

BUILDING DIGITAL TERRESTRIAL TELEVISION ON SERVICE ORIENTED ARCHITECTURE

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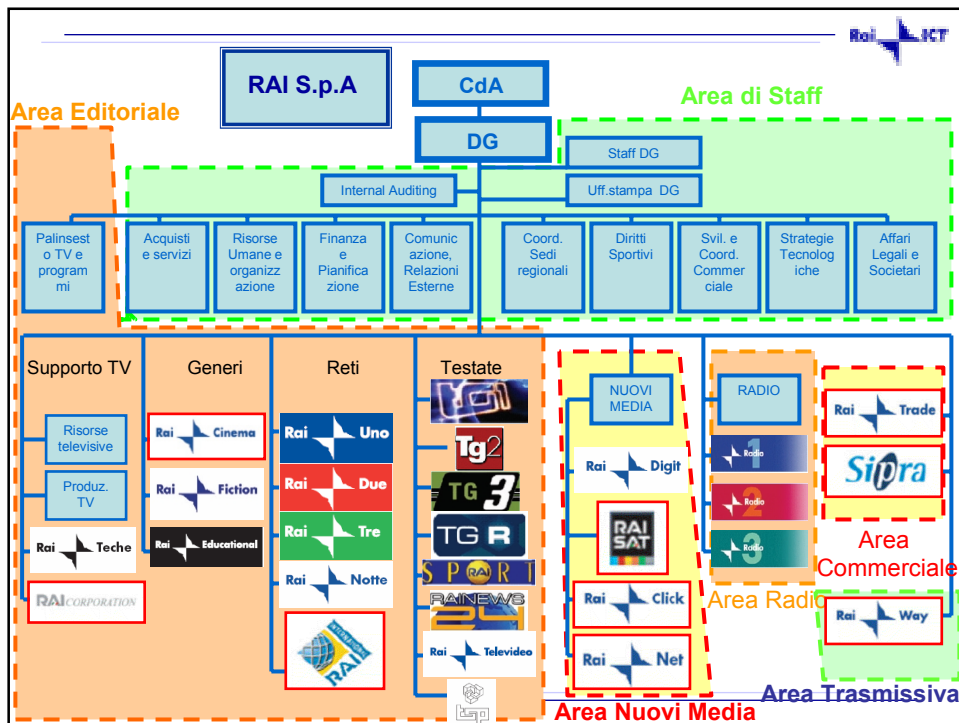
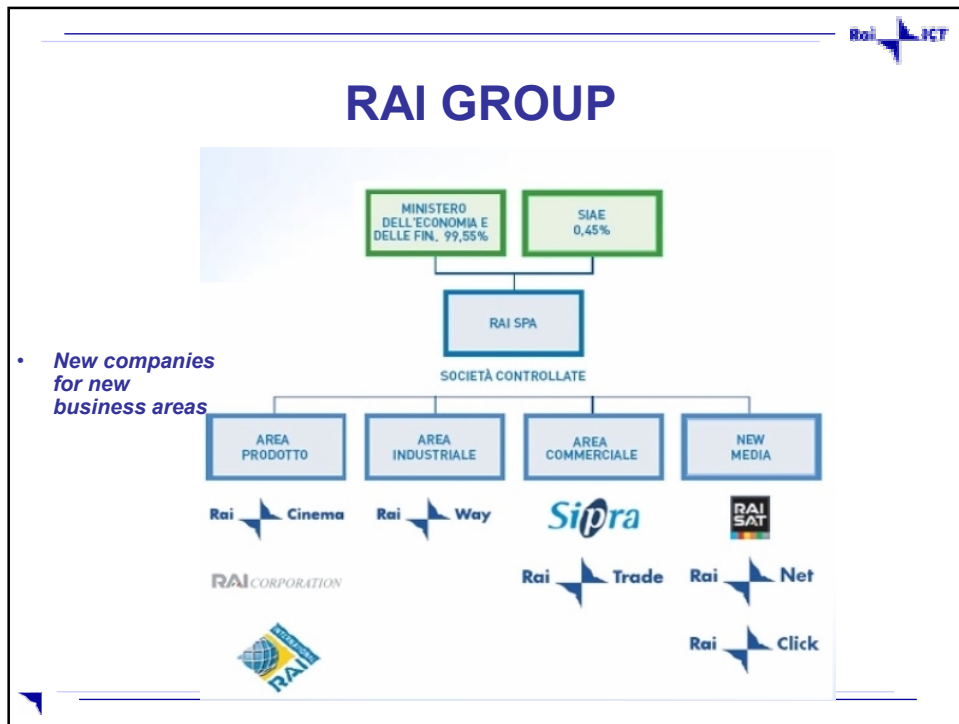
...about RAI

RAI (Radio Audizioni Italiane), created in 1924, is the Italian Public Service Broadcaster.

It operates three terrestrial television channels and three radio channels, in addition to several satellite and digital terrestrial offerings.

RAI is governed by a nine member Administrative Council. Seven of its nine members are elected by parliamentary committee, the remaining two (one of which includes the President) are nominated by the largest shareholder – that is, the Finance Ministry.





ORGANIZATIONAL STRUCTURE SOME FIGURES

- **10.064** Employees
- **2.808.000.000 Euro** Total revenue
- **3** Terrestrial TV channels
- **14** Satellite TV channels
- **11** DTT TV channels
- **5** RF channels
- **79.321** Hours of TV transmission
- **66.776** Hours of RF transmission

AGENDA

- An approach for IT & Business alignment
- SOA: “technological” view and “business” view
- The business drivers for SOA evolution
- A new business goal for RAI: Digital Terrestrial Television
- RAI Interactive Platform Architecture
- SOA implemented: the “Common Data Model”
- Common Services for Special Needs
- DEMO: Interacting with TV

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AN APPROACH FOR IT& BUSINESS ALIGNMENT

IT Depts have to support business processes.

This is possible only if they know business context, understanding relationships between their Companies and “external environment”.

Company defines many processes to support its business and its services,
IT Dept. defines many hardware and software components to support IT Services.

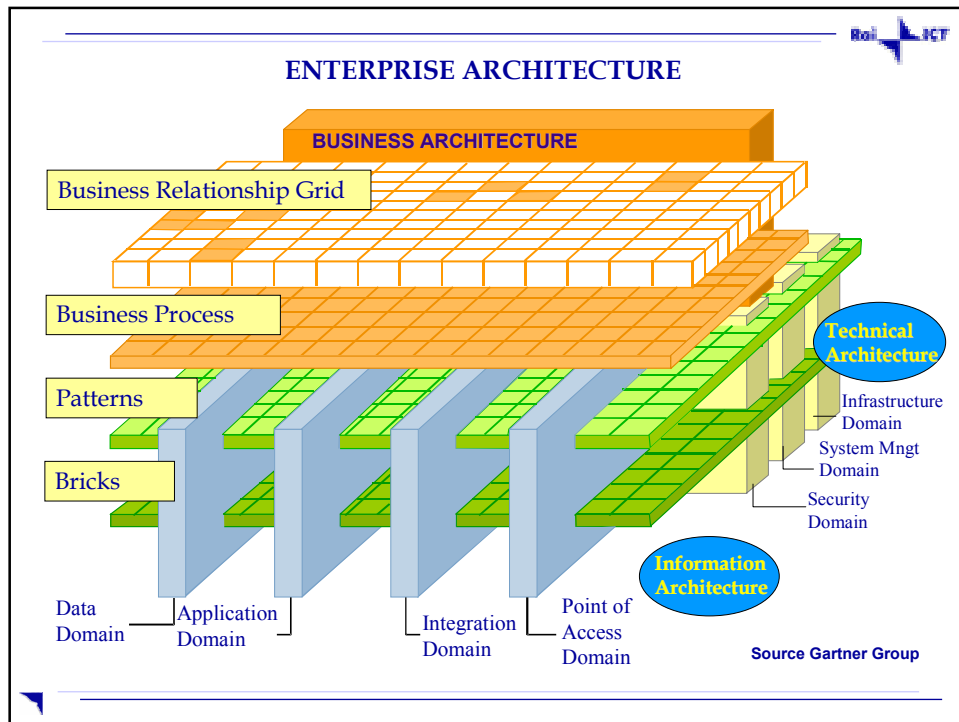
We have IT & Business alignment when “IT Services” support Business Services.



Enterprise Architecture represents the logical model to describe:

- o **Business Relationships**
- o **Processes**
- o **IT Services**
- o **IT Infrastructure**





RoI JCT

IT & BUSINESS ALIGNMENT: FROM PRESENT TO FUTURE

Business is very dynamic and the Companies, understanding external context and market trends, define their strategies and design the "route" to new and "future states".

IT Depts. define projects to align Enterprise Architecture to the "future states".

➡ **IT projects carry Enterprise Architecture from "present state" to "future states".**

IT & BUSINESS ALIGNMENT: SOFTWARE REUSE

“Software Reuse” is linked to “Services Reuse”.

Only if technology infrastructure supports IT services it is possible to enable new services to support new business “scenarios”.

Most SOA projects are implemented by combining established applications and new services. SOA’s ability to combine old and new is part of its power and one of its virtues.



Service Oriented Architecture is a good way to anticipate the changes of context and to match the business priorities.



IT & BUSINESS ALIGNMENT: MOVING TO SOA

Moving to a SOA is, in most cases, motivated by significant changes in the business environment.

Most frequently this need most manifest itself in the context of a specific business unit, but often, and most importantly, also at the corporate level.

The modular, “composable” and technology-neutral nature of service-oriented applications fits well with a large spectrum of “Bottom-up” business unit wide and “Top-down” enterprise-wide requirements.

SOA is first and foremost a key enabler to improve companies’ ability to adapt more rapidly to the quickly changing business environment.



IT & BUSINESS ALIGNMENT: "DIGITAL TELEVISION CASE"

In Europe Media and Communication Platforms are actually moving to Digital Standard.

RAI is moving from a "*present state*" (mainly Analog TV) to "*future state*" (full Digital TV).

This challenge is leading RAI to align his business to supply new services on digital platform.

IT Dept. have to understand this change of context, analysing existing software components and realizing new IT Services.

These new IT services will allow to support new Business Services.



**Enterprise Architecture models our new contexts.
Service Oriented Architecture is the right way to
build our new digital platforms.**



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SOA DEFINITIONS

SOA is a group of processes, organizational rules and technical methods to design an architecture to :

- create software services using a definition language and standard interfaces invoked to execute business processes

"technical view"

- assure more flexibility and speed to create and change the IT components to meet the business needs

"business" view



SOA doesn't depend on a particular technology



TECHNICAL VIEW - WARNINGS

- *Performance* the use of XML is slower than traditional way to communicate
Solution : IT transactions need high business value
- *Security* The use of shared standard can get to unauthorized access
Solution: Systems and Users need strong authorizations and authentications
- *Governance* This is the best way to enforce reuse
Solution: Governance process and methods need new skills



**SOA without governance normally degenerate.
The governance of SOA involves deep organizational change.**



BUSINESS VIEW - GOALS

- *Reduction of time to market*
The reuse of components and the definition of standard allow to implement faster IT components.
- *Multi-Channel*
The independence of services from user interface and the reuse of components support multi-channel.
- *Control and update of business processes*
The use of standards allows to trace easier the processes and to update them in according to the business requests.
- *Reduction of complexity*
Justify upfront investment on the basis of three main benefit: architectural partitioning, incremental deployment and reuse.



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SOA IN BUSINESS TERMS

The changeable of enterprise and market requirements increase the gap between enterprise needs and IT answers:
“Many companies are adopting SOA to fill up this gap”.

Business trends are driving the focus beyond the stability and reliability of operations and processes.

An SOA approach moves the primary focus toward process definition, visibility and control; the main objective with SOA initiatives is to address a more agile, flexible and standardized approach to design, develop and deploy functionalities.

To justify SOA project, organizations must understand that SOAs reflect core business drivers and are not simply technology changes within IT infrastructure.

BUSINESS DRIVERS

- B2B, to implement the link between different enterprises
- Multi-channel, to access to enterprise's offers through many ways
- Renewal of systems, for absence of skills and increase of risks
- Merge of different systems
- Business activity monitoring
- ...



Business needs are driving SOA Evolution in the Enterprise Architectures.

IT DRIVERS

- Incremental engineering and maintenance of software
- Improved scalability and software availability
- IT Standards facilitate the evolution of SOA's technologies
- SLAs need services that SOA can supply
- Business Intelligence Analysis requires high quality's results and SOA can help to obtain this goal due to the enterprise process tracing services.



IT Evolution enables SOA Evolution



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MEDIA AND COMMUNICATION PLATFORMS

Media and Communication platforms are moving to digital standard

- Fixed phone: POTS, ISDN, xDSL-Fibre, WiFi
- Mobile phone: TACS, GSM, GPRS/GPRS Edge, UMTS
- TV SAT: Analog, Digital - DVB-S
- Terrestrial TV: Analog, DVB-T, DVB-H

Terrestrial TV is the last Media and Communication platform in transition from analog to digital ...

MEDIA AND COMMUNICATION PLATFORMS

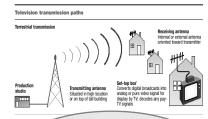
The convergence drops the current barriers

- Contents: Production - Packaging
Cinema - Music - TV Programs - Print - Radio Programs
- Distribution Network
Cable, Satellite, Fixed TLC Network, Mobile TLC Network, Optical Fibre, Broadcast
- Access technology
Fixed phone, Mobile phone, TV, PC, ...

Any content - Through any transport - On any computer

BROADCASTERS : DTT'S FEATURES - CONTEXT

The introduction of DTT leads a new way "to make" television (digital and complete platform of production) and "to watch" television ("I see and I take part") by the definition of value services



Digital Transmission

It refers to digital transmission of contents (terrestrial-DTT, satellite-DTH, cable)

Digital Television

It refers to technologies that permit automatic on-air, acquisition and store in digital format for improvement of production and transformation of contents

Interactive Television

It refers to services that permit to users to be interactive with television



Production and Digital Contents Management



DTT'S FEATURES - THE MODEL

Place of contents

"Traditional" TV Channel
Audio/Video in digital quality

- Interactive services (applications)
- Mail
- Database
- Games
- Purchase / Payment

Information Technology (info & content)
• Super Teletext (interactive or no)

Contents

Classic Media TV Content

New services "ri-examined" Services on Web

From traditional Teletext From Web

MHP

Multi-Channel



BUSINESS GOALS ON DIGITAL TERRESTRIAL TELEVISION

- T-Payment** It permits the payment of bills and fines; it hasn't a great diffusion in Europe but it's one of the most interesting application of DTT
- T-Government** It permits the diffusion of bulletin and informations from public administration and the participation of the people
- Interactive** It is contained into a TV program
- T-Learning** It contains applications that permit to execute interactive course on distance; this is a very important driver for a TV that has to absolve to public service
- Information/Enhanced TV** It contains the guide of TV programs, informations on traffic, dossiers on news, etc.



BUSINESS GOALS ON DIGITAL TERRESTRIAL TELEVISION

- Gaming** It contains interactive games, this service permits to capture the attention of the young people
- Participation TV** This service includes applications for user's interactive participation with programs (telequiz, vote, etc.)
- Betting** It permits bet on sport's events and game of chance
- Messaging** This service includes chat, communities, dating services, SMS, MMS; it is available on cable and satellite
- Pay per View** It includes crypt events that users can purchase; the reception of contents is available on Smart Card



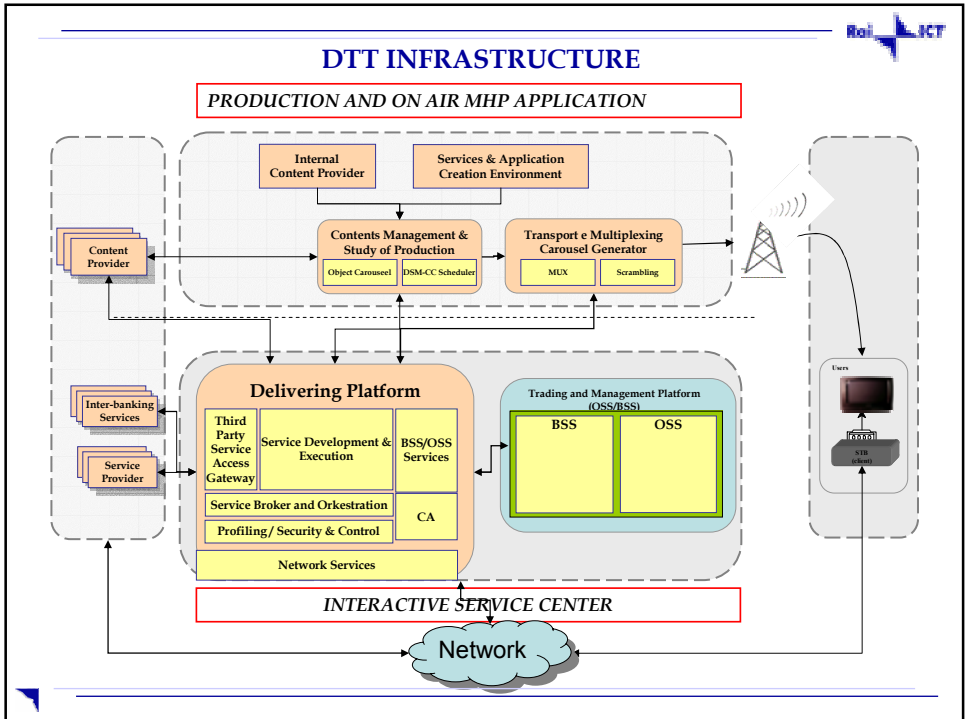
DTT'S FEATURES - CHAIN OF VALUE

DTT principal actors are:

- Broadcaster (RAI)
- Content/Service Provider (interactive services) (RAI and third parts)
- Network operator (RaiWay)
- Telco
- Final users

DTT architecture can be represented into two blocks:

- **Production an on-air of interactive applications** (direct channel)
 - o Factory of interactive applications
 - o On-air systems
- **Interactive Service Center**
 - o Network Service Platform
 - o Platform of available services
 - o Gateway for third parts services
 - o Pay TV platform and pre-paid cards
 - o Client Database (subscribers, clients of interactive services, clients of Pay TV)
 - o Definition of client's profile

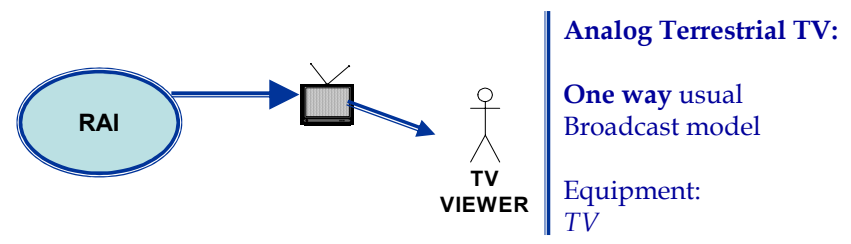


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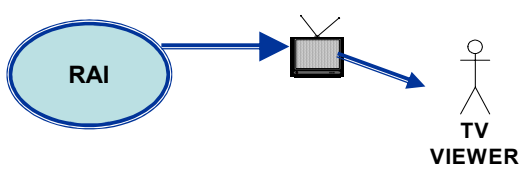
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ANALOG & DIGITAL TERRESTRIAL MODELS FOR RAI



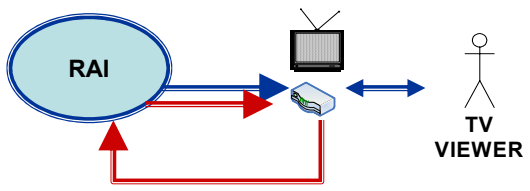
ANALOG & DIGITAL TERRESTRIAL MODELS FOR RAI



Analog Terrestrial TV:

One way usual Broadcast model

Equipment:
TV

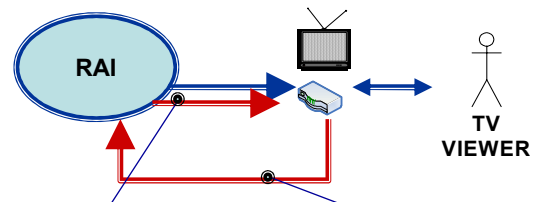


Digital Terrestrial TV:

Two way model: Broadcast + Interactivity

Equipment:
TV + Set Top Box (STB)

DIGITAL TERRESTRIAL ARCHITECTURE



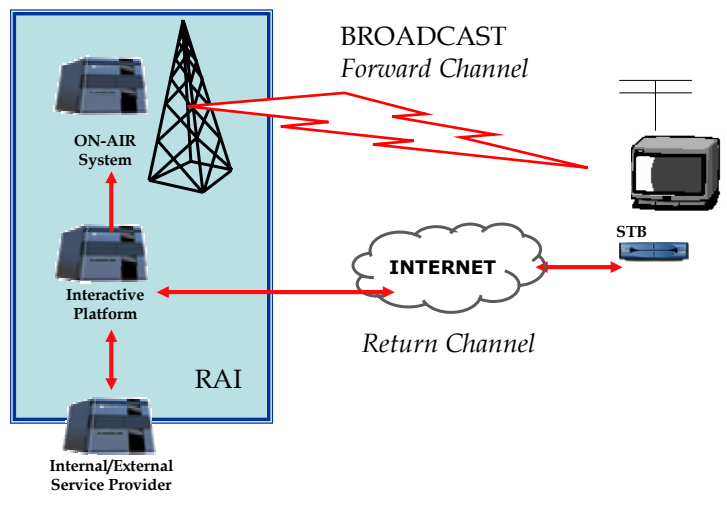
Forward Channel:

- Strict interaction with on air systems
- Application scheduling and update
- Synchronization with studio events

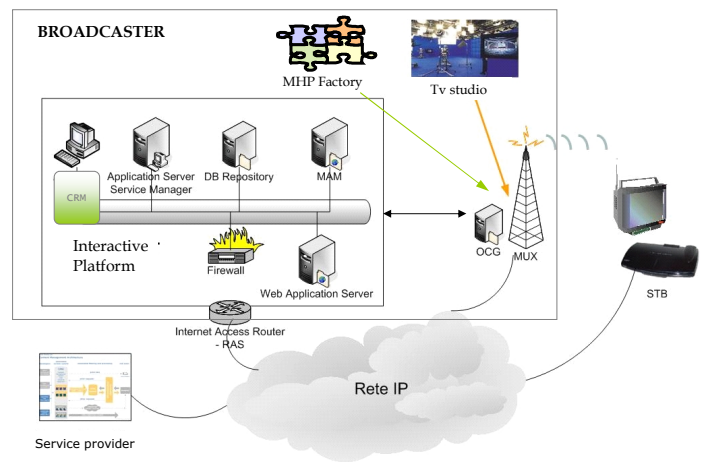
Return Channel:

- Interaction with several MHP application "dialects"
- Response to user request with (potentially) complex transaction

DIGITAL TERRESTRIAL ARCHITECTURE



DIGITAL TERRESTRIAL ARCHITECTURE



DIGITAL TERRESTRIAL ARCHITECTURE

Example 1: TV Magazine

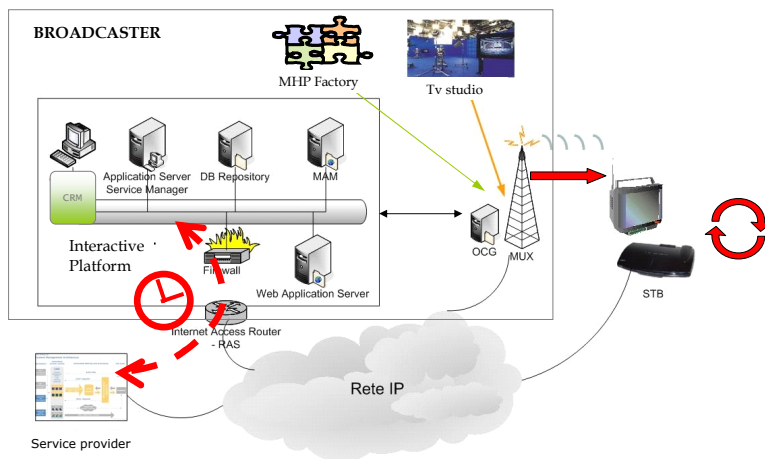


Key features:

- search engine
- head2head
- channels navigation
- games

DIGITAL TERRESTRIAL ARCHITECTURE

Example 1: TV Magazine



DIGITAL TERRESTRIAL ARCHITECTURE

Example 2: interactive SMS Forum

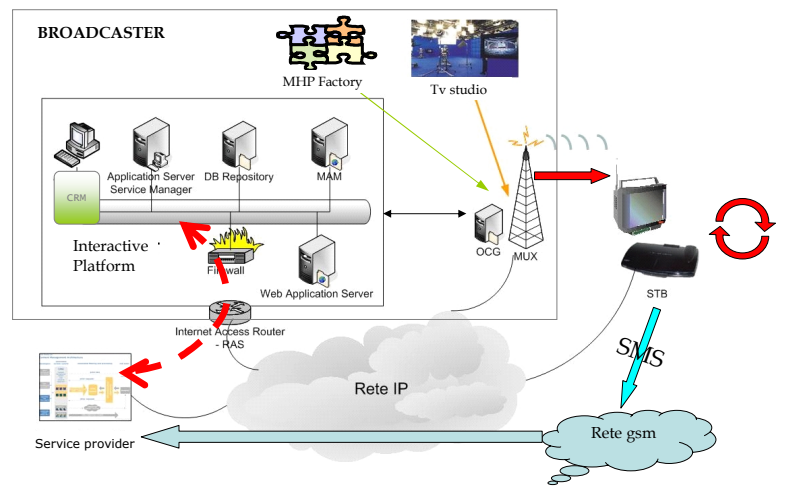


Key features:

- User interaction through Mobile Phone
- Easy and fast
- On Air Results
- Integration with other media

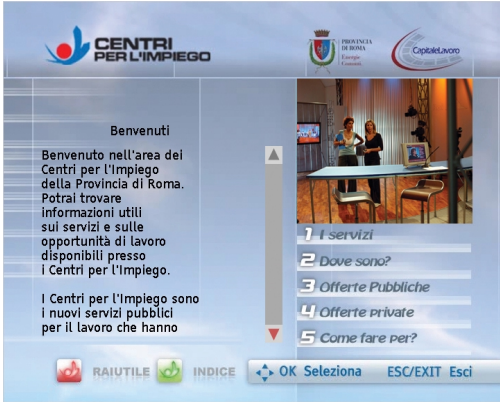
DIGITAL TERRESTRIAL ARCHITECTURE

Example 2: interactive SMS Forum



DIGITAL TERRESTRIAL ARCHITECTURE

Example 3: T-Government service

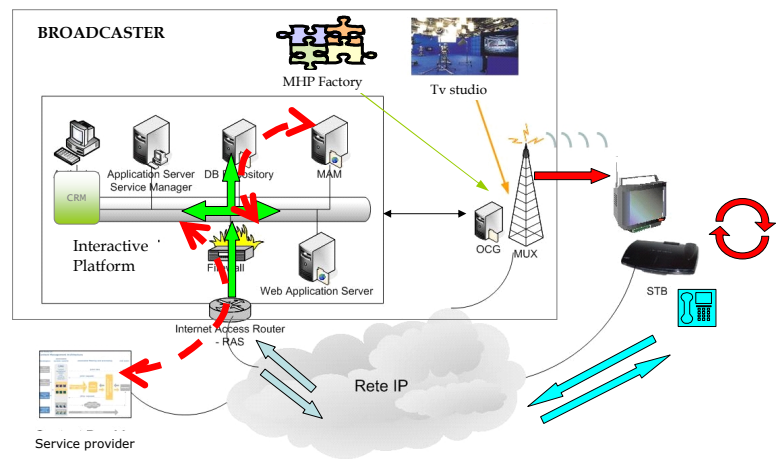


Key features:

- Return Channel Interaction
- Integration with other Media (web)
- User Auth/Profiling
- Transaction oriented model

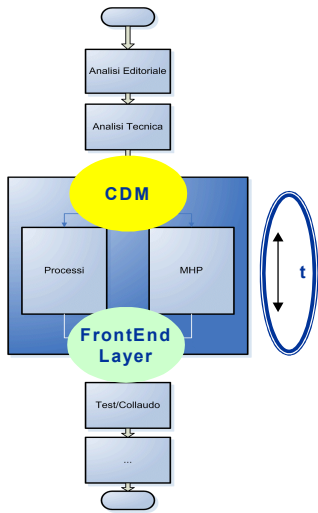
DIGITAL TERRESTRIAL ARCHITECTURE

Example 3: T-Government service



RAI INTERACTIVE PLATFORM ARCHITECTURE

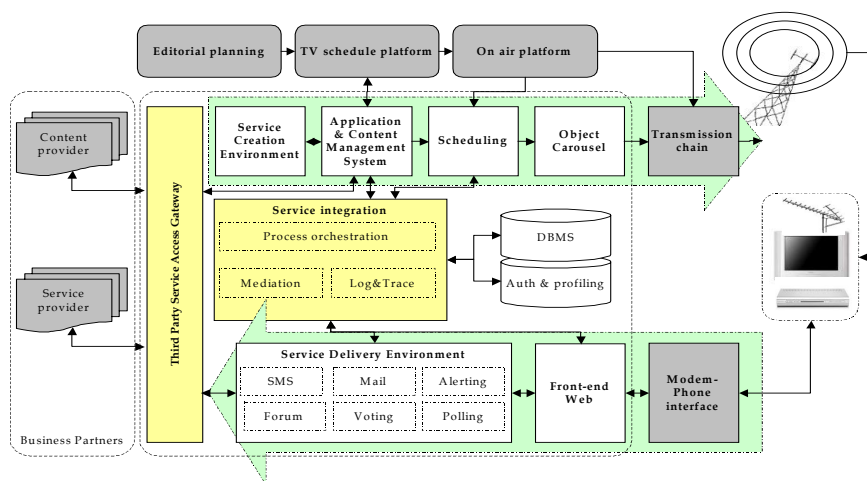
Lifecycle of an Interactive Application



- Editorial Analysis
- Technical Analysis
- Process Design & MHP implementation
- Test / Deploy
- On Air "Execution"



RAI INTERACTIVE PLATFORM ARCHITECTURE



RAI INTERACTIVE PLATFORM FORWARD CHANNEL: *an overview (1)*

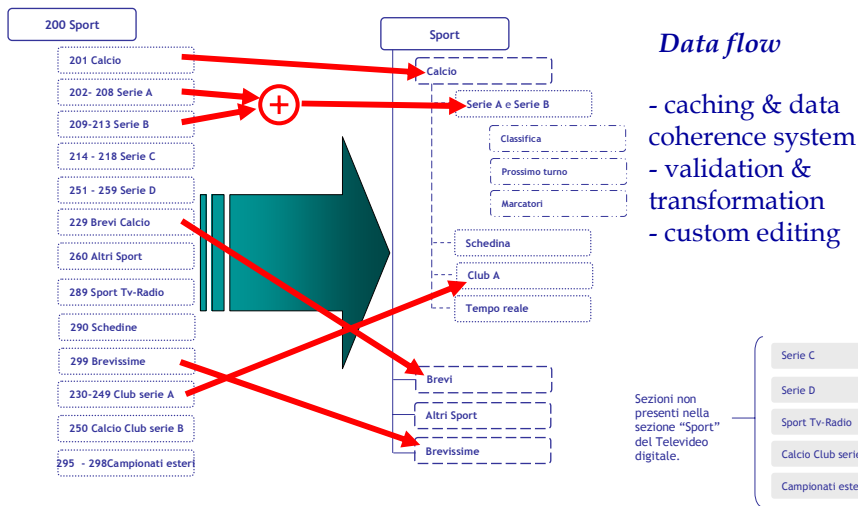
Forward channel means:

- Contents Updating
 - EAI/CMS
- I-TV apps management
- OnAir events synchronization
- OnAir production systems



RAI Teletext Evolution

RAI INTERACTIVE PLATFORM FORWARD CHANNEL: *an overview (2)*

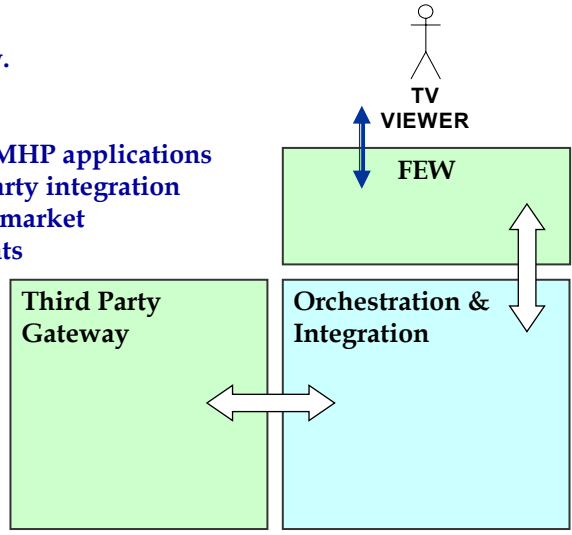


RAI INTERACTIVE PLATFORM RETURN CHANNEL: overview

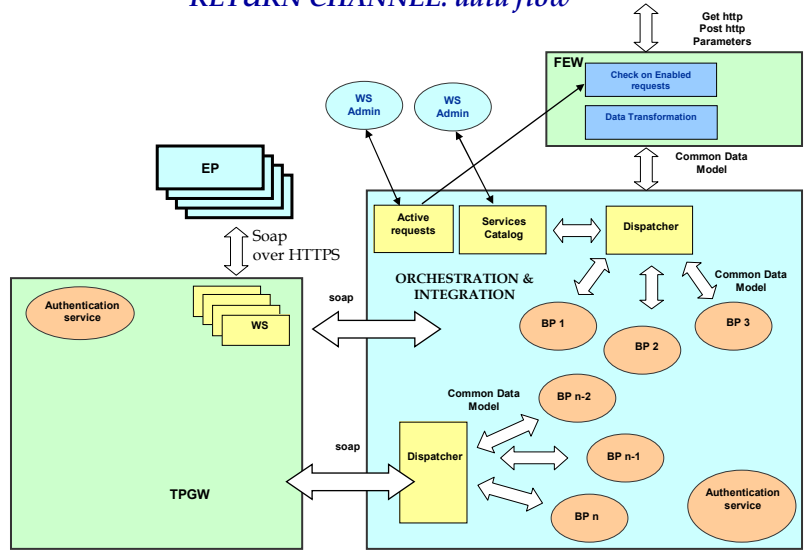
Return Channel Data flow.

Subjects:

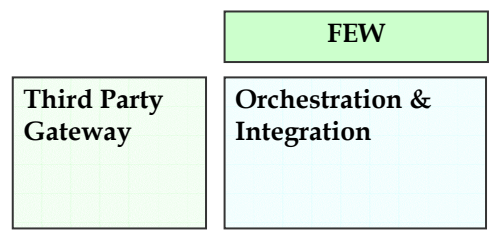
- Several kind/dialects of MHP applications
- External/internal third party integration
- High flexibility / time to market for Business Requirements



RAI INTERACTIVE PLATFORM RETURN CHANNEL: data flow



**RAI INTERACTIVE PLATFORM DATA FLOW:
FRONT END WEB**



Front End Web:

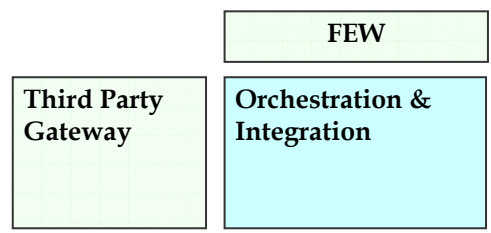
Main interface for all services available to the interactive TV Viewer.
Web server based.

Main duties:

- Receive requests in several formats/protocols, depending on implementation
- Return data in the custom format
- Drop disabled calls
- Check for logical request structure



**RAI INTERACTIVE PLATFORM DATA FLOW:
ORCHESTRATION & INTEGRATION**



Orchestration & Integration:

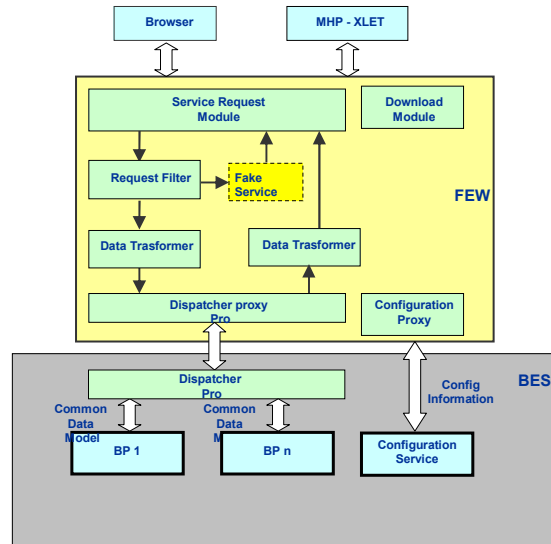
Platform Kernel. Based on BEA WLI, it offers graphical and low level tools for Business process implementation

Main duties:

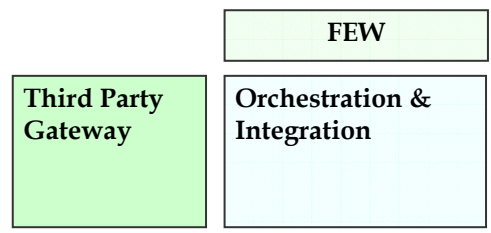
- Manage User requests with (complex) processes and third parties services
- Trace & Monitor Process execution
- Offers *Common Services* for Basic service availability



RAI INTERACTIVE PLATFORM DATA FLOW: FRONT END WEB



RAI INTERACTIVE PLATFORM DATA FLOW: THIRD PARTY GATEWAY



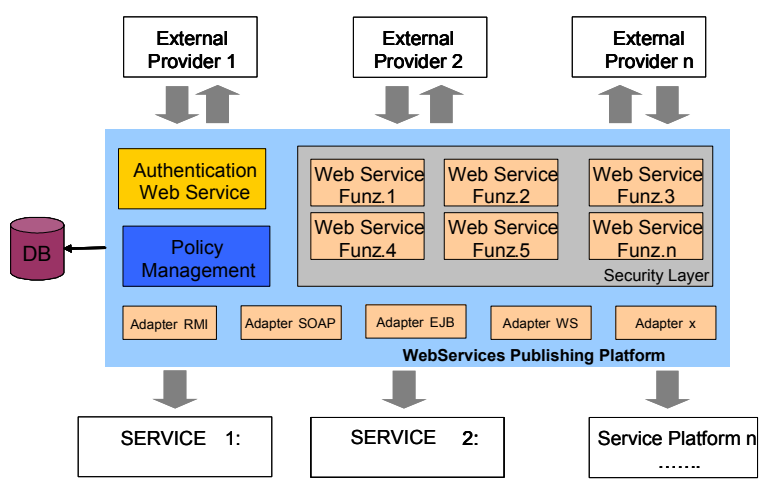
Third Party Gateway

BackEnd interface to External Contents & Service Providers.

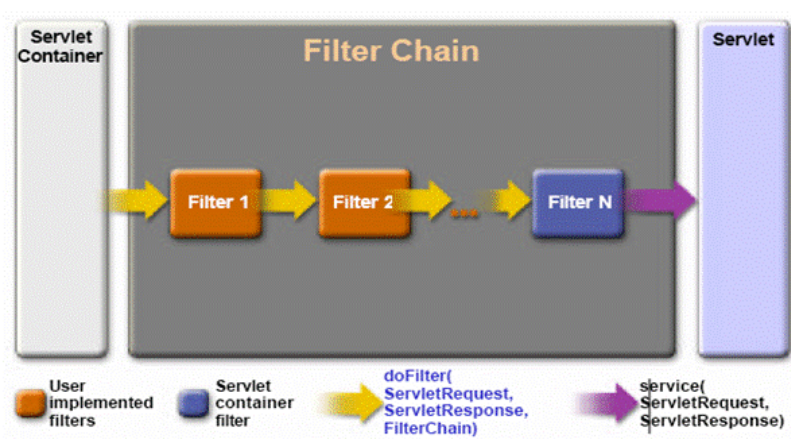
Main duties:

- Authenticate/Profile third parties
- Trace & Monitor External usage/request of exposed services
- Enable/Disable/Shape external data throughput

RAI INTERACTIVE PLATFORM DATA FLOW: THIRD PARTY GATEWAY



RAI INTERACTIVE PLATFORM DATA FLOW: THIRD PARTY GATEWAY



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COMMON DATA MODEL

Definition:

The Platform internal language used to manage:

- Communication with Front End Web and Third Party Gateway
- Business process execution
- Transaction logging/tracing
- OSS / BSS support

Format:

- Xml based
- “Message passing” model

Service Catalog:

- Each referred service inside the common data model is previously declared and configured into a **Service Catalog**

SERVICE CATALOG

Definition:

The Platform main **Catalog** for Services Management.

It contains:

- Service definition, with metadata and logical description
- Service status: enabled, disabled, loopback (testing)
- Service authorization records
- Service “abstract” interfaces



COMMON DATA MODEL

```

<cdm>
  <credential user="a" password="a" token="a" />
  <session>![CDATA[ aaaa ]]</session>
  <request timestamp="10/10/2005" method="a" service="a" device="a" applicationID="a" callerIP="aa" requestID="aa">
    <request-data>
      <root>
        <none-parametro1>valore parametro 1</none-parametro1>
        <none-parametro2>valore parametro 2</none-parametro2>
      </root>
    </request-data>
  </request>
  <response timestamp="10/10/2005" processID="a">
    <response-data>
      <root>
        <none-parametro1>valore parametro 1</none-parametro1>
        <none-parametro2>valore parametro 2</none-parametro2>
      </root>
    </response-param>
    <esito errorCode="a" status="a">
      <errorDescription>![CDATA[ aaaa ]]</errorDescription>
    </esito>
  </response>
</cdm>

```



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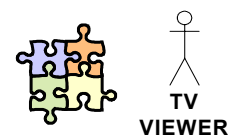
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COMMON SERVICES

Definition:
A set of Common Modules available for complex Business Process Execution.


- Examples:**
- SMS send/receive
 - Email
 - Voting
 - Polling
 - Payment



FEW

Third Party Gateway

Orchestration & Integration



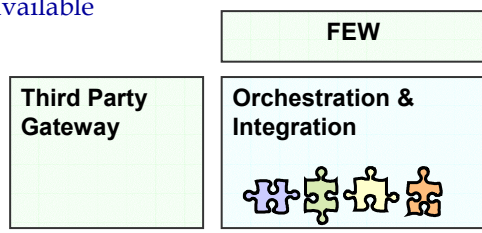
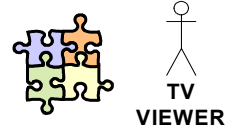
The diagram shows a cluster of five interlocking puzzle pieces in shades of orange and yellow, similar to the one in the 'TV VIEWER' diagram.



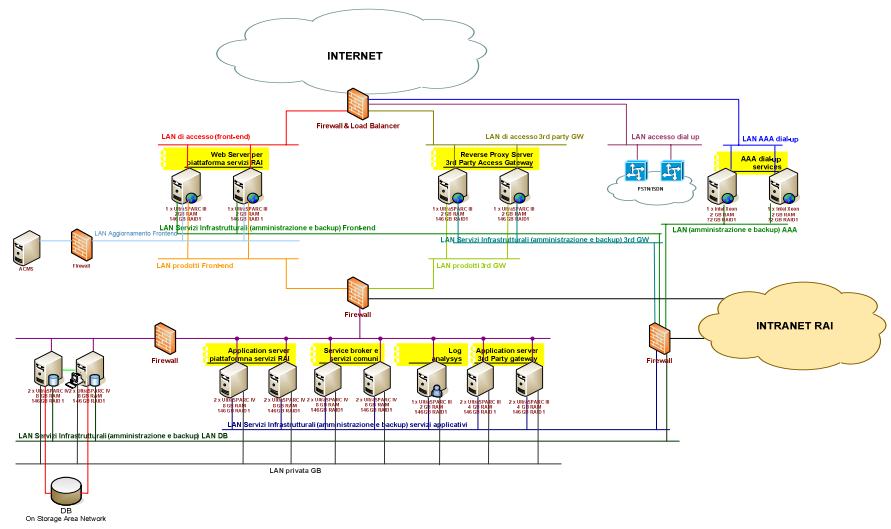
COMMON SERVICES

Current Implementation:

- Main interfaces already defined with TIM for SMS sending/receiving.
- Voting and polling already available as Internal Services
- Still working on payment system



PHYSICAL ARCHITECTURE



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