InterDatabase and DandD

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Environmental Changes of Statistics

- Computers and Statistics

The Internet and Statistics

- Role of Statistics

Methodologies for Random Data

Total Environment for Working With Data

InterDatabase

- Inter-Databases
- Databases over the Internet

Environment for Utilising Different Databases Simultaneously

Environments for Working with Various Type of Data

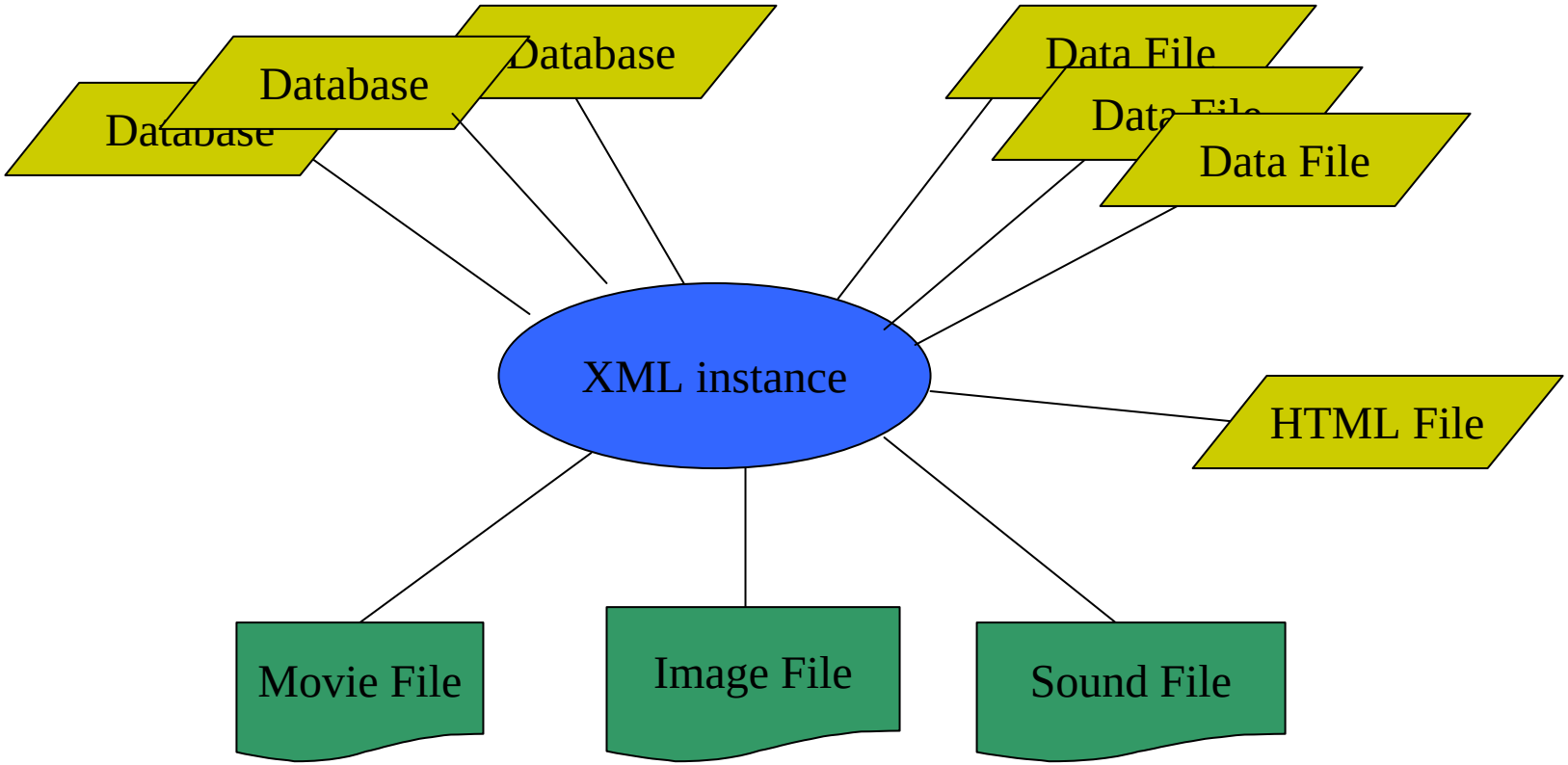
- NetCDF (Rew and Gren, 1990) Atmospheric Data
  - Data Abstraction
  - Array Data
  - Reformat of Data
- DDI and NESSTAR (1999) Survey Data for Social Sciences
  - Meta Data
  - A Multivariate Data
  - No simultaneous Use
- MetaBroker (Laurenson et al., 2002) Weather Data for Agriculture
  - MiddleWare
  - Simultaneous Use of Various Data Sources

Goal of InterDatabase

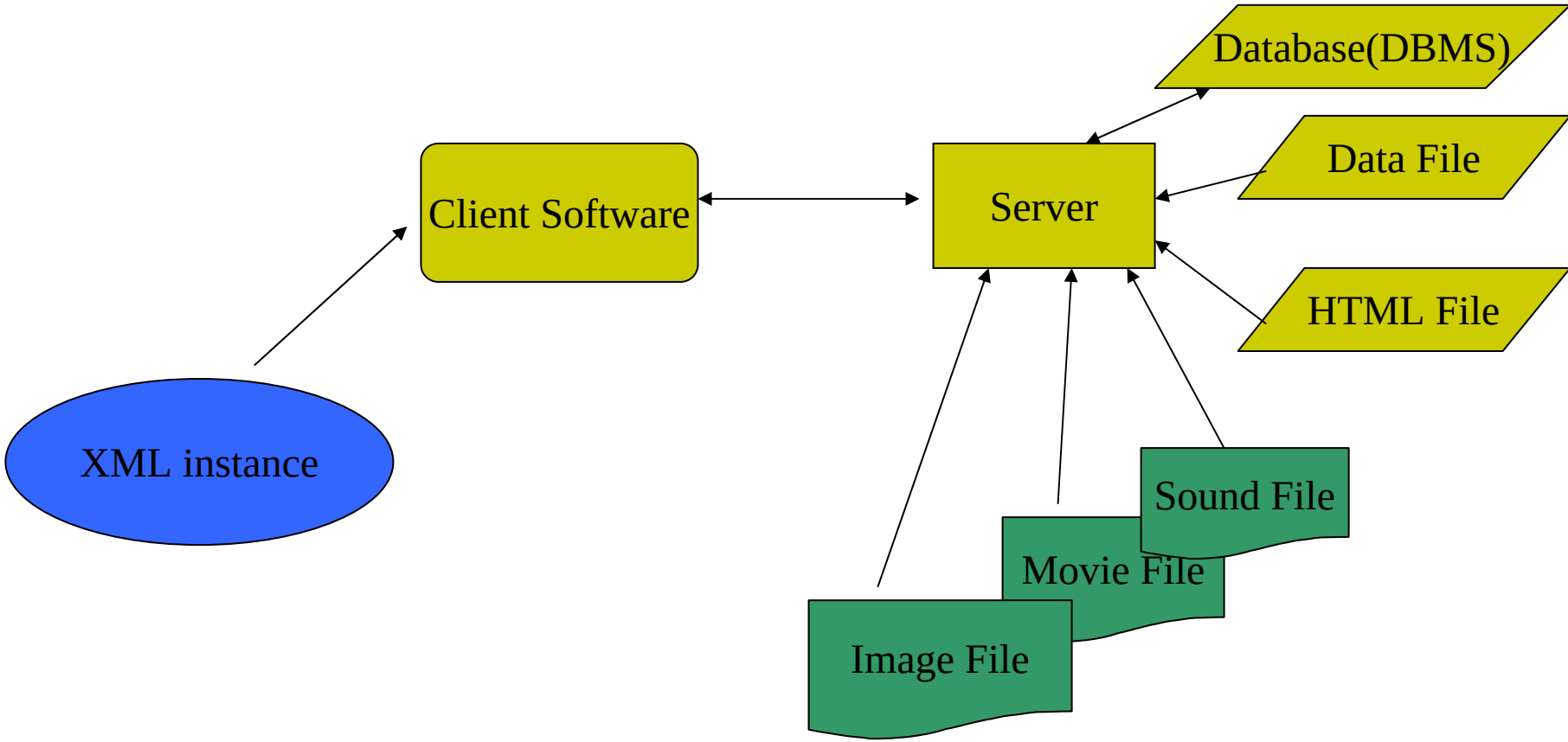
- No Specific Field of Application
- Simultaneous Use of Heterogeneous Data
- Scattered over the Internet
- No Reformat of Data
- Portability

•High Level Data Abstraction
•Independence from Any Software

Integration of Data and Auxiliary Information Through an XML Instance



Support Software



History of DandD project

- DandD = Data and Description
- Formal Description of Data Type for Statistical Analysis (1987, The 1st IASC world conference)
- Use of XML for implementation (1997)
  - External Data
  - Client –Server Support System
- InterDatabase(2001)
  - Object Oriented

D&D

DandD

DandD II

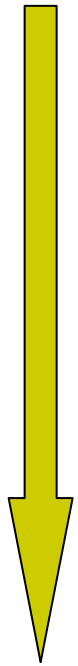
DandD III

DandD IV

DandD Client Server System (Thursday, Contributed V)

Abstraction of Data

- Data vector
  - DataBody + Attributes
- Structure
  - Relational Structure
  - Array Structure
- Data
  - Structures + Attributes (Keys.,…)
- DandD instance
  - Data + Auxiliary Information



Data Vector

- Internal Data

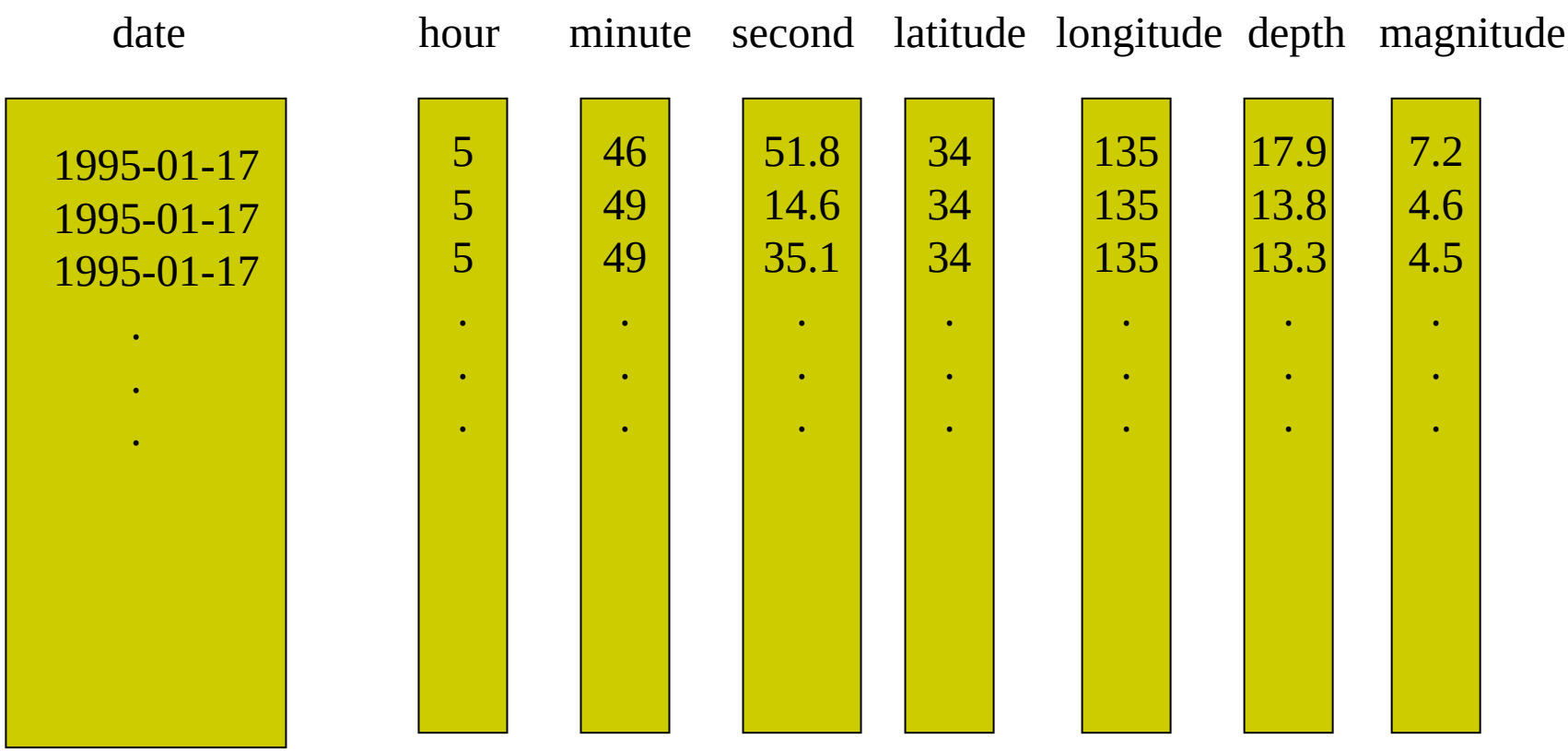
```
<DataVector  Id="i1"  LongName="Year" >
95 95 95 …
</DataVector>
```

- External Data

```
<DataVector  Id="i1"  LongName="Year" Access="a1" Protocol="b1" PostProcessing="c1"/>

<Access Id="a1" IPAddress="131.113.65.1" UserId="dandd"/>
<Protocol Id="b1" Physical="TCP"/>
  <JDBC DatabaseServerType="postgresql" DatabaseName="KobeQuake">
     select date from kobequake
  </JDBC>
</Protocol>
<ScanFormat Id="c1">
%s-%*s-%*s
</ScanFormat>
```

“Kobequake” in RDB



Getting a Data Vector from RDB

Access Information

```
<Access Id="a1" IPAddress="131.113.65.1" UserId="dandd"/>
```

Database Protocol

```
<Protocol Id="b1" Physical="TCP"/>
  <JDBC DatabaseServerType="postgresql" DatabaseName="KobeQuake">
     select date from kobequake
  </JDBC>
</Protocol>
```

Post processing after acquisition

```
<ScanFormat Id="c1">
%s-%*s-%*s
</ScanFormat>
```

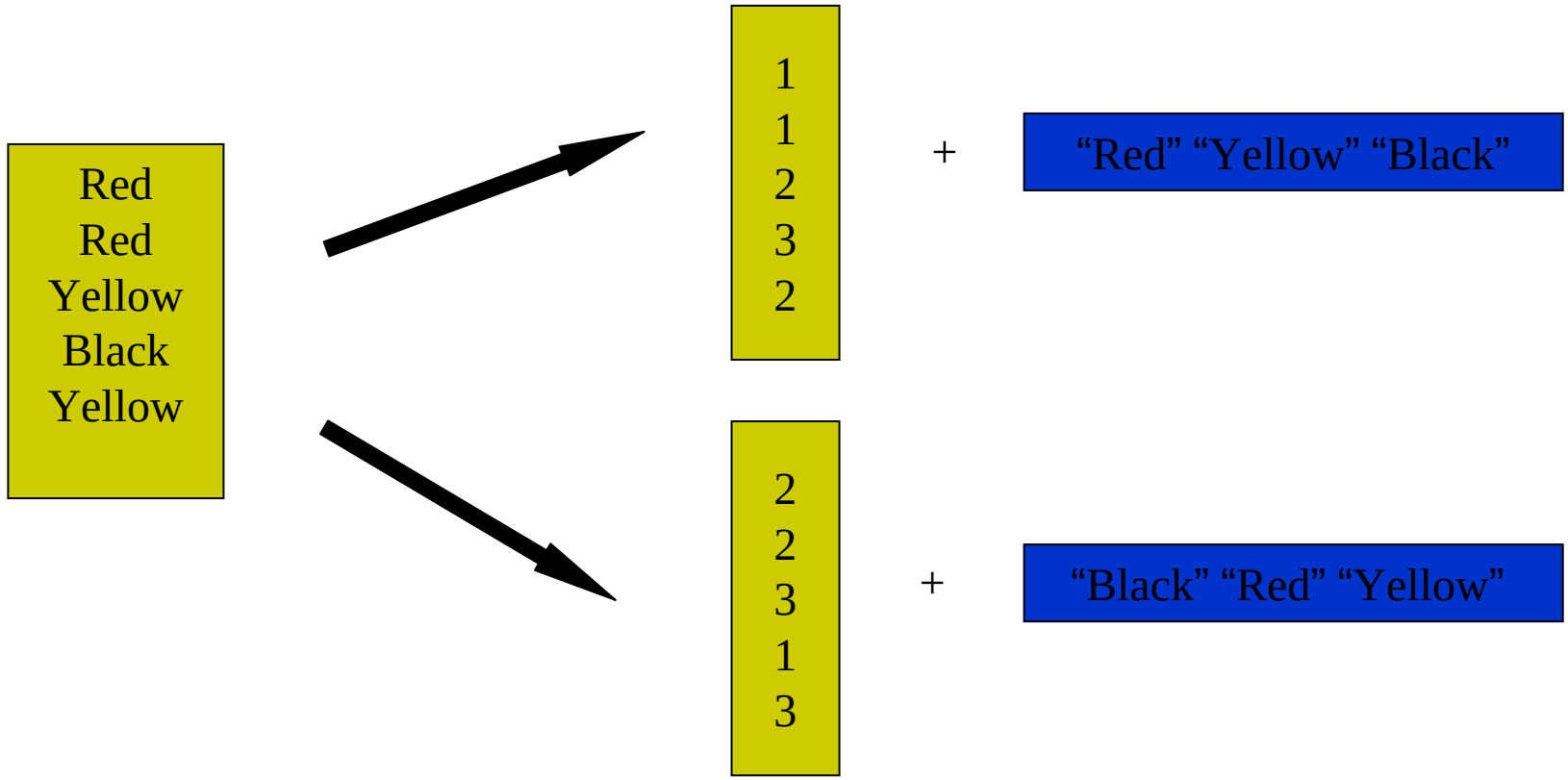
Access Attributes

- Access
  - IPAddress
  - USerId
  - Password
- Protocol
  - Physical : TCP/UDP
  - JDBC/FTP/HTTP
- Post Processing
  - ScanFormat
  - PrintFormat
  - Arithmetic
  - Media
  - Movie
  - Code
- Code

2004-08-25	→	08
95	→	1995
10	→	600

Code Conversion

- Categorical Data = Numbers + Code Attribute



An example: Commodity Futures

Up to Dec. 2002

"11"	"12"	"13"	"14"	"21"	"31“	"32"	"33"
Gold	Silver	Platinum	Palladium	Aluminum	Gasoline	Kerosene	CrudeOil

From Jan. 2003

"01“	"02"	"03"	"04"	"05"	"06"	"07“	"08"
Gold	Silver	Platinum	Palladium	Aluminum	Gasoline	Kerosene	CrudeOil

Conversion of the codes for simultaneous use of the data

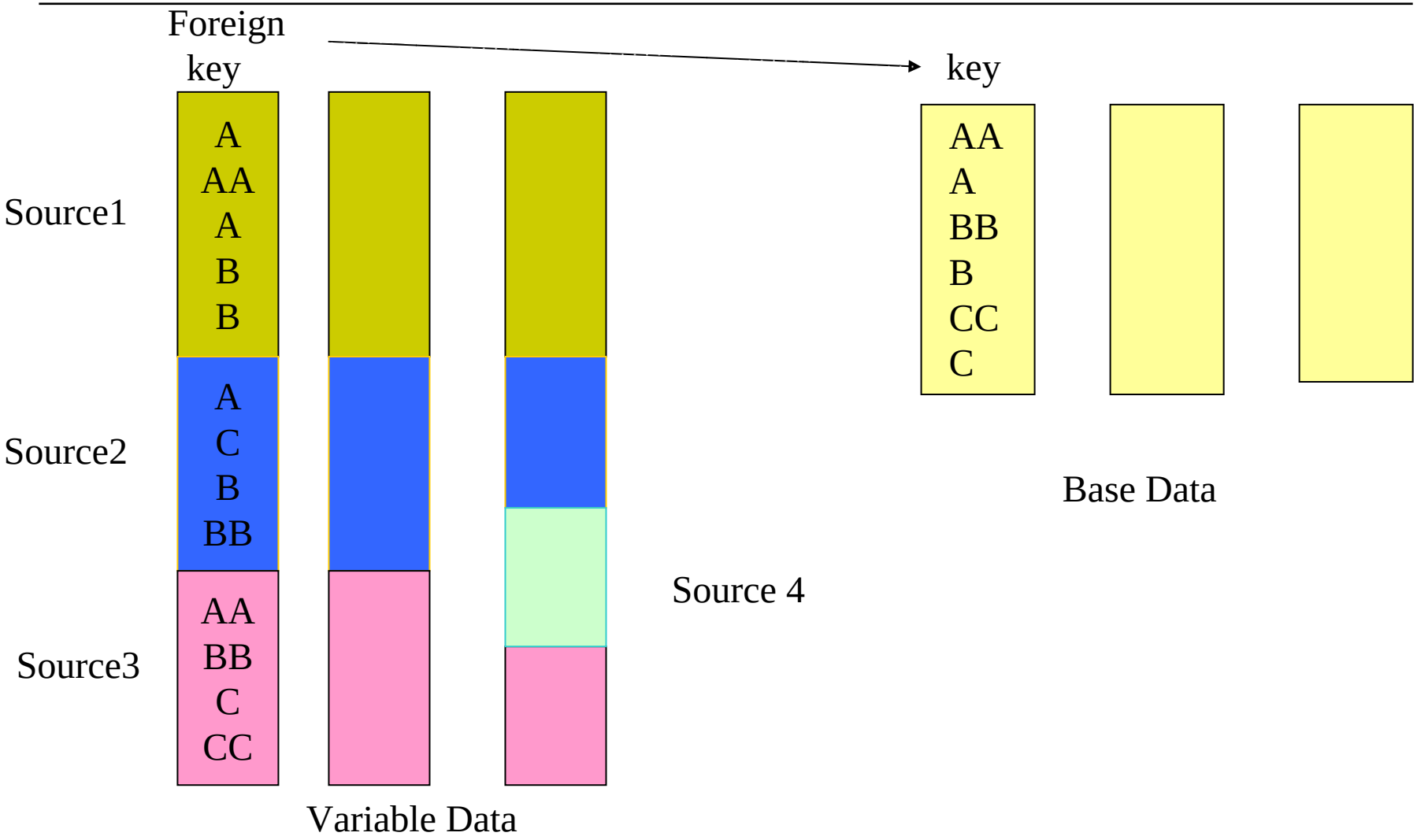
Design Principle

- No Modification to Data Sources
- Homogenization at the Stage of Acquisition
- All Necessary Conversions are Described as the Attributes to DataVector

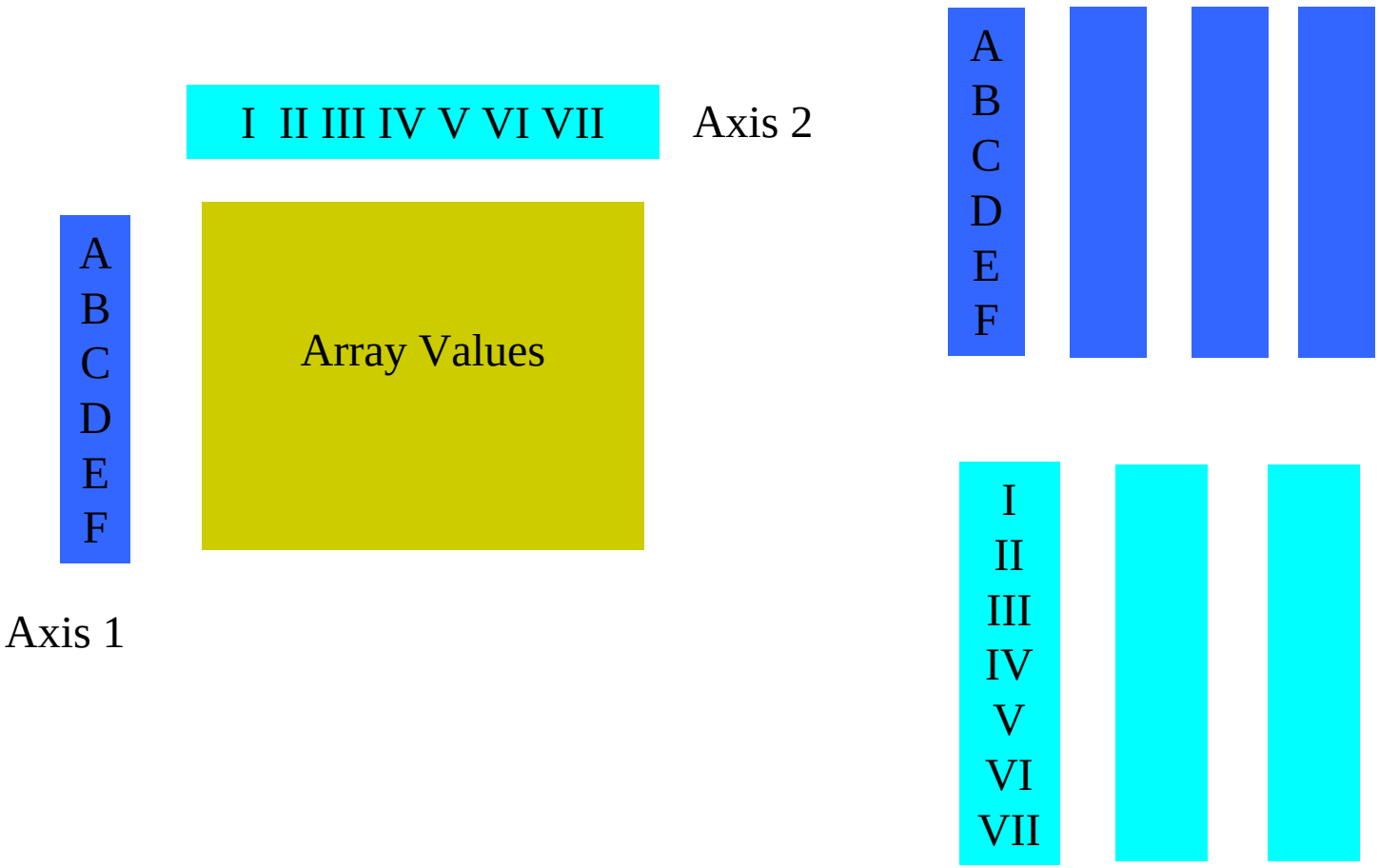
Localization of Conversion

Flexibility, Free from data update

Set of Relataional Data (An Example)



Array Data (An example)

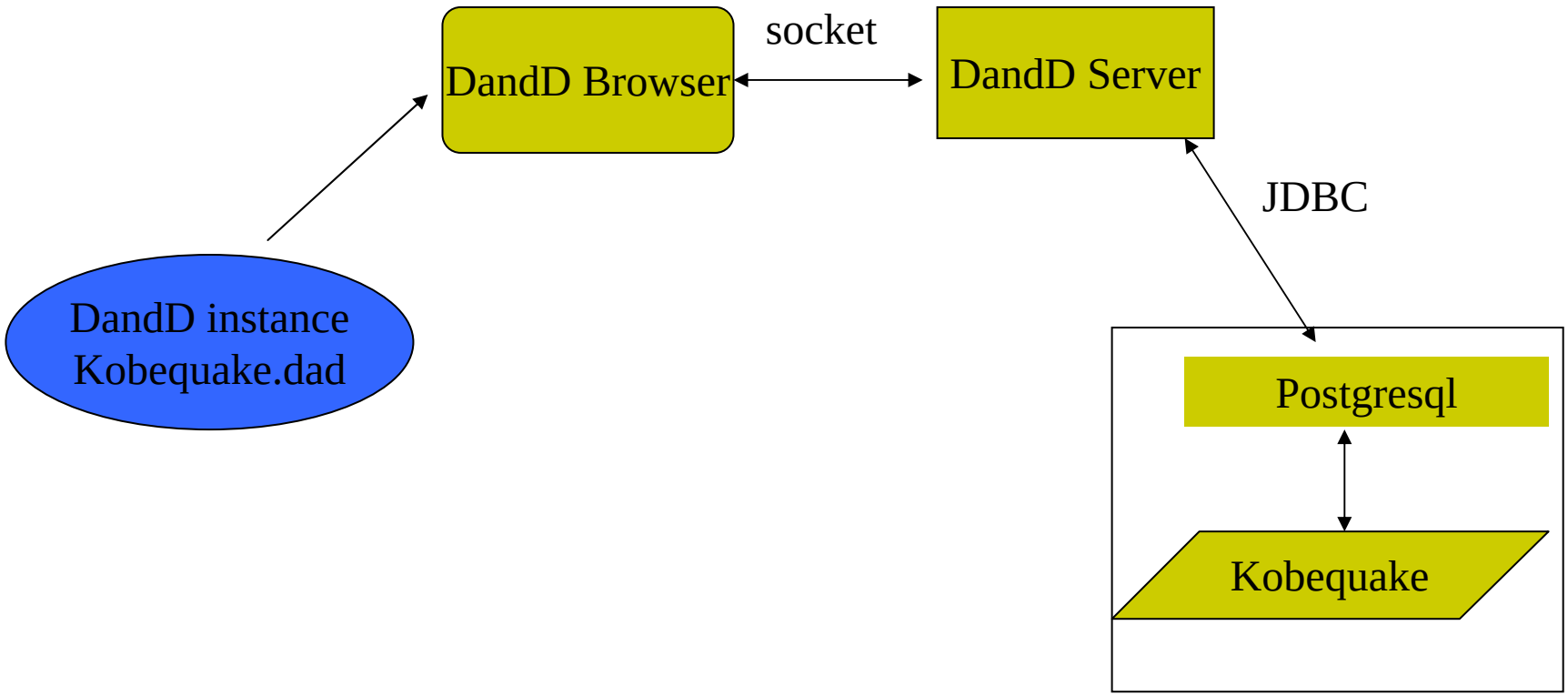


Link between Structures

- Sharing the Same Vector
  - Axis Values : Attribute of an Array and Attributes of Each Values
- Sharring Values
  - Key and Foreign Key
- Common Variable
  - Different Observations of a Variable
- Common Measurement
  - Time of Time Series and Occurrence Time

InterDatabase implemented by DandD

Kobe Quake



Option Help

OAD | STOP | URL for DandD Instance | file://C:\Documents and Settings\shibata\Desktop\KobeQuake.dad

Quakes in Hanshin Awaji Area

DandD
BackGround
Data
Quakes in Hanshin Awaji Area

V1
Year
(Systems= Time (Japan Standard Tim

V2
Month
(Systems= Time (Japan Standard Tim

V3
Day
(Systems= Time (Japan Standard Tim

V4
Hour
(Systems= Time (Japan Standard Tim

V5
Minute
(Systems= Time (Japan Standard Tim

V6
Second
(Systems= Time (Japan Standard Tim

V7
Degree of Longitude
(Systems= Location of Epicenter)

V8
Minute of Longitude
(Systems= Location of Epicenter)

V9
Degree of Latitude
(Systems= Location of Epicenter)

V10
Minute of Latitude
(Systems= Location of Epicenter)

Quakes in Hanshin Awaji Area

...	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	
1	1995	1	17	5	46	51.8	135 degree	2.1 minute	34 degree	35.6 minute	17.9 km	7.2 magnitude	6
2	1995	1	17	5	49	14.6	135 degree	4.9 minute	34 degree	37 minute	13.8 km	4.6 magnitude	2
3	1995	1	17	5	49	35.1	135 degree	4.5 minute	34 degree	37.2 minute	13.3 km	4.5 magnitude	3
4	1995	1	17	5	49	48.8	135 degree	7.1 minute	34 degree	39.4 minute	11.5 km	4.7 magnitude	4
5	1995	1	17	5	50	23.9	135 degree	7.9 minute	34 degree	39.1 minute	12.9 km	5.2 magnitude	4
6	1995	1	17	5	51	5.2	135 degree	0.1 minute	34 degree	35.3 minute	12.1 km	4.1 magnitude	2
7	1995	1	17	5	51	47.5	135 degree	2.9 minute	34 degree	35.8 minute	12.5 km	4.4 magnitude	2
8	1995	1	17	5	52	7.3	135 degree	8.9 minute	34 degree	39.9 minute	15.1 km	4.4 magnitude	3
9	1995	1	17	5	52	40.2	134 degree	59.9 minute	34 degree	33.8 minute	15.1 km	3.6 magnitude	1
10	1995	1	17	5	53	11.6	135 degree	9.1 minute	34 degree	40.5 minute	9.2 km	4.9 magnitude	4
11	1995	1	17	5	54	4.1	135 degree	11.2 minute	34 degree	39.6 minute	13 km	3.9 magnitude	2
12	1995	1	17	5	54	30.2	135 degree	4.5 minute	34 degree	37.8 minute	12.9 km	4.2 magnitude	2
13	1995	1	17	5	56	5.8	135 degree	11 minute	34 degree	40.1 minute	11 km	4 magnitude	2
14	1995	1	17	6	4	18.4	134 degree	59.8 minute	34 degree	34.6 minute	11.5 km	3.6 magnitude	1
15	1995	1	17	6	5	10.3	134 degree	58.8 minute	34 degree	34.2 minute	9.6 km	3.5 magnitude	1
16	1995	1	17	6	5	19.6	135 degree	8.7 minute	34 degree	40.4 minute	16.9 km	3.9 magnitude	2
17	1995	1	17	6	6	15.8	134 degree	59.3 minute	34 degree	36 minute	13.3 km	3.3 magnitude	1
18	1995	1	17	6	6	44.7	135 degree	1 minute	34 degree	35.2 minute	12.3 km	3.2 magnitude	NA
19	1995	1	17	6	7	11.7	135 degree	9.4 minute	34 degree	41.7 minute	8.6 km	4 magnitude	NA
20	1995	1	17	6	7	35.2	134 degree	57.7 minute	34 degree	33.5 minute	9.9 km	3.5 magnitude	NA
21	1995	1	17	6	8	9.9	134 degree	54.3 minute	34 degree	31.3 minute	12 km	3.8 magnitude	1
22	1995	1	17	6	8	32.5	134 degree	52.3 minute	34 degree	29.9 minute	10.5 km	3.6 magnitude	1
23	1995	1	17	6	9	24.1	134 degree	55.6 minute	34 degree	32.3 minute	9.2 km	3.5 magnitude	NA
24	1995	1	17	6	9	59.3	134 degree	57.7 minute	34 degree	33.5 minute	9.2 km	3.4 magnitude	NA
25	1995	1	17	6	10	17.5	135 degree	1.1 minute	34 degree	35.1 minute	11.1 km	3.6 magnitude	1
26	1995	1	17	6	11	1.7	134 degree	53.1 minute	34 degree	31.4 minute	7.4 km	3.1 magnitude	NA
27	1995	1	17	6	11	46.5	135 degree	11.1 minute	34 degree	41.3 minute	12.6 km	3.3 magnitude	1
28	1995	1	17	6	12	9.8	135 degree	8.5 minute	34 degree	38.7 minute	9.4 km	3 magnitude	NA
29	1995	1	17	6	12	42.9	135 degree	7.4 minute	34 degree	36.4 minute	12 km	3.3 magnitude	1
30	1995	1	17	6	14	58.8	134 degree	53.4 minute	34 degree	30.6 minute	11.4 km	3.8 magnitude	1
31	1995	1	17	6	15	58.5	135 degree	14.8 minute	34 degree	45 minute	9 km	3.3 magnitude	NA
32	1995	1	17	6	16	39.7	135 degree	0.7 minute	34 degree	35.2 minute	11.6 km	3.5 magnitude	NA
33	1995	1	17	6	17	2	134 degree	59.1 minute	34 degree	34 minute	13.9 km	3.1 magnitude	NA
34	1995	1	17	6	18	30.8	135 degree	6.6 minute	34 degree	38.8 minute	13.1 km	3.7 magnitude	1
35	1995	1	17	6	18	47.1	135 degree	10.5 minute	34 degree	41.6 minute	14.3 km	3.2 magnitude	NA
36	1995	1	17	6	19	14.7	135 degree	6.4 minute	34 degree	38.2 minute	9.9 km	3 magnitude	NA

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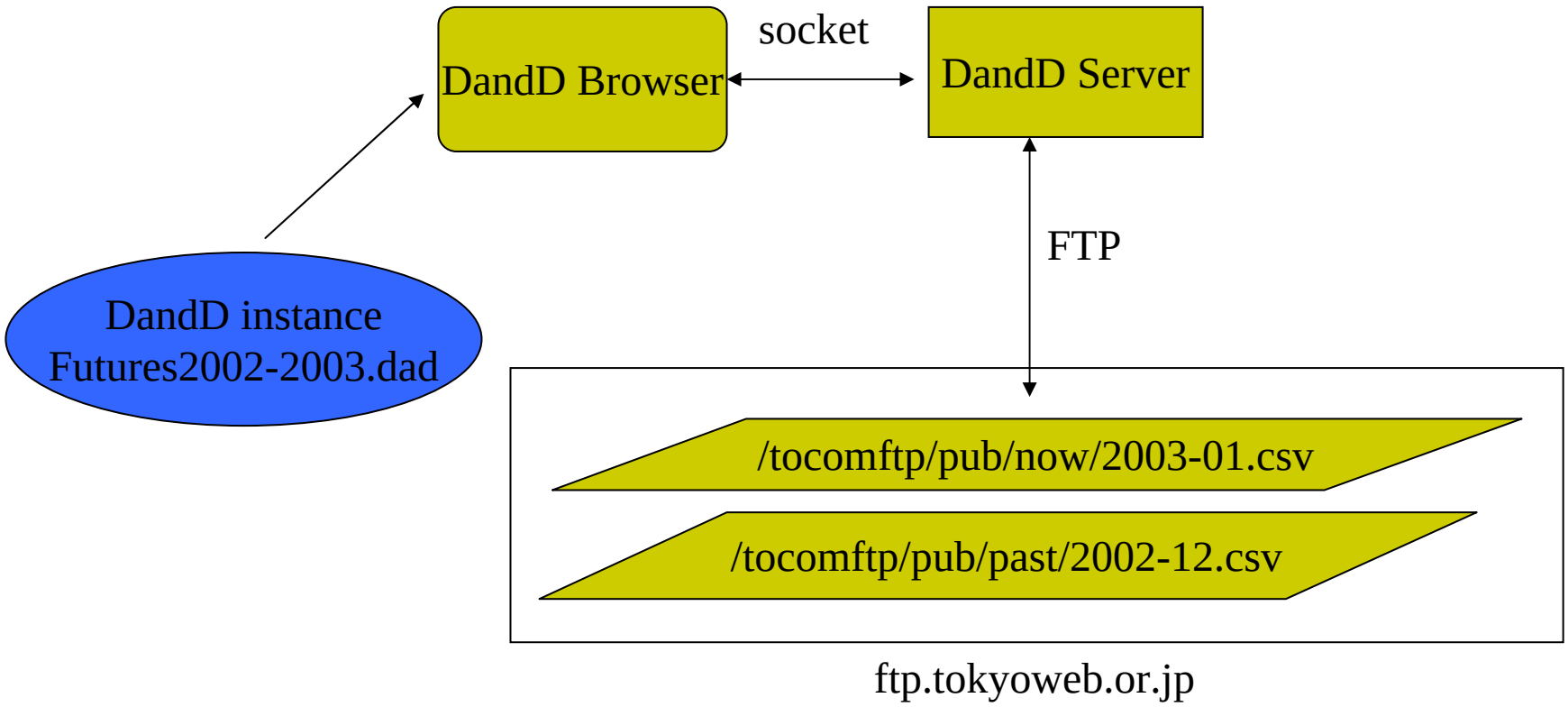
InterDatabase implemented by DandD

Futures



Option Help

OAD | STOP | URL for DandD Instance | file://C:\DandD\Futures2002-2003.dad

Futures Prices

- DandD
- BackGround
- Data
- Futures Price
  - V1 Dealing Year02 / Dealing Year03
  - V2 Dealing Month02 / Dealing Month03
  - V3 Dealing Day02 / Dealing Day03
  - V4 Commodity02 / Commodity03
  - V5 Delivery Year02 / Delivery Year03
  - V6 Delivery Month02 / Delivery Month03
  - V7 Opening Price02 / Opening Price03
  - V8 Highest Price02

Futures Price

No.	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13
1	2002	12	2	Gold	2002	12	1260 yen/g	1264 yen/g	1258 yen/g	1264 yen/g	1264 yen/g	PreciousM...	4978 unit
2	2002	12	2	Gold	2003	2	1261 yen/g	1264 yen/g	1258 yen/g	1264 yen/g	1264 yen/g	PreciousM...	712 unit
3	2002	12	2	Gold	2003	4	1261 yen/g	1264 yen/g	1258 yen/g	1263 yen/g	1263 yen/g	PreciousM...	1160 unit
4	2002	12	2	Gold	2003	6	1260 yen/g	1263 yen/g	1256 yen/g	1263 yen/g	1263 yen/g	PreciousM...	3547 unit
5	2002	12	2	Gold	2003	8	1258 yen/g	1261 yen/g	1254 yen/g	1261 yen/g	1261 yen/g	PreciousM...	11166 unit
6	2002	12	2	Gold	2003	10	1257 yen/g	1259 yen/g	1252 yen/g	1259 yen/g	1259 yen/g	PreciousM...	32518 unit
7	2002	12	2	Silver	2002	12	179 yen/g	179 yen/g	179 yen/g	179 yen/g	179 yen/g	PreciousM...	21 unit
8	2002	12	2	Silver	2003	2	177 yen/g	177 yen/g	177 yen/g	177 yen/g	177 yen/g	PreciousM...	1 unit
9	2002	12	2	Silver	2003	4	175 yen/g	176 yen/g	175 yen/g	176 yen/g	176 yen/g	PreciousM...	19 unit
10	2002	12	2	Silver	2003	6	175 yen/g	176 yen/g	174 yen/g	176 yen/g	176 yen/g	PreciousM...	35 unit
11	2002	12	2	Silver	2003	8	175 yen/g	176 yen/g	174 yen/g	175 yen/g	175 yen/g	PreciousM...	393 unit
12	2002	12	2	Silver	2003	10	174 yen/g	175 yen/g	174 yen/g	175 yen/g	175 yen/g	PreciousM...	1919 unit
13	2002	12	2	Platinum	2002	12	2347 yen/g	2347 yen/g	2323 yen/g	2342 yen/g	2342 yen/g	PreciousM...	1859 unit
14	2002	12	2	Platinum	2003	2	2310 yen/g	2310 yen/g	2283 yen/g	2307 yen/g	2307 yen/g	PreciousM...	331 unit
15	2002	12	2	Platinum	2003	4	2270 yen/g	2279 yen/g	2259 yen/g	2279 yen/g	2279 yen/g	PreciousM...	695 unit
16	2002	12	2	Platinum	2003	6	2249 yen/g	2255 yen/g	2235 yen/g	2255 yen/g	2255 yen/g	PreciousM...	3178 unit
17	2002	12	2	Platinum	2003	8	2223 yen/g	2235 yen/g	2213 yen/g	2234 yen/g	2234 yen/g	PreciousM...	12826 unit
18	2002	12	2	Platinum	2003	10	2209 yen/g	2217 yen/g	2195 yen/g	2213 yen/g	2213 yen/g	PreciousM...	37059 unit
19	2002	12	2	Palladium	2002	12	1031 yen/g	1031 yen/g	1031 yen/g	1031 yen/g	1031 yen/g	PreciousM...	3 unit
20	2002	12	2	Palladium	2003	2	1030 yen/g	1035 yen/g	1024 yen/g	1035 yen/g	1035 yen/g	PreciousM...	7 unit
21	2002	12	2	Palladium	2003	4	1028 yen/g	1028 yen/g	1028 yen/g	1028 yen/g	1028 yen/g	PreciousM...	1 unit
22	2002	12	2	Palladium	2003	6	1026 yen/g	1038 yen/g	1026 yen/g	1037 yen/g	1037 yen/g	PreciousM...	17 unit
23	2002	12	2	Palladium	2003	8	1027 yen/g	1028 yen/g	1026 yen/g	1028 yen/g	1028 yen/g	PreciousM...	16 unit
24	2002	12	2	Palladium	2003	10	1030 yen/g	1032 yen/g	1023 yen/g	1030 yen/g	1030 yen/g	PreciousM...	288 unit
25	2002	12	2	Aluminum	2002	12	179 yen/g	179 yen/g	179 yen/g	179 yen/g	179 yen/g	Aluminum	98 unit
26	2002	12	2	Aluminum	2003	1	179 yen/g	180 yen/g	179 yen/g	180 yen/g	180 yen/g	Aluminum	17 unit
27	2002	12	2	Aluminum	2003	2	179 yen/g	180 yen/g	179 yen/g	180 yen/g	180 yen/g	Aluminum	53 unit
28	2002	12	2	Aluminum	2003	3	179 yen/g	181 yen/g	179 yen/g	180 yen/g	180 yen/g	Aluminum	278 unit
29	2002	12	2	Aluminum	2003	4	179 yen/g	181 yen/g	179 yen/g	181 yen/g	181 yen/g	Aluminum	896 unit
30	2002	12	2	Aluminum	2003	5	180 yen/g	181 yen/g	180 yen/g	181 yen/g	181 yen/g	Aluminum	1208 unit
31	2002	12	2	Gasoline	2003	1	25660 yen/...	25740 yen/...	25650 yen/...	25730 yen/...	25730 yen/...	Petroleum	1034 unit
32	2002	12	2	Gasoline	2003	2	25980 yen/...	26070 yen/...	25910 yen/...	26010 yen/...	26010 yen/...	Petroleum	913 unit
33	2002	12	2	Gasoline	2003	3	26460 yen/...	26530 yen/...	26410 yen/...	26450 yen/...	26450 yen/...	Petroleum	2066 unit
34	2002	12	2	Gasoline	2003	4	26910 yen/...	26990 yen/...	26850 yen/...	26920 yen/...	26920 yen/...	Petroleum	6335 unit
35	2002	12	2	Gasoline	2003	5	27320 yen/...	27380 yen/...	27200 yen/...	27230 yen/...	27230 yen/...	Petroleum	19442 unit
36	2002	12	2	Gasoline	2003	6	27460 yen/...	27480 yen/...	27300 yen/...	27420 yen/...	27420 yen/...	Petroleum	46589 unit

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Network of Transfigurations Over the Internet