

Web-based Application

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Attributes of Web-based Applications

- Network intensive – may be placed in an intranet, or internet.
- Content driven – use hypermedia to present text, graphics, audio and video content to the end-user.
- Continuous evolution
 - Conventional application: evolves over a series of planned, chronologically spaced releases
 - Web Application: updated frequently, (e.g. on hourly schedule)

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General Characteristics

- Immediacy – time to market is very short (in terms of days or weeks). Developers have to use a compressed time schedule for development.
- Security – to protect sensitive content and provide security modes of data transmission.
- Aesthetic – appeal of look and feel.

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Application Categories

- Informational – readonly content with simple navigation and links
- Download – download information
- Customizable
- Interaction – communication among a community of users, via chatroom, bulletin boards, or instant messaging.
- User input – forms-based input
- Transaction oriented – user makes a request (e.g. place an order) fulfilled by application

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- Service oriented – application provides services to the user (e.g. assist user in determining a mortgage application)
- Portal – channels the user to other web content or services.
- Database access
- Data warehousing – queries a collection of large databases and extract information.

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Quality

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graph LR
    WAQ[Web application quality] --> U[Usability]
    WAQ --> F[Functionality]
    WAQ --> R[Reliability]
    WAQ --> E[Efficiency]
    WAQ --> M[Maintainability]
    U --> U1[Global site understandability]
    U --> U2[On-line feedback and help features]
    U --> U3[Interface and aesthetic features]
    U --> U4[Special features]
    F --> F1[Searching and retrieving capability]
    F --> F2[Navigation and browsing features]
    F --> F3[Application domain-related features]
    R --> R1[Correct link processing]
    R --> R2[Error recovery]
    R --> R3[User input validation and recovery]
    E --> E1[Response time performance]
    E --> E2[Page generation speed]
    E --> E3[Graphics generation speed]
    M --> M1[Ease of correction]
    M --> M2[Adaptability]
    M --> M3[Extensibility]
  
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Technologies

- Component-based Development
 - Provide an infrastructure that enables developers to deploy 3rd party and custom developed components.
 - e.g. CORBA, COM/DCOM, JavaBeans.
- Security
 - Prevent unauthorized access
 - Encryption, firewalls, etc.
- Other Standards
 - E.g. XML is widely used in e-commerce

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Development Framework

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- Formulation – identifies the goals and objectives of the application.
- Planning – estimates overall project cost, evaluates risks and defines a development schedule.
- Analysis – establishes technical requirements and identifies the content items that will be incorporated.

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- Engineering – do software engineering
- Page generation
 - involve heavy use of automated tools to produce HTML and XML contents.
 - Integration with middleware, such as JavaBean.
- Customer Evaluation

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Formulation

- Ask the following questions
 - What is the main motivation of the application
 - Why is the application needed
 - Who will use the application
- Identify informational goal and applicative goal
- Develop a user profile.
- Statement of scope.

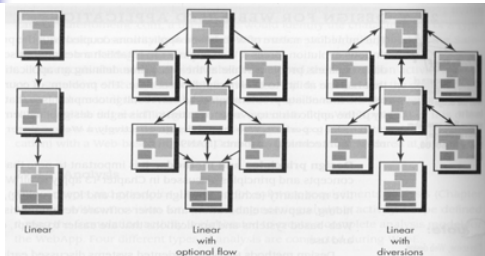
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Analysis

- Content analysis
- Interaction analysis – the manner in which the user interact with application
- Functional analysis – All operations and functions are described in detail
- Configuration analysis – the environment and infrastructure in which the application resides will be described in detail.

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Architectural Design – Linear structure

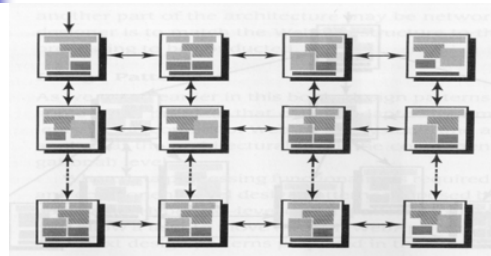


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Grid structure

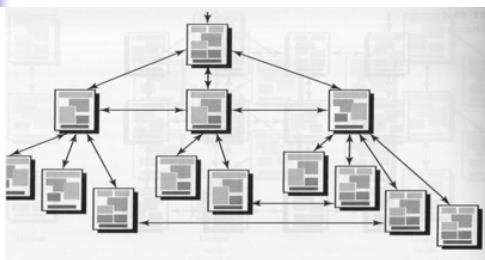


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Hierarchical Structure



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Navigation Design

- Design navigation pathways that enable a user to access application contents and services.
- Goals associated with each user role (e.g. visitor, registered users, or privileged users)

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Interface Design

- User interface is the first impression
- Guidelines
 - Avoid server errors – will drive customers away.
 - Do not force users to read voluminous content (reading speed on monitor is 25% slower than hardcopy)
 - Avoid “under construction” signs
 - Important information should be placed within the dimension of a typical browser window (users prefer not to scroll)

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- Navigation menus and headbars should be designed consistently and should be available on all pages.
- Design should not rely on browser functions.
- Aesthetic should never supersede functionality, (e.g. use simple button than complex graphics)
- Navigation options should be obvious, even to the casual users.

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Testing

- Review the content model to uncover errors – typographical, grammatical, content consistency, graphical representation and cross referencing errors.
- Review design model to uncover navigation error
- Selected processing components are unit tested.
- Integration testing for the chosen architecture.

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- Application tested for overall functionality and content delivery (like conventional validation)
- Application tested under different environment configuration (e.g. OSes, browsers etc)
- Application tested by a controlled and monitored population of end-user (beta testing).

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