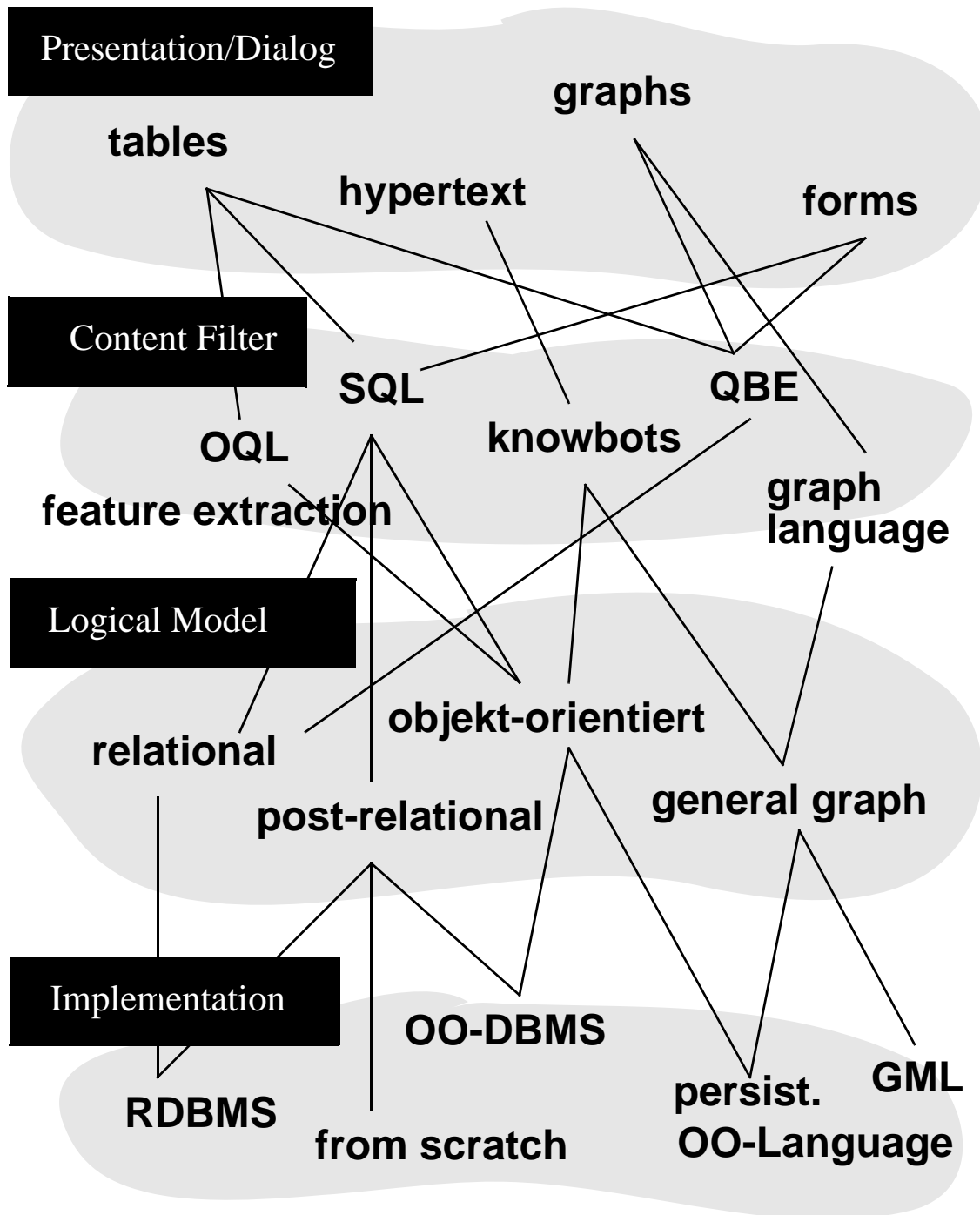


Contents

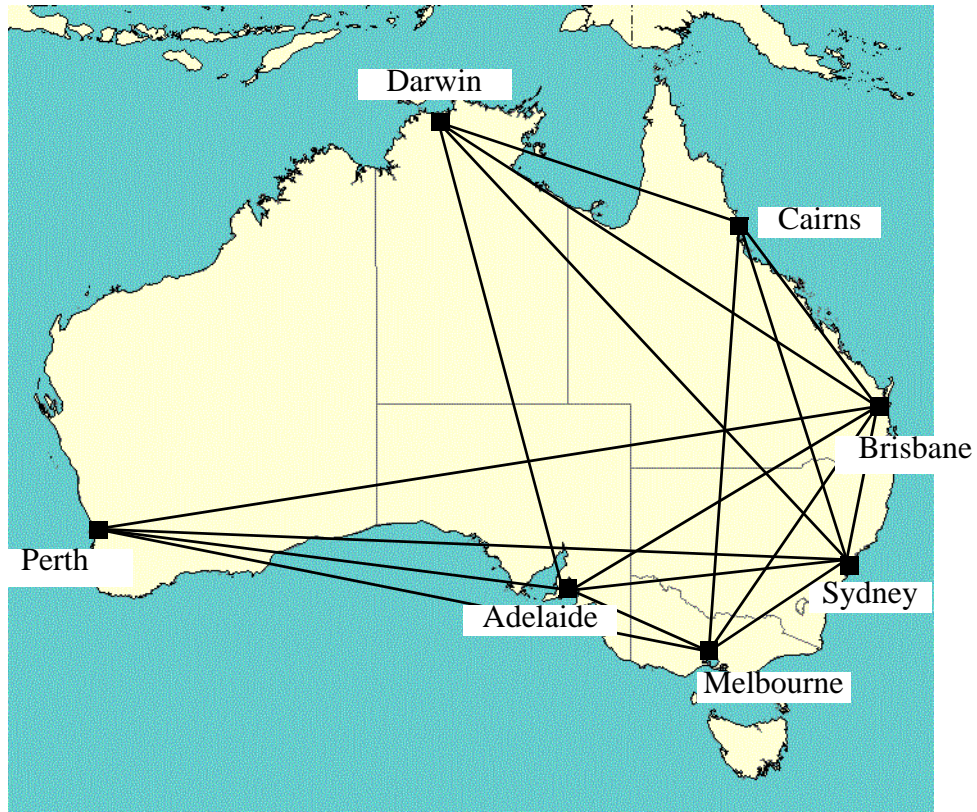
1. Visualization: graphs and tables
2. Navigation over nested tables
3. Cut & Paste, queries, multimedia
4. Conclusion: flying over data space

1 Visualization: Graphs and Tables

Large number of options on all levels



Example 1: Flight Connections



similarly

- real estate offerings on a city map
- hotel accomodation on a map
- travel route

but

- „does not scale well“

Ansett Australia Flightplaner 4/95 (partial)

System Schema Table Application
Application: wegner

TABLE: AUS.tbl / SCHEMA: FLIGHTS.scm / APPL: wegner

File Edit Fingers Query Sorting Options Help

CONNECTIONS

CODE	NAME	TZONE	DESTINATIONS								
			DCD	DNAME	FTIME	FLIGHTS					
						DAYS	DEPART	ARRIVE	#FLTNO	NOTE	
CNS	Cairns	10	BNE	Brisbane	2:10	X	17.00 17.15	19.10 19.15	431 77	?s?	
			DRW	Darwin	2:45	-2-456- -3----- -----7	17.10 17.35 20.20	19.40 19.40 22.30	478 496 498	?s? ?s? ?s?	
			MEL	Melbourne	3:15	-----67	10.55	14.05	1281		
			PER	Perth	?s?	O					
			SYD	Sydney	2:50	X X X -----6-	06.50 12.50 15.10 19.45	09.40 15.35 18.00 22.30	83 33 49 1287	?s? ?s? ?s? ?s?	
DRW	Darwin	9,5	ADL	Adelaide	3:35	-----6- X	02.30 14.10	06.05 17.40	22 58	?s? ?s?	
			BNE	Brisbane	3:45	-----7 X	05.55 13.30	10.10 17.35	135 155	?s? ?s?	
			CNS	Cairns	2:45	----5-- -----6- -3-----	10.00 10.00 13.25	13.00 13.00 16.30	479 499 497	?s? ?s? ?s?	
			MEL	Melbourne	?s?	O					
			PER	Perth	?s?	O					
			SYD	Sydney	4:00	1-3456- 12345--	06.15 06.35	10.55 07.20	25 91 91	?s? ?s?	
MEL	Melbourne	10	ADL	Adelaide	1:05	-----67 12345--	06.25 06.35	07.10 07.20	91 91	?s? ?s?	

Null OK Cancel

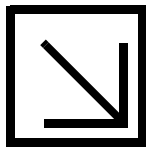
Mode: Browse Active Finger: F1

In Out Prev Next BeginQ Save

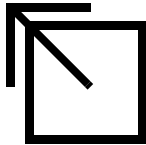
2 Navigation over Nested Tables

Extended Cursor Concept, so-called *Fingers*

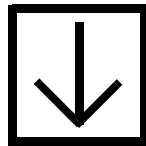
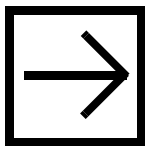
Two dimensions: in/out, next/back



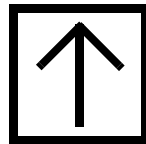
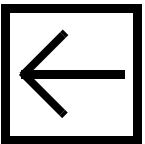
In, Enter, Push, Mouse Click



Out, Escape, Pop, Mouse Drag



**Next, Succ, Arrow Keys
Mouse Click**



**Back, Pred, Arrow Keys
Mouse Click**

- Concurrency: multiple fingers, one active finger, fork operation
- Role of color
- Table & schema finger in lock-step
- Fingers used for all kinds of internal tasks

TABLE: DFLT.tbl / SCHEMA: DF.scm / A		
<i>File Edit Fingers Query Sorting Options</i>		
{ }DFLIGHTS		
FROMCITY	<>TO	
	CITY	FTIME
Brisbane	Sydney	1:20
Cairns	Brisbane	2:10
	Darwin	2:45
	Melbourne	3:15
	Sydney	2:50
Darwin	Adelaide	3:35
	Brisbane	3:45
	Cairns	2:45
	Sydney	4:00
Melbourne	Adelaide	1:05

Null

Mode: Brov *Active Finger:* **F6**

In **Out** **Prev** **Next** **BeginQ** **Save**

3 Cut-and-Paste, Queries, and Multimedia

The image shows two windows from a database application. The left window is titled 'TABLE: DFLT.tbl / SCHEMA: DF.scm' and displays a table browser for the table '{ }DFLIGHTS'. The right window is titled 'TABLE: CLIP.tbl / S' and displays a query editor for the table 'CLIP.tbl'.

Table Browser (Left Window):

{ }DFLIGHTS		
FROMCITY	<>TO	
	CITY	FTIME
Adelaide	?s?	?s?
Brisbane	<???	
Cairns	<???	
Darwin	<???	
Melbourne	Adelaide Brisbane Cairns Perth Sydney	1:05 2:00 3:15 4:00 1:20
Perth	Adelaide Melbourne Sydney	3:15 4:00 4:50
Sydney	Brisbane Cairns	1:20 2:50

Query Editor (Right Window):

<>TO	
CITY	FTIME
Adelaide	1:05
Brisbane	2:00
Cairns	3:15
Perth	4:00
Sydney	1:20

Table Browser Controls:

Mode: Browse Active Finger: **F1**
 In Out Prev Next BeginQ Save

Query Editor Controls:

Mode: Browse Finger: **F1**
 In Out Prev Next Q Save

QBE [Zloof 1977] and Generalized QBE [Jacobs and Walczak, 1983] - modified for **ESCHER** [Wegner et al. 1995]

TABLE: AUS.tbl / SCHEMA: FLIGHTS.scm / APPL: wegner

File Edit Fingers Query Sorting Options Help

{ } CONNECTIONS

CODE	NAME	TZONE	{ } DESTINATIONS						
			DCD	DNAME	FTIME	{ } FLIGHTS			
						DAYS	DEPART	ARRIVE	#FLTNO
DRW	Darwin	9.5	BNE	Brisbane	3:45		13.30	17.30	155
			CNS	Cairns	2:45	----5--	10.00	13.00	479
						-----6-	10.00	13.00	499
						--3----	13.25	16.30	497
			MEL	Melbourne	?s?				{ }
PER	Perth	?s?				{ }			

Null

Mode: Query - Find next! Active Finger: **F1**

TABLE: QUERY.tbl / SCHEMA: QUERY.scm / APPL: wegner

File Edit Fingers Query Sorting Options Help

{ } CONNECTIONS

CODE	NAME	TZONE	{ } DESTINATIONS						
			DCD	DNAME	FTIME	{ } FLIGHTS			
						DAYS	DEPART	ARRIVE	#FLTNO
DRW			CNS					{ ??? }	

Null

Mode: Query - Find next! Active Finger: **F1**

here: find all direct flights from Darwin to Cairns

Computer-Supported Cooperative Work

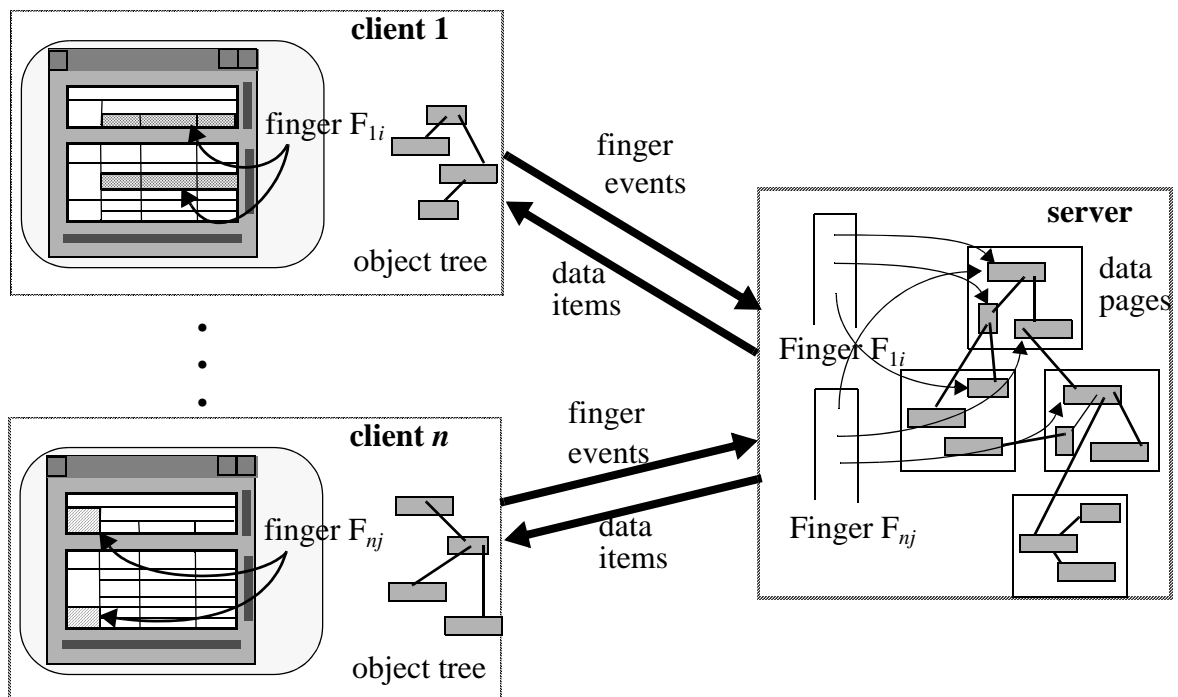
Korth (VLDB 95):

„... a shift from machine-oriented concepts to human-oriented concepts“

„... maximize human information transfers per second (HITS)“
as opposed to transactions per second (TPS).


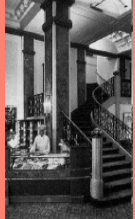

Visual support for

- synchronous collaboration
- concurrency awareness
- negotiated transactions



Example 2: Hotel Information

The screenshot shows a database application window titled 'TABLE: cityguide.tbl / SCHEMA: cityguide.scm'. The application is in 'Browse' mode. The main window displays a table of hotel information for Hamburg, Germany. The table has columns for country, city, hotel name, photo, prices, and remarks. The 'Atlantic' hotel is highlighted in red.

{}countries		{}cities				
country	city	<>hotels				
		name	::photo	{}prices		{ }remarks
				offer	#price	remark
Germany	Hamburg	SAS Plaza		double p.p. single p.p.	130 196	mo-th plus DM 33 p.p. 563 rooms
		Atlantic		double p.p. single p.p.	130 196	Kempinski at Alster mo-th plus DM 33 p.p.
		Renaissance		double p.p. single p.p.	130 196	mo-th plus DM 33 p.p. 211 rooms

The application window includes a menu bar with 'File Edit Search Script Sorting Options Help' and a status bar with 'Mode: Browse', 'Active Finger: F1', and navigation buttons 'In Out Prev Next', 'BeginQ Save'. A 'Null OK Cancel' dialog box is also visible.

Import/Export/Representation of GIF, JPG (true color) and XBM (bitmap) Pixel Pictures

HTML-Translation

The screenshot shows a Netscape browser window titled "Netscape: Transformationsergebnis". The browser interface includes a menu bar (File, Edit, View, Go, Bookmarks, Options, Directory), a toolbar with icons for Back, Forward, Home, Reload, Images, Open, Print, Find, and Stop, and a navigation bar with links for What's New, What's Cool, Handbook, Net Search, Net Directory, and Newsgroups. The main content area displays a table titled "Direct Flights" with the following structure:

```

{ DFLIGHTS }
[ DFLIGHT ]
FROMCITY { TOCITY }
          CITY  FTIME
Adelaide Brisbane 125
          Darwin 215
          Melbourne 65
          Perth 195
          Sydney 125
Brisbane Adelaide 125
          Cairns 130
          Darwin 225
          Perth 315
          Melbourne 120
          Sydney 80
Cairns {}
  
```

Below the table, there is a text prompt: "Du kannst die Tabellendefinition ändern (noch Fragen zur [Syntax?](#)) und erneut :

The transformation code is shown in a text area:

```

DFLIGHTS: {
DFLIGHT: [ FROMCITY: STR
          TOCITY: { CITY: STR FTIME: INT } ] ]
/
{ [ "Adelaide" { [ "Brisbane" 125 ] [ "Darwin" 215 ] [ "Melbourne" 65 ]
[ "Perth" 195 ] [ "Sydney" 125 ] } ]
[ "Brisbane" { [ "Adelaide" 125 ] [ "Cairns" 130 ] [ "Darwin" 225 ]
[ "Perth" 315 ] [ "Melbourne" 120 ] [ "Sydney" 80 ] } ]
[ "Cairns" { } ] }
;
  
```

At the bottom of the text area, there is a label "Unterschrift" and a text box containing "Direct Flights". The status bar at the bottom of the browser window shows "Document: Done."

- direct translation of export/import-format to HTML
- no finger interaction
- have a look yourself at <http://www.db.informatik.uni-kassel.de>

Conclusion

Flying and safe landing over data space requires:

safe and accurate autopilots guiding the user over large distances → *query facilities*

clear view and spontaneous control for visual landing and last minute changes and aborts → joystick-like *navigation*

radar screens, visual clues, and communication facilities for collision avoidance and to minimize delays → *concurrency awareness*