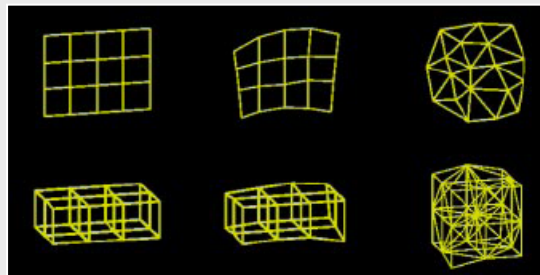


# Importing Your Own Data

## OpenDX Data Grid Types

Surfaces



Volumes

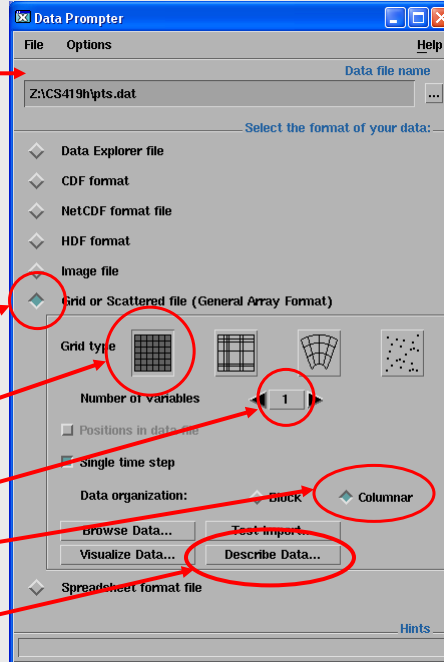
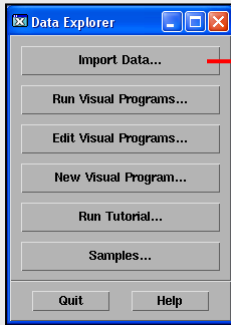
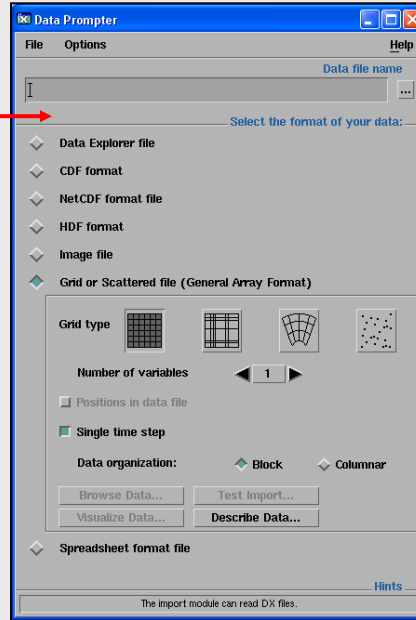
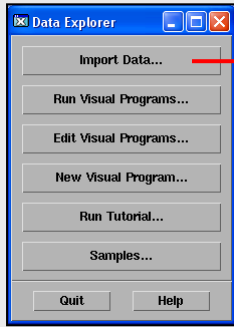
**Regular:**  
R positions,  
R connections

**Deformed Regular:**  
IR positions,  
R connections

**Irregular:**  
IR positions,  
IR connections

R = "regular"  
IR = "irregular"

## Creating an OpenDX Data Descriptor File using the Data Prompter



Most of the time, this is what you want

Regular positions, regular connections

One scalar value at each point

Doesn't matter here, but a good value for other data

See next page

**Data Prompter:**

File Edit Options

Data file: Z:\CS419h\pts.dat

Header: # of bytes

Grid size: 32 x 32 x 32

Data format: ASCII (Text) Most Significant Byte First

Data order: Row Column

Grid positions:

origin, delta	0, 1
origin, delta	0, 1
origin, delta	0, 1
origin, delta	0, 1

Field list: field0

Field name: field0

Type: float

Structure: scalar

Buttons: Add, Insert, Modify, Delete

Enter the data filename

Doesn't matter here, but a good value for other data

Describe the data at each point (type and data dimension)

Enter the spatial dimensions

These get filled in for you when you enter the data dimensions – change them if you want

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**Data Prompter:**

File Edit Options

Data file: Z:\CS419h\pts.dat

Header: # of bytes

Grid size: 32 x 32 x 32

Data format: ASCII (Text) Most Significant Byte First

Data order: Row Column

Grid positions:

origin, delta	0, 1
origin, delta	0, 1
origin, delta	0, 1
origin, delta	0, 1

Field list: field0

Field name: field0

Type: float

Structure: scalar

Buttons: Add, Insert, Modify, Delete

File → Save As ...

This saves the .general file, which will eventually tell OpenDX where to find the data and how to handle it.

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**Data Prompter**

File Options Help

Data file name: Z:\CS419hpts.dat

Select the format of your data:

- Data Explorer file
- CDF format
- NetCDF format file
- HDF format
- Image file
- Grid or Scattered file (General Array Format)**
- Spreadsheet format file

Grid type: [Grid icon] [Grid icon] [Grid icon] [Grid icon]

Number of variables: 1

Positions in data file

Single time step

Data organization: Block Columnar

Browse Data... Test Import... Describe Data...

Visualize Data...

Hints

**Message Window**

File Edit Execute Commands Options Help

```

Begin Execution
Begin Execution
[0: workar here [420]
Object Description
Input object is a Field, the basic data carrying structure in DX.
There are 32768 data items, each is of type float (4-byte or real*4).
The positions are enclosed within the box defined by the corner points:
[ 0 0 0 ] and [ 31 31 31 ]
Data range is:
minimum = 0.01, maximum = 399.46, average = 28.4054
Input is not ready to be rendered because the Field does not have colors yet.
Use the 'AutoColor', 'AutoGreyScale', or 'Color' modules to add colors.
ECHO:
  
```

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**Data Prompter**

File Options Help

Data file name: Z:\CS419hpts.dat

Select the format of your data:

- Data Explorer file
- CDF format
- NetCDF format file
- HDF format
- Image file
- Grid or Scattered file (General Array Format)**
- Spreadsheet format file

Grid type: [Grid icon] [Grid icon] [Grid icon] [Grid icon]

Number of variables: 1

Positions in data file

Single time step

Data organization: Block Columnar

Browse Data... Test Import... Describe Data...

Visualize Data...

Hints

See next page

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The screenshot displays a software interface with several components:

- Control Panel:** A window titled "Control Panel" with a menu bar (File, Edit, Execute, Panels, Options, Help). It features:
  - An "Isosurface value (for scalar, position-dependent data):" field with a slider set to 199.7.
  - A "MapToPlane normal:" section with three input fields: 0.40000, 0.00000, and 1.00000.
  - Two checkboxes: "reset isosurface value" and "reset image camera".
- 3D Visualization:** A window showing a 3D terrain plot with a color gradient from blue to green. Two spheres are overlaid on the terrain.
- Background:** Four smaller windows showing a hierarchical tree structure of data and processing steps.

This all gets created automatically!  
Pretty amazing, huh?

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### Terrain Visualization .general File

```

file = Z:\OpenDX\or.dat
grid = 201 x 105
format = ascii
interleaving = record
majority = column
field = field0
structure = scalar
type = float
dependency = positions
positions = regular, regular, 0, 1, 0, -1
end

```

Regular positions

## Vector Field Visualization .general File

```
file = Z:\OpenDX\vecs.dat
grid = 16 x 16 x 16 ← 3D
format = ascii
interleaving = record-vector
majority = column
field = velocity
structure = 3-vector ← 3-element Vector
type = float
dependency = positions
positions = regular, regular, regular, 0, 1, 0, 1, 0, 1
end
```

Regular positions

## Visualizing Points on a Scattered Grid (e.g., Digital Elevation Mapping)

West→East	South→North	Elevation
-----------	-------------	-----------

-360.78	128.438	2.25
-360.75	128.428	2.31
-360.80	128.405	2.20
-360.81	128.370	1.99
-360.91	128.369	1.75
-361.00	128.359	1.65
-361.16	128.354	1.77
-361.21	128.344	1.70
-361.25	128.344	1.76
. . .		

The screenshot shows the 'Data Prompter' dialog box with the following elements:

- Data file name:** Z:\USDA\exportxyz.txt
- Select the format of your data:**
  - Data Explorer file
  - CDF format
  - NetCDF format file
  - HDF format
  - Image file
  - Grid or Scattered file (General Array Format)** (selected)
  - Spreadsheet format file
- Grid type:** A 2D grid icon is selected.
- Number of variables:** 1
- Positions in data file:**  (selected)
- Single time step:**  (unchecked)
- Data organization:**
  - Block
  - Columnar** (selected)
- Buttons:** Browse Data..., Test Import, Visualize Data..., Describe Data... (circled in red)

Annotations with red arrows:

- Scattered Data (irregular positions, irregular connections):** Points to the 2D grid icon.
- Data Dimension: a scalar value at each position:** Points to the 'Number of variables' field (value: 1).
- Spatial Dimension: 2D:** Points to the 'Dimension' field (value: 2).
- See next page:** Points to the 'Describe Data...' button.

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The screenshot shows the 'Data Prompter' dialog box with the following elements:

- Data file:** Z:\USDA\exportxyz.txt
- Header:** # of bytes: [ ]
- Grid size:** x [ ] x [ ] x [ ]
- # of Points:** 1000
- Data format:** ASCII (Text)
- Data order:** Row
- Field interleaving:** Columnar
- Series:** n [ ] start [ ] delta [ ]
- Series separator:** # of bytes: [ ]
- Point positions:** Completely regular
- Field list:** Locations
- Field name:** field0
- Type:** float
- Structure:** SCALAR
- Record Separator:**
  - save between all records: # of bytes: [ ]
  - between records: # of bytes: [ ]

Annotations with red circles and arrows:

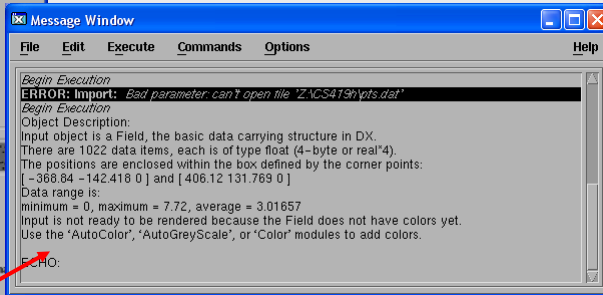
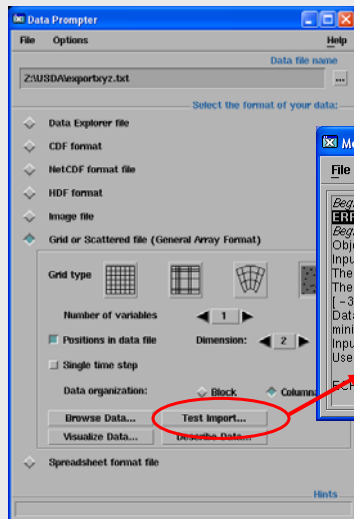
- File → Save as...:** Points to the 'Data file' field.
- 1000:** Points to the '# of Points' field.
- field0:** Points to the 'Field name' field.
- float:** Points to the 'Type' field.
- SCALAR:** Points to the 'Structure' field.

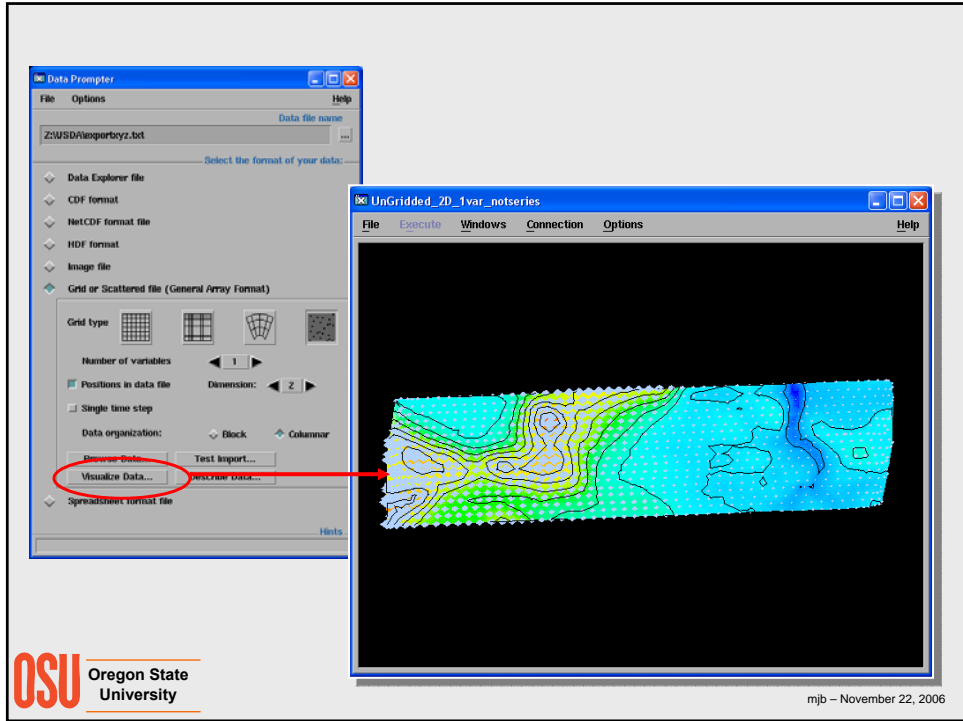
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## A Scattered Grid .general File

```
file = Z:\OpenDX\exportxyz.dat
points = 1022 ← A 1D list
format = ascii
interleaving = field
field = locations, field0 ← Each entry has a location and data values
structure = 2-vector, scalar
type = float, float ←
end
```

Each location has 2 values (X,Y). Each data is a single value (scalar).





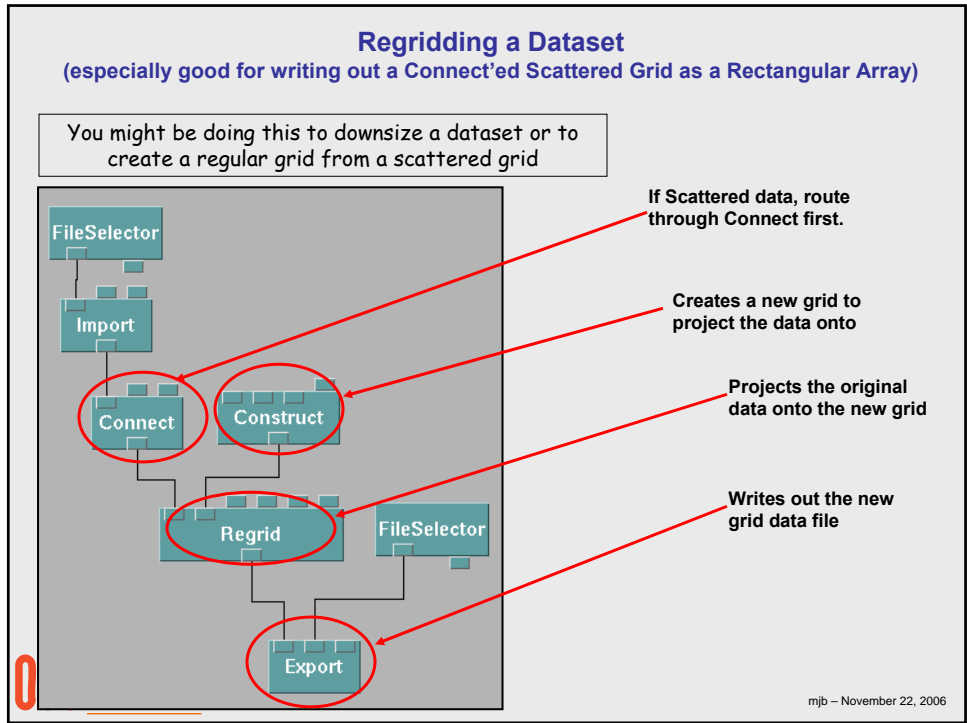
### Visualizing Points from a Scattered Grid (e.g., Digital Elevation Mapping)

**Realization** *Connect* creates triangles from scattered points.

**Realization** *ShowConnections* creates graphics to show how the scattered point connections were made.

Sample Terrain Surface

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### Regridding a Dataset

Name	Hide	Type	Source	Value
<input checked="" type="checkbox"/> origin	<input type="checkbox"/>	vector list		<input type="text" value="[-130, 40]"/>
<input checked="" type="checkbox"/> deltas	<input type="checkbox"/>	vector list		<input type="text" value=" [.05, .05]"/>
<input checked="" type="checkbox"/> counts	<input type="checkbox"/>	integer, vector		<input type="text" value=" [320 200]"/>
<input type="checkbox"/> data	<input type="checkbox"/>	value list, string list		<input type="text" value="(no default)"/>

Coordinates at the lower corner of the dataset

Step size in each dimension

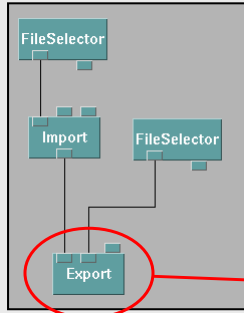
How many steps to make in the grid

Note: the upper corner coordinates will be "origin + (counts-1)\*delta"

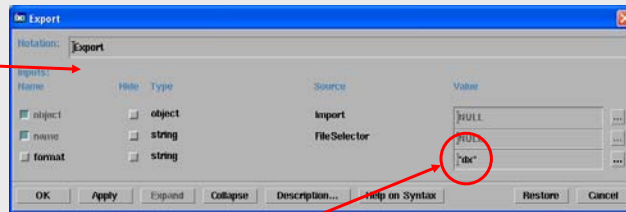
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## Writing a .general Dataset as a Native OpenDX .dx Dataset



The .dx file format embeds the data description information, the positions, and the data values in one file. This makes it easier to keep track of and easier to give to other people.



Says that you want to Export the data in a native OpenDX .dx file form.