

Databinding – The Matrix

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DYALOG

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What is Databinding?

- A way of sharing data with (typically) the GUI element of an application
- Facilitates MVVM
 - “Model View ViewModel”
 - Which is just a way of separating your “logic” from your “UI”
- It can be “two-way”. Changes in the GUI can update your data (with notification)



How does it work? (in .NET)

- A “databinding source” is just a thing that implements a number of .NET interfaces
- We can create “databinding sources” for ...



How does it work? (in .NET)

- A scalar (e.g. number, “string”):
 - INotifyPropertyChanged
 - and others
 - And of course the value itself



How does it work? (in .NET)

- A vector:
 - IList
 - ICollection
 - IEnumerable
 - and others



How does it work? (in .NET)

- A namespace
 - For each scalar variable (e.g. number, “string”):
 - INotifyPropertyChanged
 - And of course, the value itself
 - Or (if it’s a vector)
 - IList
 - ICollection
 - IEnumerable
 - And others



How does it work? (in .NET)

- A matrix?
 - Is just a collection of rows – like a vector
 - IList
 - ICollection
 - IEnumerable
 - and others
 - A row is essentially just an object in a collection



How does it work? (in .NET)

- A row
 - For each column:
 - INotifyPropertyChanged
 - And of course, the value itself
 - Or (if it's a vector, or a matrix)
 - IList
 - ICollection
 - IEnumerable



How does it work? (in .NET)

- A matrix?
 - A row is essentially just an object in a collection
 - It has named columns
 - In just the same way as a namespace in a vector is just an object in a collection
 - which has named properties
- The “consumer” of your data doesn’t care (or even know) that it’s a matrix in the workspace



I'm not good with data

- No CDDDB (well not for the first 10 minutes)
- Historical share prices
 - Date
 - Open
 - Close
 - High
 - Low
 - Volume



Share Prices

namespaces

matrix

ns_pah3

```
3466
10↑↑ns_pah3(Date Open High Low Close Volume)
1/2/2002 429 429 421 421.02 7402
1/3/2002 420.6 429 418 428 52815
1/4/2002 430 454 429 445.9 85129
1/7/2002 447 450 440.55 441 61838
1/8/2002 440.5 442.9 432 442.5 24285
1/9/2002 442.7 443 438 440 17836
1/10/2002 439.45 449.99 438 441.48 27328
1/11/2002 439.89 440 420.75 430.2 23433
1/14/2002 430 431.8 420.01 425.3 11451
1/15/2002 422.7 424 418 418 32207
```

ns_pah3.␣nl 2

Close
Date
High
Low
Open
Volume

ppah3

```
3466 6
10↑pah3
1/2/2002 429 429 421 421.02 7402
1/3/2002 420.6 429 418 428 52815
1/4/2002 430 454 429 445.9 85129
1/7/2002 447 450 440.55 441 61838
1/8/2002 440.5 442.9 432 442.5 24285
1/9/2002 442.7 443 438 440 17836
1/10/2002 439.45 449.99 438 441.48 27328
1/11/2002 439.89 440 420.75 430.2 23433
1/14/2002 430 431.8 420.01 425.3 11451
1/15/2002 422.7 424 418 418 32207
```



Share Prices

namespaces

```
src ← (2015 ⍲) 'ns_pah3'
```

```
src.Count
```

```
3466
```

```
↑src[0].⍋nl ⌈2
```

```
Close
```

```
Date
```

```
High
```

```
Low
```

```
Open
```

```
Volume
```

```
src[0].(Low High)
```

```
64.2 69.05
```

```
ns_pah3[0].(Low High)
```

```
64.2 69.05
```

matrix

```
src ← (2015 ⍲) 'pah3'
```

```
src.Count
```

```
3466
```

```
↑src[0].⍋nl ⌈2
```

```
Column0
```

```
Column1
```

```
Column2
```

```
Column3
```

```
Column4
```

```
Column5
```

```
src[0].(Column3 Column2)
```

```
64.2 69.05
```

```
pah3[0;3 2]
```

```
64.2 69.05
```



Share Prices - matrices

Date
Open
High
Low
Close
Volume

03/01/2002	64.2	69.05	64.2	68.2	62186
04/01/2002	69.13	69.99	67.83	69.1	41016
05/01/2002	69.15	69.15	67.11	68.46	20037
06/01/2002	68.31	69.62	66	67.11	18229
07/01/2002	68.2	70.49	67.51	70	38624
10/01/2002	70.12	71.09	68.78	70.27	25555
11/01/2002	70.32	73.09	69.8	72.82	28778
12/01/2002	73.2	73.89	72.38	73.05	23632
13/01/2002	74.8	75.75	71.85	72.99	43668
14/01/2002	72.98	75.25	72.98	75.25	30076



Share Prices

namespaces

```

↑src[0].⎵nl 2
Close
Date
High
Low
Open
Volume
      src[0].(Low High)
64.2 69.05
      ns_pah3[0].(Low High)
64.2 69.05

```

matrix

```

info
Date (System.String)
Open (System.Double)
High (System.Double)
Low (System.Double)
Close (System.Double)
Volume (System.Double)

```

```

pinfo
6 2
src←info (2015 1) 'pah3'
↑src[0].⎵nl 2
Close
Date
High
Low
Open
Volume
      src[0].(Low High)
64.2 69.05
      pah3[0;3 2]
64.2 69.05

```



Share Prices

namespaces

```
dg←⊞new DataGrid  
dg.DataContext←src
```

matrix

```
dg←⊞new DataGrid  
dg.DataContext←src
```



Summary

- A way of sharing data with (typically) the GUI element of an application
- A “databinding source” is just a thing that implements a number of .NET interfaces
- So anything that knows about these interfaces can see the data.
 - `csharp_function(IList list);`



Summary

- Matrix data is equivalent to a vector of rows (AKA objects, AKA namespaces)
- The “consumer” of you data doesn’t care (or even know) that it’s a matrix in the workspace
- In fact, as long as we implement the required interfaces, we can provide the data in any way we like.



Demo

