

aMaDEUS

Your technology partner

Placement presentation

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4th year Computing
Imperial College London

Schedule

- ▶ AMADEUS introduction
- ▶ Projects worked on
 - Flight History screen – JFE
 - CM
 - Other
- ▶ Experience gained

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Amadeus

► Involved in tourism industries

◦ Airline systems

- From check-in, baggage (CM)
- To plane's weight and balance (FM).
- Data centre in Erding, Germany

◦ Hotel systems and car rental.

◦ Booking systems

- Used by websites
- travel agents
- Mobile apps...etc

► €2.4 billion annual revenue



Amadeus

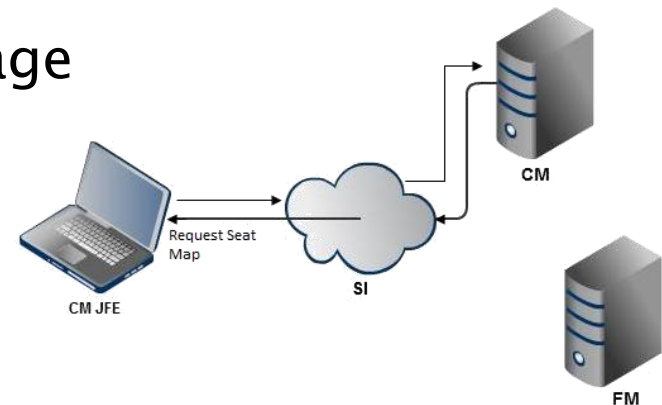
- ▶ Upcoming technologies
 - RFID bag tags and baggage tracking.
 - Ground control
 - Fully automated Airport of the future
- ▶ Area I was involved in
 - Departure Control System, Global Core D, Customer Management B (CMB), Flight team (FLT)



Me!

Amadeus

- ▶ **Airline part based on three tier system:**
 - Customer Management (CM)
 - E.g. Boarding, seating, baggage
 - 200k+ lines in C++
 - Flight Management(FM)
 - E.g. Fuel, load balance
 - 70k+ C++
 - JFE,
 - Used by check-in agents
 - 70k+ Java
 - They intercommunicate using EDIFACT messages



Projects worked on

- ▶ AMADEUS introduction
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 - Flight History screen – JFE
 - CM
 - Other
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Demand

- ▶ Requested by many airlines
 - South African, Air France, Lufthansa, Korean Air, British Airways (FM History)
- ▶ A way to view events occurred during flight



Business Needs

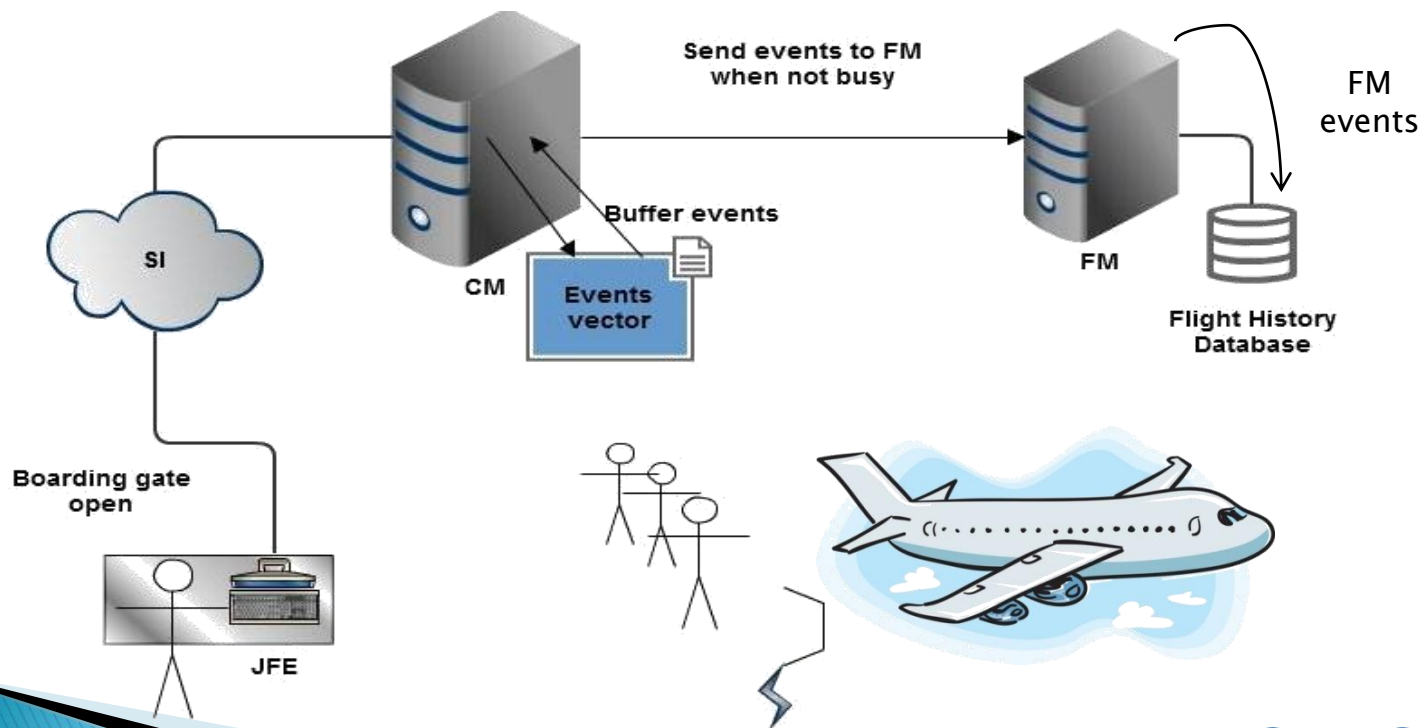
- ▶ Perform enquiries when a flight goes wrong
 - Air safety threat investigation
 - Revenue Disruption Controls
 - Operations Mishandling and Incident Recovery
- ▶ Scrutinise check-in agents activity
 - Customer complaints
 - Identify need for further training
- ▶ Online Trail Audit for troubleshooting
 - Airline agent, Help desks and Technical users

Flight History Events

- ▶ Two main types of event transactions
 - CM events
 - FM events
 - Only interested in Departure Plan FM events (DP events)
- ▶ Contain data such as:
 - Flight information, e.g. Number, Leg, General Status
 - Local Date & Time
 - User information, e.g. User ID, Office
 - Transaction information,
 - e.g. Number of trays and meals in cabins A–J

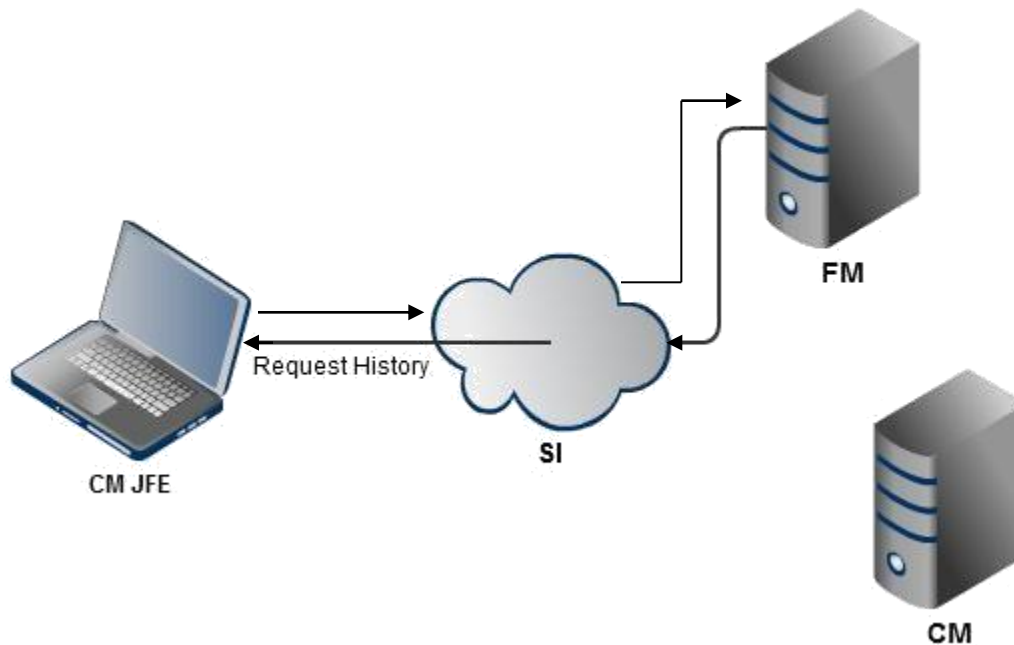
Data Flow

- ▶ **FM** events stored in FM database
- ▶ **CM** events are buffered then sent to FM DB
 - Avoids data duplication



Data Flow – Events retrieval

- ▶ Both CM and DP Flight History events retrieved from FM and displayed on screen.
 - Using FHILRQ/R EDIFACT messages



Task

- ▶ Add Flight History to CM JFE
- ▶ Cater for different levels of **permissions**.
- ▶ Add **Filtering** of events
- ▶ **Itemise** access for specific airlines only.
- ▶ **Screen layout similar to Customer History**

Customer History screen

The screenshot displays the Amadeus Customer History screen. At the top, there's a navigation bar with tabs: Applications, Device, Navigation, Logoff, and Help. Below this, a status bar shows 'Messenger (0)', 'Customer (1)', and 'Flight (2)'. The main navigation area includes tabs: 'ner Identification', 'Customer Selection', 'Customer Acceptance', 'Customer Record', and 'Customer History'. The 'Customer History' tab is active.

On the left, a 'System' section shows 'Restart' and 'SF12'. The main content area displays flight details for KL1002 on 05JUL LHR to AMS Amsterdam Schiphol Airport. The status is 'Acceptance Pending'. The flight details table shows two rows: one for 'PANGANIBAN Elenita Ms' (Seat 2D) and another for 'PANGANIBAN Elenita Ms' (Seat 2E). The 'Select Customer' dropdown is set to '2'. Below the table, there's a message: 'Select customer to view the most recent history. Select a reference to display additional information. Refine the history display with Advanced Options.'

The history list shows two transactions:

- 24JUN10 16:55**
1. Transaction: **Mass Customer Fraud Check**
Category: **Blacklist Check** Subcategory: **Customer Blacklist**
Flight: **AF185 28JUN10 D HKG-CDG**
» **Added:** Blacklisted: **No**
- 24JUN10 15:05**
2. Transaction: **Initial Amadeus Altea DCS Record Creation**
Category: **Customer Details**
» **Added:** Name: **PANGANIBAN Elenita Ms** Type: **Adult** Gender: **Female**
Created From: **Marketing Flight Booking** Record Locator: **4WRLKQ**

At the bottom, there's a 'Select Reference' field and buttons for 'Advanced Options [F2]', 'Display Reference', and 'Exit'.

Multi-level history

Organised into
categories and
subcategories

Cross-referencing

What's already available

- ▶ FM Technical GUI, built as internal tool
 - Intended for technical users only
- ▶ Events structure:
 - Common event fields
 - Details BLOB
- ▶ Stored fields are:
 - Date/Time,
 - Event description,
 - User ID,
 - Organisation,
 - Application (FM/CM)
 - Details (BLOB)

FM Technical GUI

Limited filtering

Technical information

Unformatted details

FM Flight Technical Data - FM Flight Technical Data

File Tools Help

FM Flight Technical Data

Filters

Flight

Number: 6X 185 ...

Departure Date: Mon 05Jul10

Departure Port: LHR

User ID:

Organisation:

Event Description:

From Date/Time

Date:

Time:

To Date/Time

Date:

Time:

Display

Technical Data **History** Events

| Date Time | Message Type | Transaction | Calling Event Name | Event Description | User ID | Org | Statuses | APP |
|-------------------|--------------|-------------|-------------------------------|-------------------------------------|----------|-----|-------------|-----|
| 12/06/10 6:00:09 | FXCSSR | 002NZ18EEF | <<Internal Process>> | Activity FCF updated | | | GO/AO/BN/LI | FM |
| 12/06/10 6:00:09 | none | 002NZ18EER | <<CPR Feed Update>> | CPR Feed Status Set | STHAO | 1A | GO/AO/BN/LI | CM |
| 12/06/10 15:14:07 | FDCSCQ | 2FCLV04CXG | <<Interrogate Business Rule>> | Flight Handling Rule retrieved | AGAGNEUX | 1A | GO/AN/BN/LO | FM |
| 12/06/10 15:14:07 | FDCSCQ | 2FCLV04CXG | <<Interrogate Business Rule>> | IATA Service Type Rule retrieved | AGAGNEUX | 1A | GO/AN/BN/LO | FM |
| 12/06/10 15:14:07 | FDCSCQ | 2FCLV04CXG | <<Interrogate Business Rule>> | Template Flight Type Rule retrieved | AGAGNEUX | 1A | GO/AN/BN/LO | FM |
| 12/06/10 15:14:07 | FDCSCQ | 2FCLV04CXG | <<Interrogate Business Rule>> | Baggage Type Rule Retrieved | AGAGNEUX | 1A | GO/AN/BN/LO | FM |
| 12/06/10 15:14:08 | FDCSCQ | 2FCLV04CXG | <<Internal Process>> | Activity ADP added | AGAGNEUX | 1A | GO/AN/BN/LI | FM |
| 12/06/10 15:14:08 | FDCSCQ | 2FCLV04CXG | <<Internal Process>> | Activity BLP added | AGAGNEUX | 1A | GO/AN/BN/LI | FM |
| 12/06/10 15:14:08 | FDCSCQ | 2FCLV04CXG | <<Internal Process>> | Activity BTM added | AGAGNEUX | 1A | GO/AN/BN/LI | FM |
| 12/06/10 15:14:08 | FDCSCQ | 2FCLV04CXG | <<Internal Process>> | Activity BTM added | AGAGNEUX | 1A | GO/AN/BN/LI | FM |
| 12/06/10 15:14:08 | FDCSCQ | 2FCLV04CXG | <<Internal Process>> | Activity CAP added | AGAGNEUX | 1A | GO/AN/BN/LI | FM |
| 12/06/10 15:14:08 | FDCSCQ | 2FCLV04CXG | <<Internal Process>> | Activity CBP added | AGAGNEUX | 1A | GO/AN/BN/LI | FM |
| 12/06/10 15:14:08 | FDCSCQ | 2FCLV04CXG | <<Internal Process>> | Activity CCM added | AGAGNEUX | 1A | GO/AN/BN/LI | FM |

Page 1 of 2

Details: Free Text=CntFlightLegDesignator :
_carrierCode = "6X"
_flightNumber = 185
_departurePort = "LHR"
_origPortDepartureDate = 2010-07-05
_origPortUTCDate = 2010-07-05
Id = 56279880,

Connected: LON6X0NGD, 6X, FJORDAN/SU (FM_UAT/si) 05/07/10 10:23 AM

Issues

- ▶ Existing history framework limited
 - No categorisation of events.
 - Event details stored as free text.
- ▶ Yet, desired display similar to Customer History
 - Events organised in categories and sub-categories
 - Old values stored, history cross referencing

Solutions

- ▶ Solution is to update the whole framework down to the database level.
 - Cannot be done within my time frame
- ▶ Added an extra layer of abstraction in JFE
 - Mapped events' unique "Calling event name" to their relevant groups.
 - Cons:
 - Need to update JFE each time new event added
 - Pros:
 - Only temporary solution for a few months
 - Events don't change often once added
 - Helped progress of project at least from JFE's side

Screenshots

The screenshot displays the Amadeus flight management system interface. At the top, there is a menu bar with 'Applications', 'Device', 'Navigation', 'Logoff', and 'Help'. The date and time '30JUN10 13:22' are shown in the top right corner. Below the menu bar, there are tabs for 'Messenger (0)', 'Customer (1)', and 'Flight QF10 (2)'. The 'Flight QF10 (2)' tab is selected, and the 'Flight Information' sub-tab is active.

On the left side, there is a 'System' section with a 'Restart' button and a 'SF12' label. The main area shows flight details for QF10, including the route '12JUN LHR (3) → SIN (1) → MEL Melbourne Tullamarine (2)', 'STD: 22:05', 'Gate: None', and 'Boarding: 21:20'. Below this, there is a table of events:

| Date Time | Event Description | Category | Office ID | User ID |
|----------------------|------------------------------------|----------|-----------|------------|
| 15 09/06/10 13:05'07 | Predicted ZFW Fuel Split retrieved | | QF | U999114 |
| 16 09/06/10 13:06'51 | CPR Feed Status Set | CPR Feed | 1A | FM1AAGENT1 |
| 17 09/06/10 13:07'41 | CPR Feed Status Set | CPR Feed | 1A | FM1AAGENT1 |
| 18 10/06/10 14:55'47 | Catering Figures Set | Catering | QF | U334180 |
| 19 10/06/10 14:58'05 | Catering Figures Set | Catering | QF | U334180 |
| 20 11/06/10 08:49'25 | Customers have been regraded. | Seating | QF | U803355 |

Below the table, there is a 'Select event:' field with the value '16'. To the right of this field are buttons for 'Pg-Up', 'Pg-Down', 'Expand [SF2]', and 'Page 1 of 2'. Below the 'Select event:' field, there is a section titled 'Select an event to view more details.' with a 'Details:' label. The details section shows 'Feed set to: INIT' and 'Flight Statuses: GO/AN/BN/LO'. At the bottom right, there is a button for 'Advanced Options [F2]' and an 'Exit' button.

Screenshots – INT permission

The screenshot displays the Amadeus flight information system interface. At the top, there is a menu bar with 'Applications', 'Device', 'Navigation', 'Logoff', and 'Help'. The date and time '30JUN10 13:20' are shown in the top right corner. Below the menu bar, there are tabs for 'Messenger (0)', 'Customer (1)', and 'Flight QF10 (2)'. The 'Flight QF10 (2)' tab is selected, and the 'Flight Information' sub-tab is active.

The main content area shows flight details for QF10: 12JUN LHR (3) → SIN (1) → MEL Melbourne Tullamarine (2). The status is 'Acceptance Not Open' and 'Codeshare: BA7310'. The standard time is 'STD: 22:05' and the gate is 'Gate: None'. The boarding time is 'Boarding: 21:20'.

Below the flight details, there is a table of events:

| Date Time | Event Description | Calling Event Name | User ID |
|----------------------|---|------------------------------------|-----------|
| 24 12/06/10 02:52'09 | Compute weights succeeded | <<Compute Weights>> | SYSTEM |
| 25 12/06/10 02:52'09 | External Capacity Calculation accepted. | <<Get External Capacity Estim...>> | U000214 |
| 26 12/06/10 05:19'59 | Catering Figures Set | <<Set Catering Figures>> | U477849 |
| 27 12/06/10 05:21'13 | Catering Figures Set | <<Set Catering Figures>> | U477849 |
| 28 12/06/10 05:25'09 | Flight Related Comment Added | <<Create Flight Related Comm...>> | U373306 |
| 29 12/06/10 11:52'29 | Passenger details were not received from... | <<Get Passenger Details>> | SCHEDULER |

Below the table, there is a 'Select event:' dropdown menu with '28' selected. To the right of the dropdown are buttons for 'Pg-Up', 'Pg-Down', 'Expand [SF2]', and 'Page 1 of 2'. Below the dropdown, there is a link 'Select an event to view more details.' and a section titled 'Details:'.

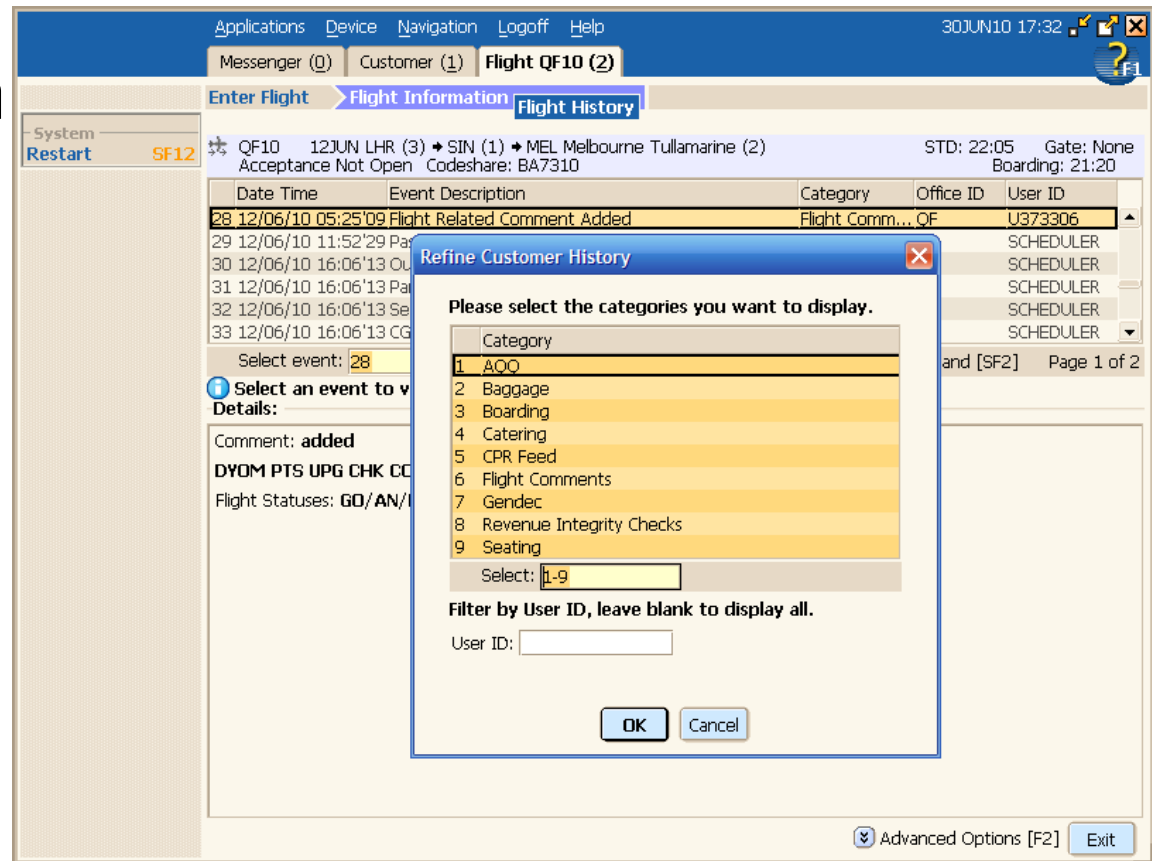
The 'Details:' section shows the following information:

- Comment: **added**
- Category: **GA**
- SIN RLC EEUEN TEL: (65)6311-1414 FAX: (65)6545-4022
- Flight Statuses: **GO/AN/BN/LO**

At the bottom right of the interface, there are buttons for 'Advanced Options [F2]' and 'Exit'.

Screenshots – Filtering

- ▶ Category multiselection
- ▶ User ID



Future solutions

- ▶ XSL-FO
 - Extensible Stylesheet Language Formatting Objects
 - Unified presentational language
 - Can export to PDF, GIF...any format
- ▶ Write formatted data in XML, transform using XSLT
 - allows automatic generation of a table of contents
 - linked references
 - an index...etc
- ▶ Use to display format differently in different JFE screens
- ▶ Copes well with Format And Deliver

Schedule

- ▶ AMADEUS introduction
- ▶ **Projects worked on**
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CM

- ▶ Logging Flight History events
 - Added events
 - Modified events already logged events.
- ▶ Communicated with Product development
- ▶ Worked on queuing events before sending to FM
 - Sent when low server load

CM (cont)

- ▶ Learnt basics of designing a report with iNet-Designer, Crystal Clear.
- ▶ I was introduced to how EDIFACT messages get created
 - For Format And Deliver printing, eventually had to be put on hold as FM support FND yet.

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CM Technical GUI

- ▶ Task: Find a way for SMC to see Flight History in an intuitive way and facilitate visualising issues
- ▶ How:
 - Get Flight History events from FM and use HTML Kit for display as part of CM Technical GUI.
 - Using Html Tool Kit
 - C++ and XML grammar generating HTML

CM Technical GUI

- ▶ The original idea was to use timeline.
- ▶ I tried to build on the idea, I looked at dozens of types of graphs:

Timeline

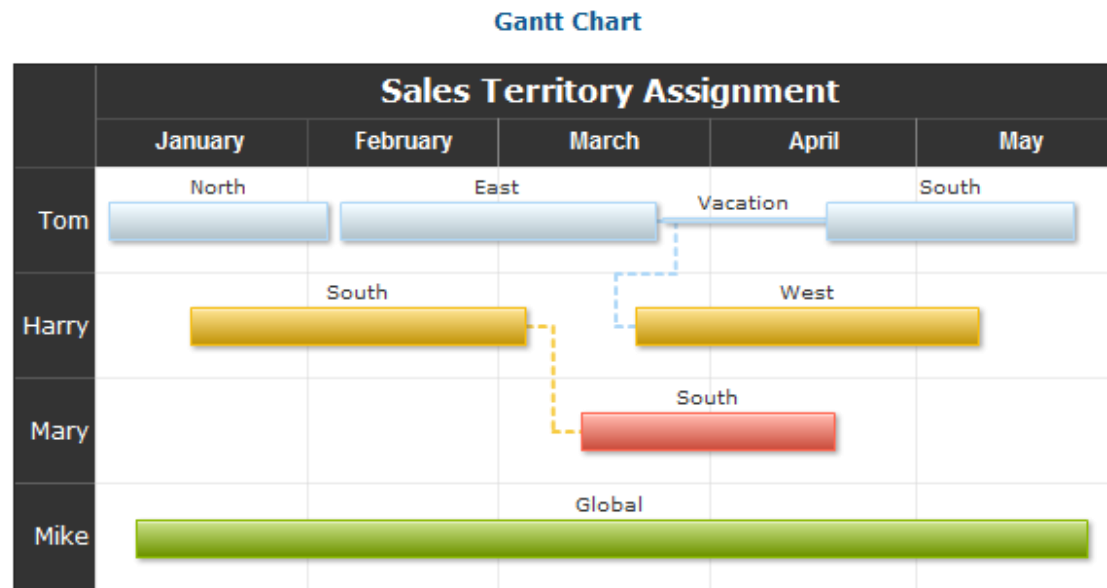
Web Widget for Visualizing Temporal Data

With this widget, you can make beautiful interactive timelines like the one below. Try dragging it horizontally with your mouse wheel. Click on each event for more details.



CM Technical GUI

- ▶ GANTT chart seemed most suitable to start with.
- ▶ Events can be displayed as levels



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 - CM Technical GUI
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Experience gained

- ▶ Industry standards in development
 - Product Development, Product Management teams
 - Development cycles
 - Testing
- ▶ Work organisation in an international environment
 - E.g. German law wouldn't allow tracking agents activity
- ▶ New technologies
 - XSLFO, HTML Tool Kit, Crystal Clear, EDIFACT

Most useful degree skills

- ▶ Object Oriented Programming
 - Both Java and C++
- ▶ Databases
- ▶ Haskell (recursion)
- ▶ Group exercises
 - Linux lab
 - Trading game
 - 3rd year group project (Financial Data Warehouse)
 - Learning new technologies as seems appropriate

Questions

