

Design for WebApps

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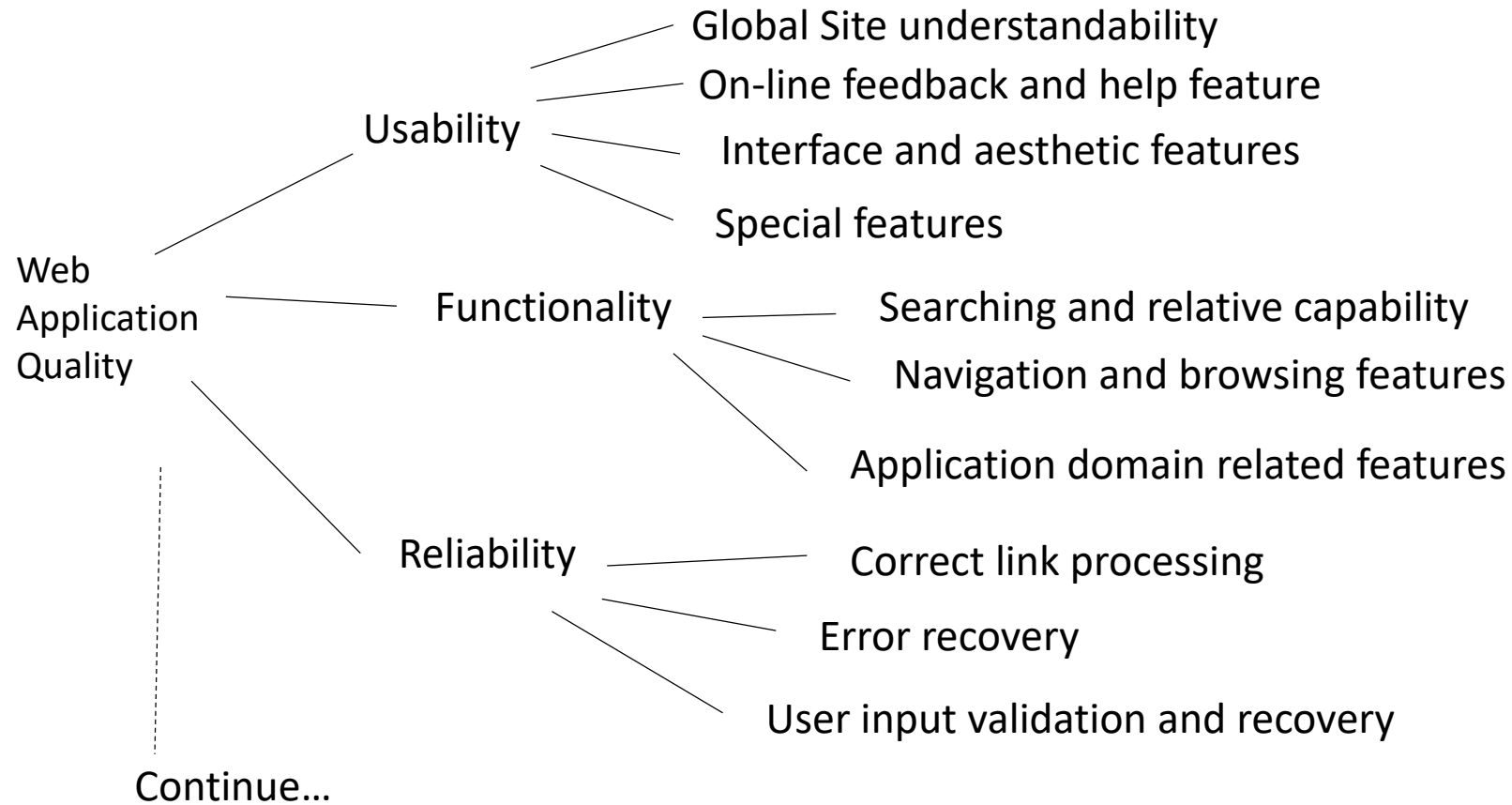
Design issues for web engineering

- Generic as well as specific issues
- Design must reflect customer requirements
- Design and WebApp quality
- Quality in the context of webapp
- Every surfer has an opinion about “what is a good WebApp”
- Some prefers graphics, others want simple
- Some demand huge content, others abbreviated presentation
- Some like sophisticated tools fro database access, others like simple tools

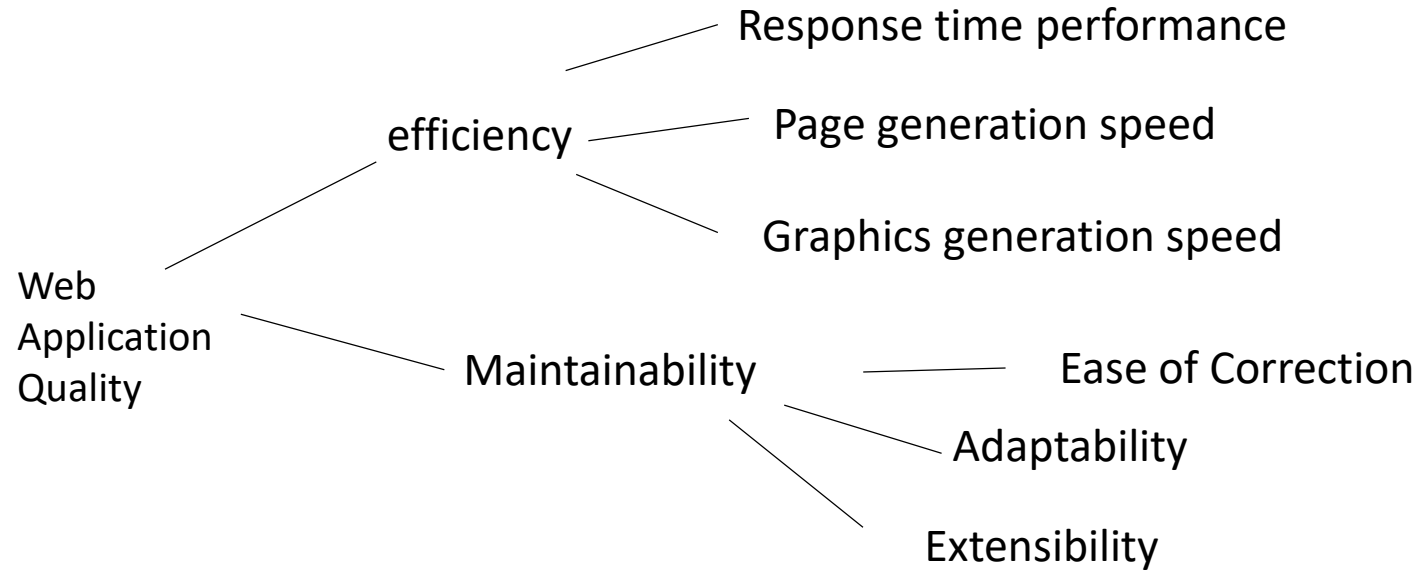
Design issues for web engineering

- Attributes exhibited to achieve goodness for end users
- also exhibit technical characteristics of quality
- All general quality of SE apply to Web Apps
- More relevant are – Usability, functionality, reliability, efficiency and maintainability

Quality of WebApps



Quality of WebApps



Security

- webApps heavily integrated with critical corporate and government databases
- Ecommerce applications extract & store sensitive customer info
- Security is of paramount concern
- Security is ability of WebApp and its server environment to rebuff unauthorized access
- And thwart a malevolent attack

Availability

- If WebApp is not available technically, it will not meet user's needs
- Availability is measured as % of time a webpage is available for use
- Must be available for 24x 7x365
- Up-time is not the only indicator of availability
- If webApp Uses features of only one platform or browser, it will be unavailable for different browser/platform
- User will go elsewhere

Scalability

- Webpage & server Scalable to multiple users simultaneously?
- Variation in volume
- Not enough to build successful webApp
- Important to accommodate burden of simultaneous users

Time to market

- Not a true quality attribute
- A quality attribute by business point of view
- First webapp captures huge end users
- Thousands of webpages for a search

Time to market

- How does user assess quality of the content within webapp?
 - Can the scope and depth of content meets user's needs
 - Can background and authority of content easily identifiable
 - Possible to determine quality of content & last updates
 - Content & location stable
 - Is content credible
 - Content unique
 - Valuable to target community
 - Well-organized

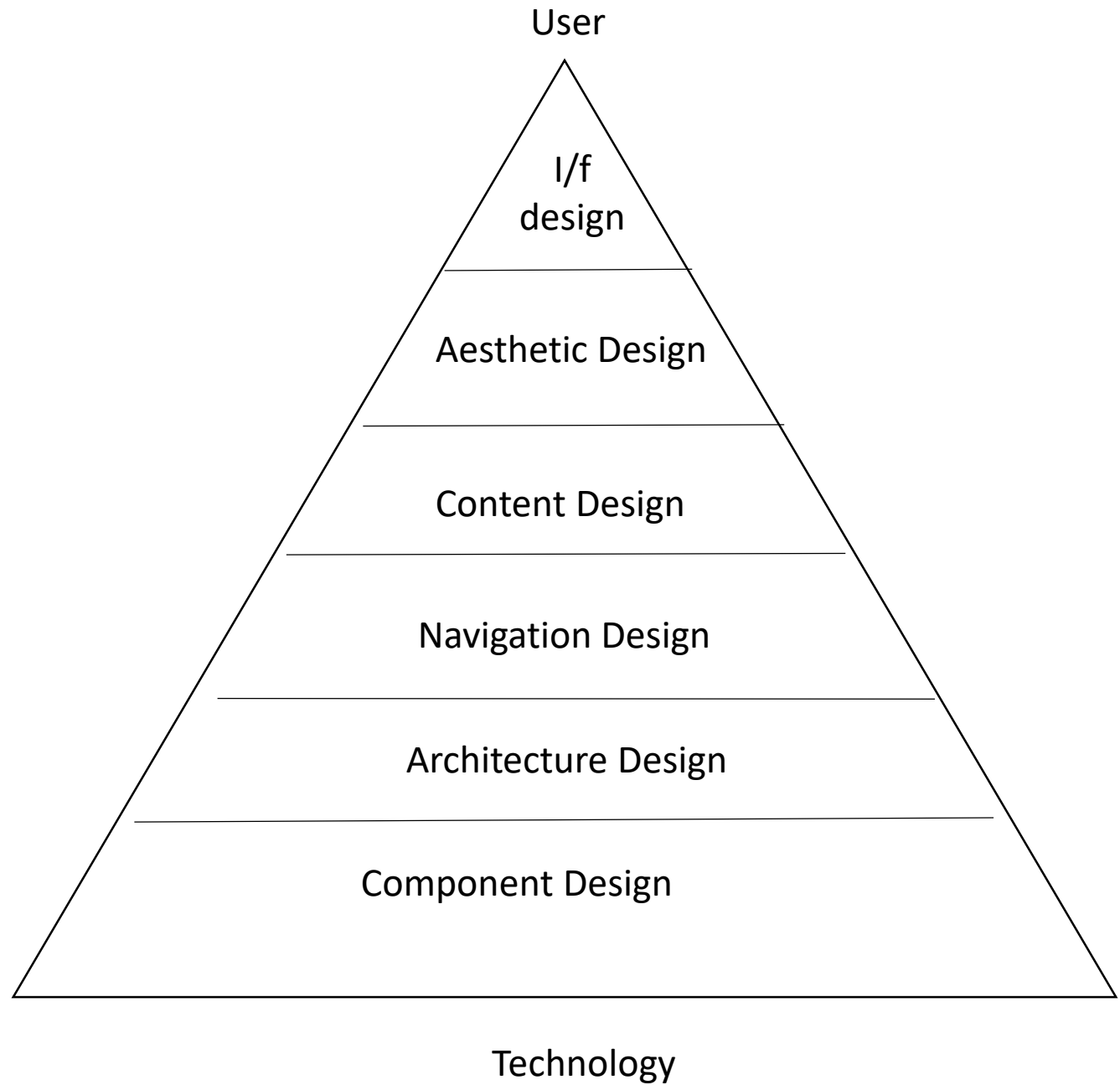
Design Goals

- Simplicity – moderation, do not provide too-much like exhaustive content, extreme visuals, intrusive animation, enormous webpage,
- Consistency – content must be consistent, graphic design, text formatting, navigation, hypermedia structure
- Identity – aesthetic, i/f and navigation design must be consistent within application domain, a web page for kindergarten is different than that for a financial service, must accommodate different types of users and objectives

Design Goals

- Robustness – robust content & functions relevant to user's needs
- Navigability – simple & consistent navigation, intuitive & predictable, how to move about in app
- Visual appeal – web apps are more visual & dynamic, aesthetically designed like layout, colors, balance between text & graphics
- Compatibility – available for variety of environment, hardware, connection types, OS, browsers etc

Design Pyramid



WebApp i/f Design

- Easy to use, easy to learn, easy to navigate, intuitive, consistent, efficient, error-free and functional
- Where am I – provide an indication, user's location in content hierarchy
- What can I do now – help users understand options, live links, relevant content

i/f Design principles and guidelines

- Effective i/f should visually apparent, do not concern users with inner working
- Anticipation – anticipates user's next move
- Communication –status of any activity initiated by user
- Consistency – navigation , menu icons, aesthetics
- Controlled autonomy – facilitate user movement throughout webApp
- Efficiency – optimize user's work efficiency

i/f Design principles and guidelines

- Flexibility – enable users to accomplish tasks directly, explore randomly
- Focus – focused on user tasks on hand
- Human i/f objects – reusable objects
- Latency reduction – use multitasking that let user proceed with work rather than making user wait to complete tasks
- Learnability- minimize learning time
- Metaphors –

i/f Design principles and guidelines

- Work-product integrity – work product must be automatically saved, not lost on error
- Readability – information readable
- Track state – keep track of user interaction
- Visible navigation -

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i/f Design principles and guidelines

- Reading from monitor is 25% slower than from hardcopy, do not force users to read voluminous text
- Avoid under construction signs, they raise expectation
- Users prefer not to scroll, imp info to be placed within dimensions of window
- Consistent design for navigation menu
- Aesthetics should not shadow functionality
- Navigation options must be clear

Aesthetic design

- Graphic design
- Artistic endeavor, complements technical aspects
- Without it webapp may be functional but not appealing
- Identify users

Aesthetic design- layout issues

- Webapp contains navigation, features, information contents and functionality
- Planned during aesthetic design
- Don't be afraid of white spaces – do not cramp info
- Emphasize content – 80% content and remaining for navigation & other features
- Organize layout elements from top-left to bottom-right – user scan web page in same manner, high priority elements in top-left

Aesthetic design- layout issues

- Group navigation, contents and functions geographically within the page – humans look for pattern in all, if there are no pattern in within a web page, users get frustrated
- Don't extend content that need scrolling bar – scrolling is necessary many times, most studies indicate users do not prefer to scroll, reduce page content
- Consider resolution and browser window size while designing – do not fix the size, use % of available space

Aesthetic design- Graphic design issues

- Look and feel of webapp
- Includes layout, color scheme, typefaces, size, style and media and aesthetic elements

Navigation design

- After architecture establishment & definition of components (pages, scripts, applets)
- Define navigation pathway that enable user to access webapp content
- 1. identify semantics of navigation for different users of site
- 2. define syntax of achieving the navigation

Navigation design – navigation semantics

- Consider user hierarchy and develop related use-cases for each category of users
- Each category (actor) may use webapp differently
- May have different navigation requirements
- Use case for each actor will define a set of classes encompassing one or more objects of functions
- When a user interacts with webapp, they encounters a series of navigation semantic unit (NSU)

Navigation design – navigation semantics

- navigation semantic unit (NSU) – a set of info and related structure that collaborate in fulfillment of subset of related user requirements
- NSU is composed of set of navigation sub-structures that are called as ways of navigation(WoN)
- It represent best navigation way or path to achieve desired goal
- The WoN structure is made out of a set of relevant navigational nodes connected by navigational links, sometimes other NSUs

Navigation design – navigation semantics

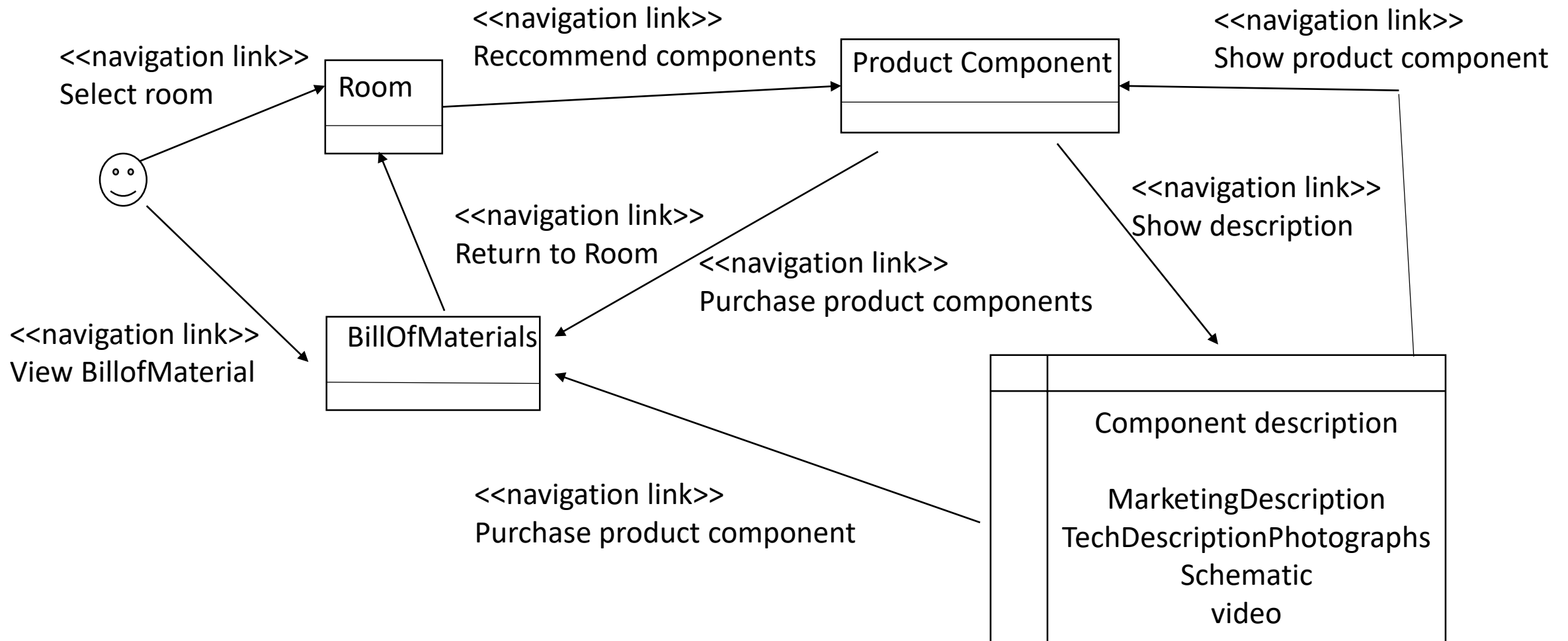
- Use-case: select safehome component

The webapp will recommend product components (control panels, sensors, cameras etc) and other features (ex. PC based functionality implemented in s/w for each room and exterior entrance). If user request alternatives, the webapp will provide them if they exist. User will be able to get descriptive and pricing information for each product component. Webapp will create and display bill-of-material as user select various components. User will be able to give name to bill-of-material and save it for future reference.

Navigation design – navigation semantics

- Underlined items are classes and content objects that will be incorporated in one or more NSU
- Will enable customer to perform the scenario description

Navigation design – navigation semantics



Navigation design – navigation semantics

- Figure depicts semantic analysis of navigation implied by select safehome component use-case
- Also represent a way of navigation in webapp
- Webapp designer creates a NSU for each use-case associated with each actor
- Ex. A new customer may have 3 different use-case, all may access different information and function, 3 NSU will be created

Navigation design – navigation semantics

- Webapp content architecture is assessed to determine WoN for each use-case
- WoN identifies navigation nodes and links that enables navigation between them
- WoN are then organized into NSUs

Navigation design – navigation Syntax

- Mechanics of navigation is defined, options are
- Individual navigation link – text based links, icons, buttons and switches and graphical metaphor
- Horizontal navigation bar – lists major contents or function categories in a bar with appropriate link
- Vertical navigation column -