must first be saved as separate file on disk.**
      - If object linked to many documents each one can access object (file).
      - When linked object updated - all documents that have a link to it can be automatically updated.
- Release of OLE 2.
  - Not just acronym for OLE.
  - Standards include:
    - **Visual editing (in-place editing).**
      - Edit embedded object - never leave client application.
      - Object edited where it is - don't open another application to do editing.
      - Menu /toolbars temporarily replaced by object/s source program.
    - **Cross-application dragging and dropping.**
      - Object can be dragged out of server and dropped into client document.

- **Container objects (nested objects).**
  - Objects can contain other objects.
  - Document can contain object/s created in other programs in addition to its own data.
  - Considered a compound document.
- **OLE automation.**
  - Create scripts that move data between two or more applications using a programming language
  - Able to create documents that will automatically update themselves as changes are made to the objects that are linked to, or embedded in them.
- **Object conversion.**
  - Lets users edit object if they have some program that will convert the data.
- **Component Object Model (COM).**
  - Defines standards that server applications use to create data.
  - Defines mechanisms (interfaces) by which the server and container applications interact when they deal with objects.
  - Foundation for OLE/Active X.
- OLE technology big part of W98.
- **OLE-aware (OLE-compliant).**
  - Application software incorporates and uses object linking and embedding.
  - Describes Windows-based application programs that supports and recognize OLE.
- Some programs either server or client.
  - High-end applications function as both client and server.
  - W98 - Paint is only server.
  - W98 - WordPad is only client.

## LINKING AND EMBEDDING

- Embedded object. (two copies)
  - Part of client document.
    - No connection to source document.
    - Doesn't need source document.
    - Changes made to object in client document not reflected in source document.
  - Connection only to server application (inside client application).

- Linking.(one copy)
  - **LINKED OBJECT MUST FIRST BE SAVED AS A FILE.**
  - Does not create another object.
  - Not part of client document.
  - Create link (pointer) to source document.
  - Editing link - editing source document with original source application.
  - Changes made to object are in source document.
  - Update.
    - Instantaneous (automatic/hot links)
    - At users request (manual/cold links)
  - Original object edited.
- Advantages to linking.
  - Work with source document only.
    - **Source document must be on disk.**
  - Only one copy of object - save space.
  - Update object - all documents linked to object have updated version.
  - Many programs can use same link.
- Decision to link or embed depends on the end purpose.
  - Embed.
    - Need one copy of object that belongs to client document.
    - Embedding is permanent and portable.
    - Source document not needed.
    - Any changes only occur in current document.
    - Makes document larger.
    - Paste usually defaults to Embedding.
  - To link.
    - Use if many programs will use an object and each document should reflect changes made to object.
    - Only one correct copy of object.
    - All editing changes are incorporated into destination documents.
    - Take up less space.
    - Only pointer (not object) is stored in container document.
    - Linked object can be available to everyone on a network (embedded object cannot).
    - If anything happens to source file - link is worthless.

## **EMBEDDING AN EXISTING OBJECT**

- Embedded object.
  - Data created with server application.
  - May/may not be saved as a file.
  - May be a part of another document.
    - Selection of row and columns in a spreadsheet.
    - An entire document such as a drawing.
- **Embed object to customize it in a specific client application.**
- *Only altering what is in current document.*

## **ACTIVITY - EMBEDDING AN EXISTING OBJECT**

1. Open WordPad.
2. Insert Object from the menu bar.
3. Click Create from File. Click the Browse button and open plane.bmp in the Act-disk folder.
4. Save this document on your practice disk as plane.doc.
5. Click once on the picture of the plane if it is not selected. (It will have sizing handles around it if it is selected.)
6. Center the picture by clicking the Center icon on the toolbar.
7. Drag one of the sizing handles and make the picture a little larger by dragging the sizing handle.
8. Double-click the drawing. (If you look at the title bar, you are still in WordPad, but the menus and toolbars are for Paint, the server application. You are doing in-place editing.
9. Change the color of the plane to blue.
10. Using the text tool, place a message inside the banner. Make the font bold.
11. You have altered your drawing.
12. Click save and close WordPad. Your original object stored as Plane.bmp has not changed. You edited only the embedded copy of the object in the WordPad document.

## **EMBEDDING A NEW OBJECT**

- Often need to do task that can't be done in current application.
- Example: in WordPad you want to create a drawing object.
- Can create an embedded object inside WordPad.
- Does not have to exist as file.

## **ACTIVITY - EMBEDDING A NEW OBJECT**

1. Open WordPad.
2. Click Insert. Click Object.
3. The Create New button should be checked. You want to create a new drawing that will be embedded in this document. Click on Bitmap Image. This will open Paint. Then click OK.
4. Create an image of your choice.
5. When finished, click outside the picture. This returns you to WordPad.

## **EDITING OBJECTS**

- Can edit embedded object's data and characteristics.
- Object can appear as icon.
  - Takes up less space on screen/disk.
  - W98 compresses image when icon.
- Users choice for icon or viewable object.
- Example: Create report in Word containing object created in Excel.
  - Change object to icon.
  - Interested in numbers - open icon to see data.
- Can change object's icon or label.

## **ACTIVITY - EDITING OBJECTS**

1. Open Paint. Click Image. Click Attributes. Click Default.
2. Create a small picture using whatever tools you choose.
3. Click the Select tool.
4. Encircle your image and copy to clipboard.
5. Close Paint. Not necessary to save file.
6. Open WordPad.
7. Click Edit. Click Paste Special.
8. Click Display as Icon box to set it. Click OK. Instead of having a drawing, you have an icon representing your drawing.
9. Click outside the sizing box. Double-click the icon. By double-clicking the icon, you caused the image to appear.
10. Make several changes to you image.
11. Click outside the text box.
12. Click File. Click Update Document. (You have changed the image. You want to update your document with the change and then return to WordPad.)

13. Click File. Click Exit & Return to Document.
14. Right-click the icon. (You returned to your WordPad document. You then opened the shortcut menu by right-clicking the icon. Since the icon is an object, it has properties. In addition, it is a Bitmap Image Object that can be altered.)
15. Click Object Properties. Click the View tab. (Here is where you can change the display back to the actual picture instead on an icon. You can also change the icon or its label.
16. Click Change Icon. Click a different icon. In the Label text box, select the text and key in the following: My Drawing
17. You have changed both your icon and your label. Right-click the object. Point to Bitmap Image Object. Click Open.
18. Alter your drawing again.
19. Click File. Click Exit & Return to Document.
20. Your object is an icon. You want it to be your drawing. Right-click the object. Click Object Properties. Click the View tab. Click the Display as editable information option button. Click OK. Click outside the drawing to deselect it.
21. Your drawing is no longer an icon, but a picture. Close WordPad.

## **SOUND OBJECTS**

- Can embed.
  - Drawings, sound clips, video clips.
  - Other types of multimedia objects.
- Useful to embed multimedia objects in documents created with presentation software. (PowerPoint)
  - Presentation software designed for public speaking, other types of public presentation
  - There are hardware requirements since these objects "play" - sound card and video display.

## **ACTIVITY - EMBEDDING A SOUND OBJECT**

**Note:** If you do not have a sound card, you will not be able to do this activity.

1. Open WordPad. Key in: **This is a test of embedding a sound file.**
2. Click **Insert**. Click **Object**. Click **Create from File**. Click **Browse**.
3. Locate Windows folder. Double-click it.
4. Double-click **Media**. If you cannot see it, scroll until you can.

5. Click **Tada.wav**. Click **Insert**.
6. Click **Display As Icon** checkbox. Click **OK**. Click outside icon to deselect it.
7. Double-click **Wave Sound** icon.
8. Right-click **Wave Sound** icon. Click **Object Properties**. Click **View** tab.
9. Click **Change Icon** button. Choose second icon. In Label text box, key in:  
**Double-click to hear a tada.**
10. Click **OK**. Click **OK**. Click outside icon to deselect it.
11. Double-click **icon**.
12. Right-click **icon**. Point to **Wave Sound Object**. Click **Edit**.
13. Click **Effects** on menu bar of the Sound Object in Document window.
14. Click **Increase Speed (by 100%)**. Close Sound Object in Document window.
15. Double-click **sound** icon.
16. Click **File**. Click **Print Preview**.
17. Close WordPad. Do not save document.

### LINKING AN OBJECT

- Working with single object.
- First, object must be saved to disk as file.
- Editing object.
  - Modifying original object.
  - Any changes made to object also occur in documents linked to object.
- Working with source document.
  - Use original **server application**.

### ACTIVITY - LINKING THE PLANE PICTURE

1. Open Paint. Open Plane.bmp from the Act-disk folder.
2. Click the Select tool. Encircle the plane. Click Edit. Click Copy To.
3. In the File name text box key in: A:\MyPlane.bmp. Save as 16 Color Bitmap. Click Save. (The first requirement in linking an object is to create a file for that object.)
4. Close Paint. Open WordPad.
5. Click Insert. Click Object. Click Create from File. Click Browse.
6. In the File Name text box, key in the following: A:\myplane.bmp
7. Click Insert.

8. Click the Link check box to set it. Click OK. Double-click the plane picture in WordPad. Arrange the two open windows so that you can see both of them. When you double-click the object in WordPad, the Paint program opened and became the active window. You are not doing in-place editing; you are editing the actual file called A:\myplane.bmp.
9. Change the color of the plane to blue. Your linked object in WordPad changed to reflect the changes made to the object in Paint.
10. Close Paint. Note that the dialog box is asking you if you want to save your changes in Paint, not WordPad. The object you are changing is the myplane.bmp file. Click Yes.
11. Click the plane object in WordPad. Right-click. Click Object Properties. Click the Link tab.
12. Click Cancel.
13. Close WordPad.

## LINKING TO MANY DOCUMENTS

- Difference between linking and embedding.
  - Linking - Open object's file and edit.
  - Embedded - edit in place.
- Power of linking.
  - Only update object once.
  - Every document that uses link will have updated data.
- To update embedded object.
  - Go to every document that has object and update it.

## SCRAPS

- In many **OLE**-compliant applications you can select/drag portion of document onto desktop/folder.
  - Can be text/picture/any object
  - **Scrap** created.
    - Name based on its contents/source.
    - File type is .shs.
    - Can be renamed.
- Scrap file must originate in program that supports OLE.
- Two methods of creating a Scrap file:
  - Copy-and-paste method
  - Drag-and-drop method.
    - Source program must support this technique.