

Web Services & Conceptual Modeling

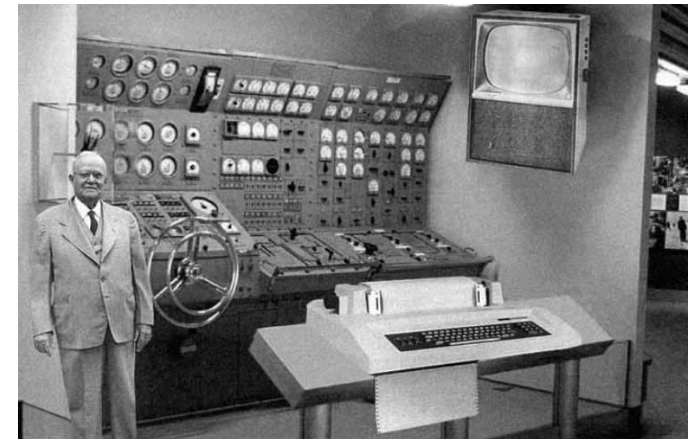
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The Basics

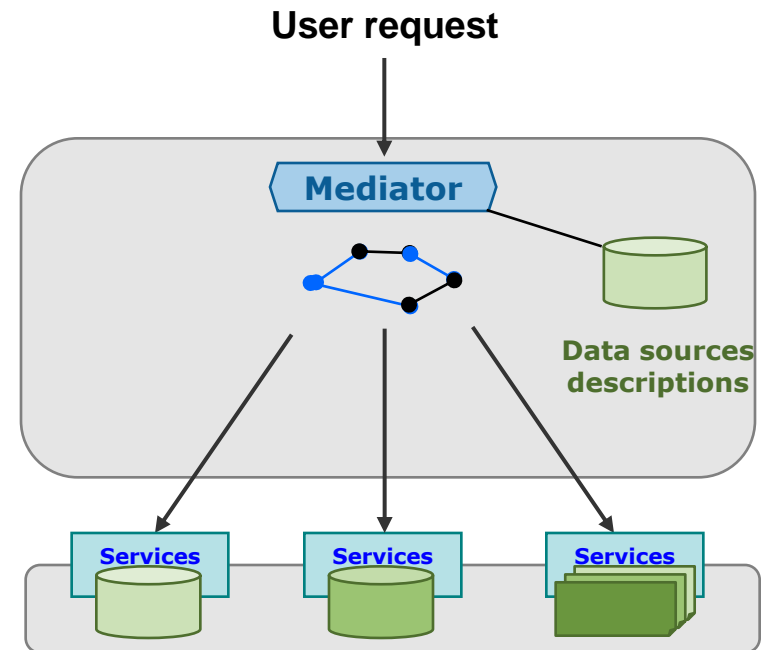
- Conceptual modeling
 - Static schema
 - specifies entity sets, relationships, ...
 - Dynamic schema
 - specifies Web services
- Question
 - How to model Web services?
- Answer
 - Depends on the scenario
 - Scenarios discussed: mediators



Scientists from the RAND Corporation have created this model to illustrate how a "home computer" could look like in the year 2004. However the needed technology will not be economically feasible for the average home. Also the scientists readily admit that the computer will require not yet invented technology to actually work, but 30 years from now scientific progress is expected to solve these problems. With teletype interface and the Fortran language, the computer will be easy to use.

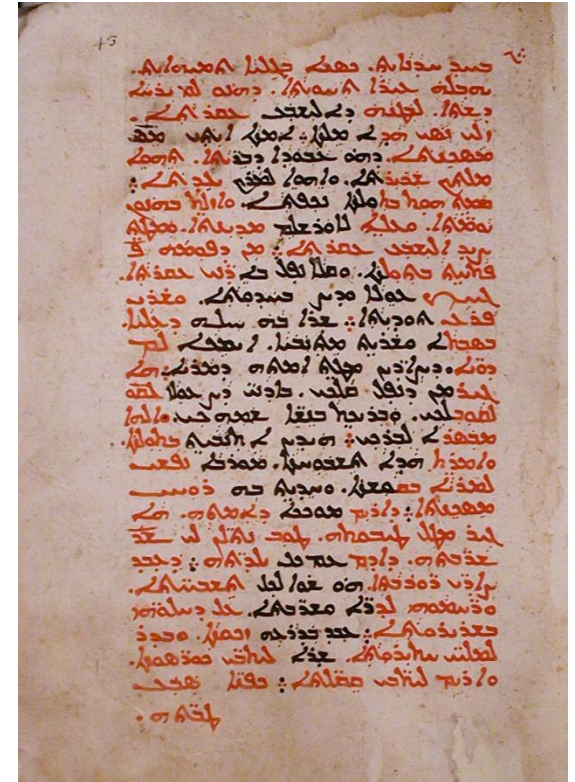
Beyond the Basics...

- Mediator with Web services
 - Data source
 - Static + Dynamic schema
 - Mediated environment
 - Static + Dynamic mediated schema
 - Static + **Dynamic Mappings**
 - **Dynamic mappings**
 - manually expressed as workflows
 - **Challenge:**
 - adding a new data source requires defining new dynamic mappings



Beyond the Basics...

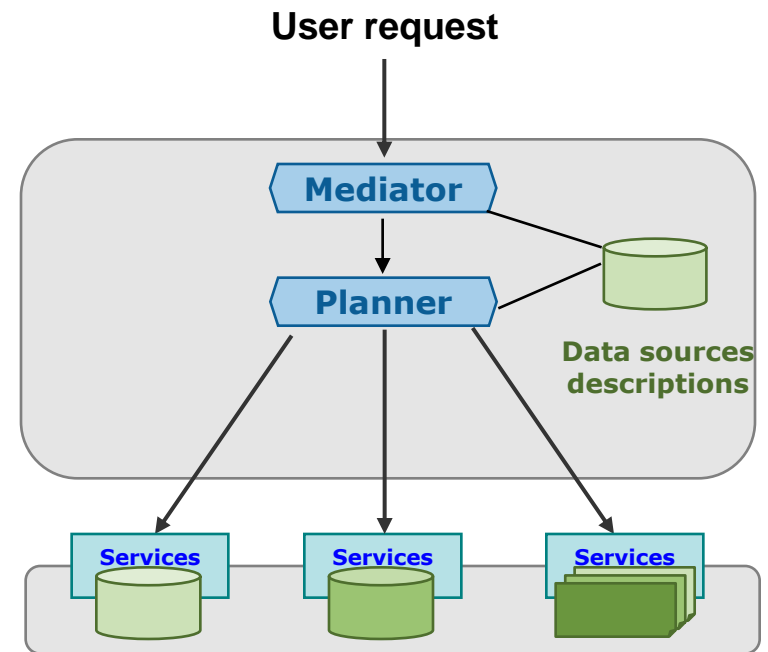
- Mediator with contracts
 - Mediated dynamic mappings specified by *contracts*
 - Contract
 - abstract workflow, specified a priori, defining a service composition, with well-defined roles
 - Data source specification
 - Static + Dynamic schema + *roles* for the Web services
 - Challenge:
 - Data sources must respect contract roles



Vat. Syr. 83 East Syriac Hudra (1537/9 AD)
E. Jan WILSON, "The Digitizing of Selected Syriac MSS in the Vatican Apostolic Library"
HUGOYE: JOURNAL OF SYRIAC STUDIES
<http://syrcom.cua.edu/Hugoye/Vol3No2/HV3N2PRWilson.html>

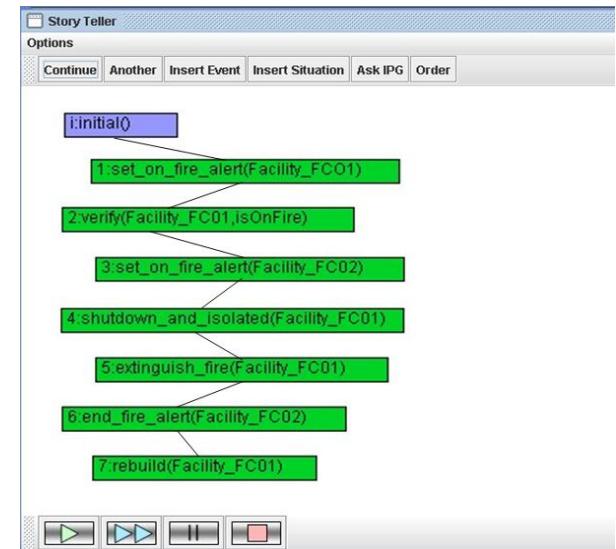
Beyond the Basics...

- Mediator with automatic composition of Web services
 - Mediated environment
 - Static mediated schema
 - Static mappings
 - Data sources
 - Static schema
 - Dynamic schema: specifies the **semantics** of Web services by **their pre- and post-conditions**



Beyond the Basics...

- Mediator with automatic composition of Web services
 - User
 - specifies goals (not Web service calls)
 - Plan generator
 - automatically creates a plan, consisting of Web service calls, to achieve user's goals
 - (Dynamic maps user's goals into compositions (plans) of Web services)

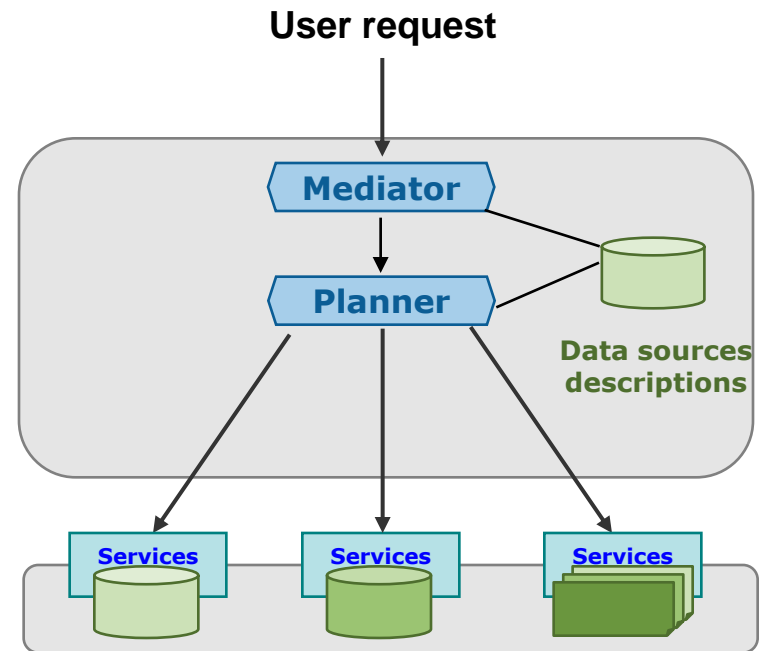


Beyond the Basics...

- Mediator with automatic composition of Web services

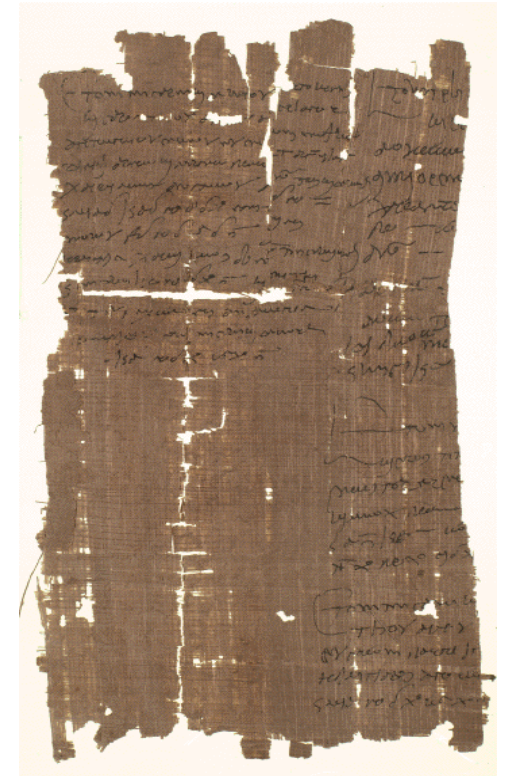
- Challenges:

- Pre- and pos-conditions expressed in terms of the source static schema
x
user's goals expressed in terms of the mediated static schema
 - Distributed "world state"



Beyond the Basics...

- Mediator with ...
 - ...
 - Contracts or plans with intensions (based on speech acts)



A collection of tax receipts from the village of Hephaistias, Egypt
<http://www.columbia.edu/~rcc20/papyrus/>

Beyond the Basics...

- Speech acts [Searle, 1975]
 - **assertive** = commits a speaker to the truth of the expressed proposition
 - reciting a creed
 - **directive** = causes the hearer to take a particular action
 - requests, commands and advice
 - **commissive** = commits a speaker to some future action
 - promises and oaths
 - **expressive** = expresses the speaker's attitudes towards the proposition
 - congratulations, excuses and thanks
 - **declaration** = changes the reality in accordance with the declaration
 - baptisms, pronouncing someone guilty

Summary

- Conceptual modeling of Web services may involve...
 - Modeling **contracts with roles**
 - Modeling **pre- and post-conditions**
 - Modeling **intensions**



Dance I : Henri Matisse