

# Standards Based Approach to User Interface Development

Sameer Chavan

Manager- Industry User Experience,  
Oracle India Pvt Ltd, Hyderabad.

Tel: 91 9849652447

[sameerhere@yahoo.com](mailto:sameerhere@yahoo.com)

## ABSTRACT

This paper tries to explore a Standard Based approach to User Interface Design. It first explores standards in general and then focuses on how UI standards are applied in Oracle applications. Oracle has more than 100 applications covering financials, HRMS, CRM, SCM, etc. UI standards were developed to support consistency & best user experience across the applications. This paper explores the benefits and challenges faced in this process.

## Keywords

UI Standards, Guidelines, Patterns, Enterprise Application

## 1. INTRODUCTION

Standards are applied in many fields and not just in Software Industry. We see standards in Architecture, Mechanical, Electrical, Medical fields and to some extent in Social life. Eg. Standard procedures in religious ceremony or worship. Standards are developed in these fields over many years and they have now matured and slowly accepted. Standards in Software Industry are evolving since only past few years. Unlike other Industry standards, Software standards are very dynamic due to changing technology. They need to be revisited every time. This paper tries to explore the challenges faced in Software UI standards in general. Then focuses on how UI standards are developed at Oracle.

## 2. Standards

### 2.1 How standards evolved

In manufacturing industry standardization started because of need of Mass production, low cost, interchangeability, etc

In software industry individual companies wrote their own standards so as to enable others to develop programs/applications with their technology. Slowly Standards work was up taken by international organizations (ISO, IEEE, CMM..) to standardize Software Engineering process which helped to Standardize on coding practices, project management, quality control, localization, Internationalization, etc.

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43<sup>rd</sup> ACM Southeast Conference, March 18-20, 2005, Kennesaw, GA, USA. Copyright 2004 ACM 1-58113-000-0/00/0004...\$5.00.

### 2.2 Standards in other industry

Lets take an example from Mechanical Industry. You have standards for how to design components ( pumps, boilers, turbines, etc). Many shapes of products are standardized. For example one can identify and know how to use scissor, pen, bicycle. In Architectural products like Chair, doors, commode, or electrical – fans, bulb, switches everyone know what these products look like and what is their function.

These user interfaces, forms & functions have matured over years and everyone is comfortable using them. This has also inspired Software UI to use metaphor from these physical products to convey messages.

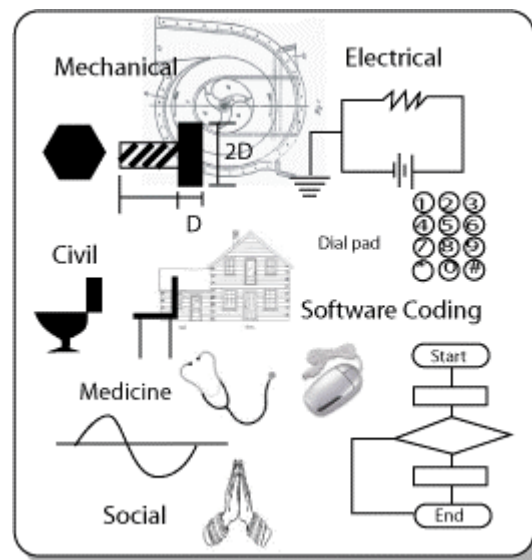


Figure 1. Standards in other industry

### 2.3 Standards in Software industry

We have standards for coding, protocol, format, architecture. There are standards organization for these. Some well known standards organizations are listed below

#### 2.3.1 International:

International organization for Standardization (ISO)  
e.g.- ISO 9241-11 : standard on usability.

#### 2.3.2 National:

American National Standards Institute (ANSI)

British Standards Institution (BSI)

Ente Nazionale Italiano di Unificazione(UNI)

Deutsches Institut Fur Normung (DIN)

2.3.3 Industry & Commercial  
Macintosh Human Interface Guidelines (Apple)

Common User Access (CUA- IBM)

OSF/Motif Style Guide (open software)

The Windows Interface Guidelines

CIF – Common industry format for Usability testing

## 2.4 What are UI standards<sup>1</sup> ?

HCI Standards are recommendations on Interaction, functional or visual representation of the elements that are represented to user to take actions to achieve specific goal.

Standards are not design solutions. They provide available and accepted resources and constrains to achieve usable design.

Most of the Standards are generic so as to cover wide range of applications. But they are measurable to determine how much the design has deviated from the standards.

Eg- Table standards, menu, buttons, page layout, color scheme, etc.

UI standards incorporates global standards(eg metaphors of floppy), platform standards(windows, Mac), company standards ( in oracle we write Cancel, OK and not OK, Cancel), then domain specific standards ( entering GL in financials against patient data entry in healthcare).

## 2.5 What are UI Guidelines<sup>1</sup> ?

Guidelines are usually a set of instruction on how to apply the standards or which standard to choose for specific requirement.

Eg- when to use radio buttons or checkbox, when to use a link against a button.

## 2.6 What are UI Patterns<sup>1</sup> ?

Pattern is a combination of guidelines and standards which represent commonly used tasks across different applications. By having commonly known patterns documented the designer need not have to spend time in reinventing designs.

Eg a shopping cart pattern, compare product pattern, copy and paste pattern, attach file pattern.

## 3. UI Standards at Oracle

### 3.1 Before Implementing UI Standards

Before having the standards all the applications had their own look and feel

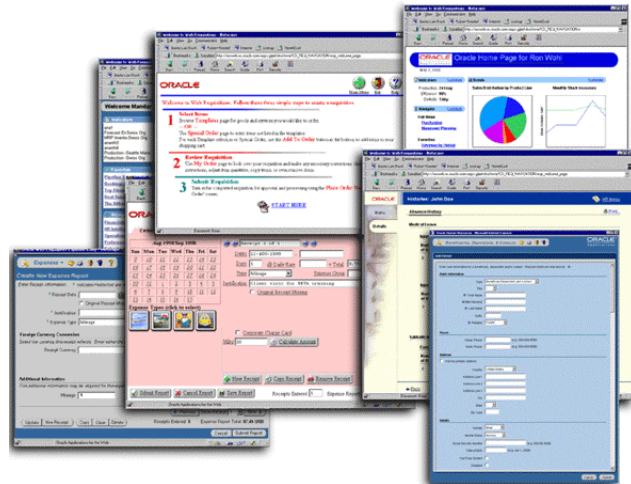


Figure 2. Oracle UI before having standards

These resulted into -

- No cohesion . Inconsistent interactions for common UI needs
- Many duplicated efforts in design and implementation
- Poor user experience
- Incoherent UI story at point of sale

### 3.2 Why have UI Standards ?

Obviously to –

- Standardize the commonly used actions, labels & dialogue boxes across the applications.
- Incorporate Human factors research and best practices, which is empirically proven.
- Reduce the number of UI decisions made during design process.
- Reuse the user experience. Avoid reinventing same designs.
- To help Product Managers to design some screens & get it reviewed from designers. This reduced the dependency on UI designers to design common tasks. This saved designers time too .
- After implementation of Standards all the applications had consistent user interactions.

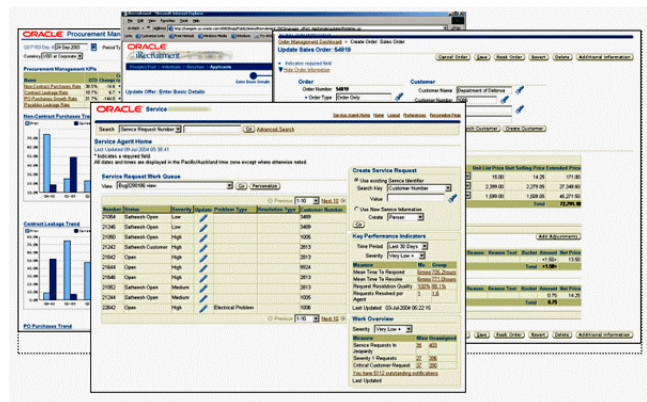


Figure 3. Oracle Apps UI after implementation of UI Standards

<sup>1</sup> These definitions may vary with different companies & authors. These definition need not reflect oracle standards definition.

<sup>2</sup> BLAF: Browser Look & Feel

### 3.3 What are short falls in UI standards ?

- Standards are very generic so they don't know exact requirements for a particular task.
- Standards are many times compromised solution across all products. So it cannot guarantee best interaction for that task.
- Having just consistent UI will not insure usability.
- All the designs cannot be documented and have UI standard.
- Standards cannot give design solution.

### 3.4 Challenges for Standards Development at Oracle.

Oracle has wide range of applications ranging from Financials, HRMS, SCM, CRM, etc. with a very broad range of user profiles. There was technological limitation to make the designs accessible, cross browser compatible and localized. Moreover earlier users were exposed to desktop applications which are more interactive then the web applications. Also the web technology was evolving. Other challenge was to convince stake holders of the new designs.

### 3.5 Solution : BLAF standards

To address these challenges standards were developed that were flexible enough to use across the variety of applications but specific enough of meet each team's requirement. The solution was BLAF (*Browser Look and Feel*) standard that were in a form of Bulls Eye model.

At the center it was standards on components. The combination of components made the page template at second level. The combination of templates made flows at third level. And combination of different page flows made patterns. Having guidelines at these different levels made it easy to apply for different product requirements.

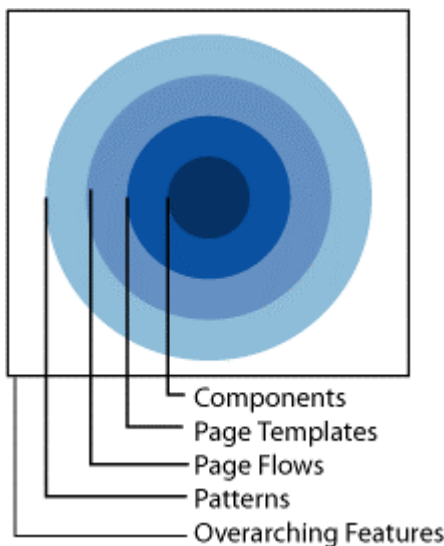


Figure 4. Bulls eye model

To make web applications accessible across different browsers interactivity was reduced and was limited to plain html. Java

script was sparingly used and Java applets not at all. This illustrates the current implemented Standards. Work is in progress to incorporate high interactive and develop new standards using new technology.

### 3.6 Benefits of Standards

BLAF<sup>2</sup> UI standards are result of -

- Functional requirements from many product teams. (tasks & flows)
- Technical constraints after discussing with development. (Browsers & bandwidth)
- Legal constraints (Accessibility)
- Competitive pressure (e.g. "Save for later" feature )
- Cost constraints
- Human cognitive limitations (e.g. reduce memory load)

The Standards are Comprehensive, Robust and scalable designs. They are Empirically proven and continuously enhanced designs. They avoid duplication of efforts, divert PM & DM to higher level tasks. Easily upgradeable. The products are consistence in look & feel and interactions. User Experience is reused so learning curve is reduced.

The best part of following standards is that one does not have to worry about the working of the component or interaction because it is already tested. Hence, anything designed as per the standards can all be implemented. One does not need to argue with development on its feasibility & technical support

The UI prototypes can be done in Visio or JDeveloper (UI prototyping tool). There are ready-made buttons, tables, layouts and one needs to just drag and create UI. The designer don't have to worry about fonts, color and placement. Its done automatically. The UI prototyping tool may change in future.

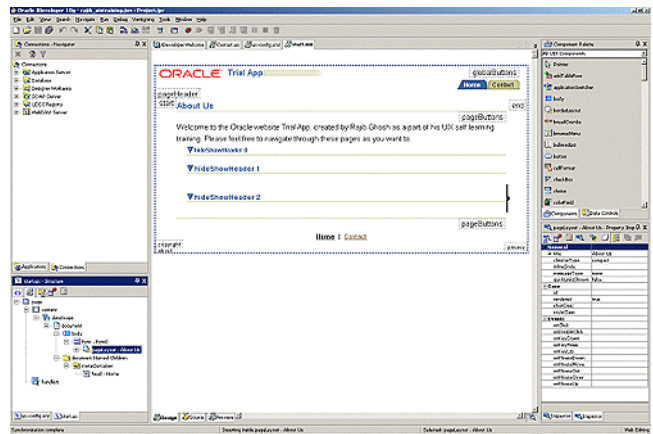


Figure 5. Jdeveloper prototyping tool.

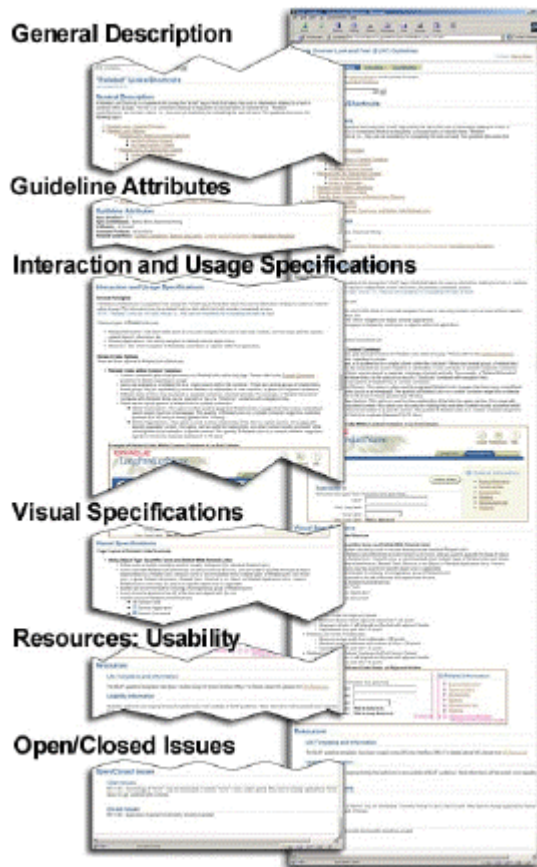
<sup>2</sup> BLAF: Browser Look & Feel

Figure 6. Structure of UI standards

### 3.7 Structure of a Guideline

Each of the guideline levels mentioned above: Components, Page Templates, Page Flows, UI Models and Patterns, and Overarching Features and Principles, are communicated in a consistent format. This format eases use and maintenance of the guidelines. Each guideline is documented in HTML, and posted as part of a complete guidelines Web site (publicly available at: <http://otn.oracle.com/tech/blaf/>). Each guideline is composed of several sections, including:

- o A general description of the guideline.
- o Guideline attributes, including a contact person from the UI group, a list of contributors, version number, products or product families using the guideline, and links to related guidelines.
- o Interaction and usage scenarios for the guideline, including general principles of use, options for the given component/template/etc., and page flows indicating how the component/template relates to other parts of the guidelines.
- o Visual specifications for the guideline that detail the color, size, minimum/maximum values, etc., and provide visual examples of the options for this component/template/flow.
- o Usability data where test results validate components, templates, or flows. These tests may be product specific tests, or guidelines-wide tests. Usability test



## 4. Standards Development process

### 4.1 Requirement gathering

As stated above standards are developed at component level, page level, pattern level and style/color scheme. When developing specifications for a component the interaction designer first lists the generic requirements for that component and its general usage. Having listed generic requirements, the designer then gets requirements for that component usage from different product teams. This first stage in this process is the requirement gathering. The product teams specify how they would like to use this component in their product. Or they can say that they want this component to have some extra abilities. After getting all the requirements the interaction designer starts writing detail specification for that component. Eg – Hierarchical table/HGrid (Fig.6).

### 4.2 Concepts and specification draft

A specification for a component like Hierarchical table will include information on all individual elements eg -Row, cell, menu, icons, etc that goes in making of this component. The specification will further explain information on design(banding, grouping, alignment, etc), Interactions (state, focus, clicks, etc) , Actions performed (expand, close, etc). An example of specification is shown below.

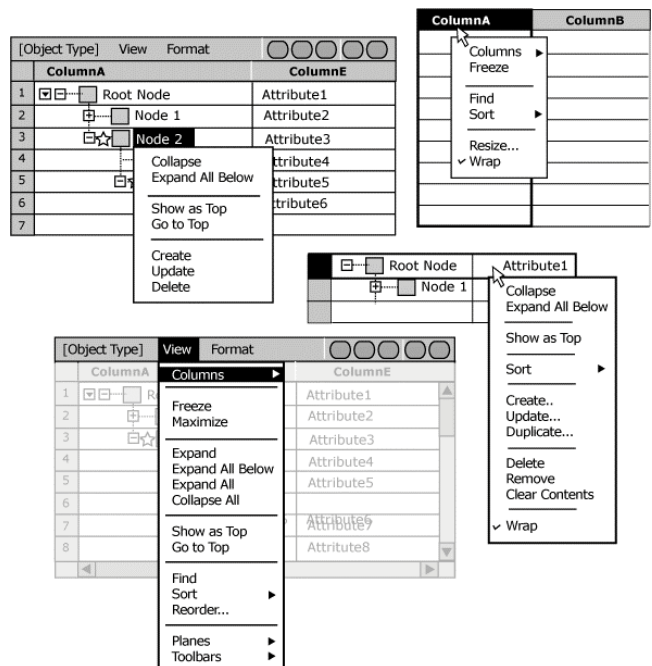
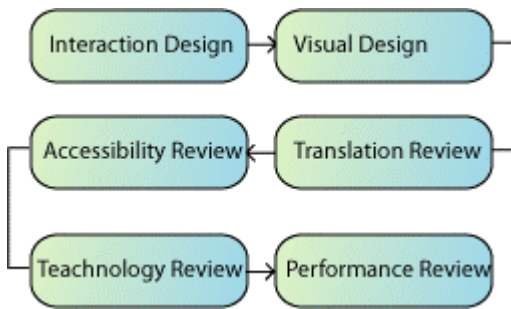


Figure 7. Sample interaction design specification for Hgrid menu actions

<sup>2</sup> BLAF: Browser Look & Feel

The interaction Designer also study parallel and competitor products where such component are used. Once a draft specification is ready the designer hosts a series of brown bag sessions for getting feedback from different product teams. After incorporating the feedback the specifications are passed to Visual designers to define shape and rendering. Once this stage is done its passed to technology team to access the feasibility. They are also consulted often while writing specifications. Then comes the accessibility review followed by performance review. After the design clears all these stages it gets published.



**Figure 8. Standards development process**

If in the design process, some new shapes or designs are created then the legal team also reviews this so that they can be copyright protected

### 4.3 Post release activities

Standard development is not a onetime process. It's continues. Even after standards are published, if some products demand a different behavior or they want to enhance some functionality it can be done by filing an enhancement bug against Standards. The standards committee will review the enhancement and if they find many teams demand it they will update the standards. The committee is also responsible to answer questions for designers and developers.

The standards are available for everyone's reference. Developers & Product Managers can themselves read the standards and implement some basic UI designs without the full involvement of UI designers. UI Designer can review these designs and he can utilize rest of time to design other products..

### 4.4 Reviews

Compliance to BLAF standards is ensured by three-stage review process. First at the time of concept when there is a wire frame or Visio diagram. Then second at the prototype level where there is some interactivity in prototype. Then finally after the final code but just before release. Reviews are properly tracked by issuing a score card to development team. Automatic bugs are also filled against UI issues.

**Table 1. Types of UI reviews**

Review Type	Attendees	When
Concept Review	UI Manager, Designer, Product Team	Requirements and modeling complete. Screen design for major flows complete
Prototype Review	UI Manager, Designer, Product Team, Blaf team	Prototype ready by development dept to start coding
Code Review	UI Manager, Designer, Product Team, Blaf team	Code stable enough to show all pages

### 4.5 Standards Training

Standards process does not stop at just defining them. Development teams, PM and designers need to be educated in applying these standards. This is achieved through regular Standards training to every new employee (UI standards user) and to

product groups. Advance classes are conducted to try to design page flows using standards and finding noncompliance in existing products.

### 4.6 Challenges due to Standards based Design

Having Standards dose not insure best design. The designer needs to apply right standards for given task flow.

- A designer needs to know each standard before designing.
- You cannot design freely as you need to see if the same design / pattern already exists in other products.
- Interpreting the meaning of standards become difficult if they are not written clearly. Its like reading a legal document.
- Standards constrains the flexibility and innovation in design.
- Due to lengthy process of standards, suggesting a change in design makes it difficult and de-motivating.
- Due to new technology and competition the standards become absolute after certain time. So standards needs to be updated continuously.

<sup>2</sup> BLAF: Browser Look & Feel

## 4.7 Future perspective on Standards

These are some questions that arises for future scope of UI standards.

- Can we have standards which can help design applications by answering some simple set of questions. Eg- a wizard based design ?
- Can standards be so perfect that the need for a designer becomes redundant ?
- Can we generalize standards across the platform (windows, Unix, mac)
- If our users are same why two different companies produce different interactions for same product. How much we consider the point that the same user may be using similar

product from other company and how that standards affect us.

## 5. ACKNOWLEDGMENTS

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## 6. REFERENCES

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<sup>2</sup> BLAF: Browser Look & Feel