

2. Design Contexts and Challenges

3 September 2008

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Plan for ISSD Lecture #2

Design contexts and dimensions

Introduction to some challenging contexts

Project Team Organization and Brainstorming

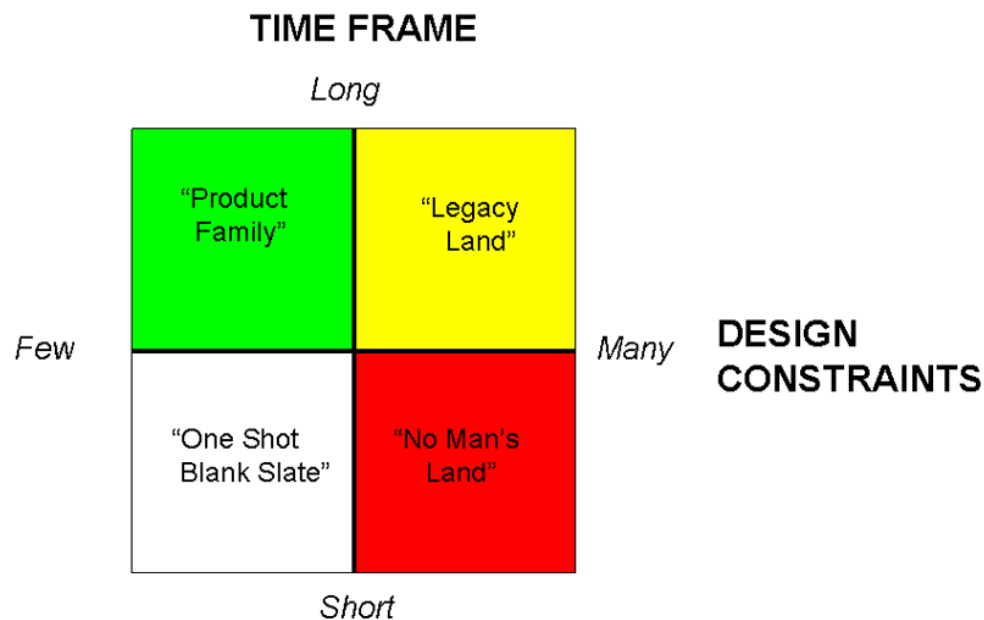
The Context of Design

The design of any service -- whether it will be performed by people or by information systems -- takes place in a context of:

- Current and potential customers
- Current and potential technologies
- Current and potential competitors
- Existing services or systems
- Existing user or application interfaces
- Legal, regulatory, cultural systems and constraints

These factors or constraints can never be equally important; how they are weighted determines the appropriate design methodology and the key characteristics of the design

Two Critical Design Dimensions



Readings for Wednesday 3 September

John Ward, "Design challenges in multichannel services"

Jill Blue Lin, "An Analysis of Graceful Degradation as a Design Method for Multi-Platform User Interfaces"

Silvana Trimi & Hong Sheng, "Emerging trends in M-government"

Sean McGrath & Connor O'Reilly, "A service-oriented approach to e-government architecture"

Glen Allmendinger & Ralph Lombreglia, "Four strategies for the age of smart services"

Jesus Bisbal, Deirdre Lawless, Bing Wu, & Jane Grimson, "Legacy information systems: Issues and directions"

So In Case You Hadn't Noticed

We are excluding from our discussion here the basic "one shot blank slate" design context

This is the design context for almost all design courses you might take

Many of its assumptions are unrealistic and unrepresentative of "real world" design

Multichannel Services

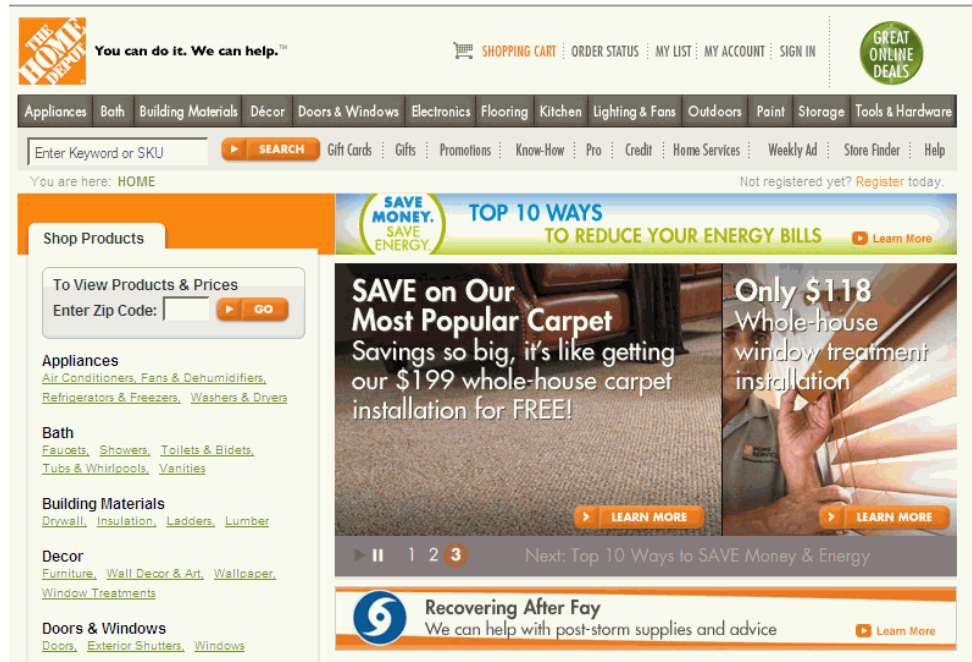
A "channel" is "the means by which suppliers of goods or services provide them to customers"

We want this to be a "business architecture" definition, not a technology one, so we don't distinguish within technology channels

Home Depot - Physical Store



Home Depot - Online Store



Design Issues for Multichannel Services [1]

What are the (actual or potential) benefits of multichannel services for providers?

How much technical integration is possible/desirable?

How much business integration is possible/desirable?

Design Issues for Multichannel Services [2]

What are the (actual or potential) benefits of multichannel services for customers?

What do customers expect or understand about the "user experience" in multichannel environments?

What are the implications for technical and business integration?

(a) Symmetric Personalization in Multichannel Services?

What information about a customer's activities in an online channel can be recorded?

How can this information be used to provide better functionality or service in the online channel? in the physical channel?

What information about a customer's activities in a physical bricks and mortar can be recorded?

How can this information be used to provide better functionality or service in the physical channel? in the online channel?

Designing for Multiple Platforms



Multi-platform User Interfaces

Why do some applications or services need to run on multiple platforms?

How can user interfaces be developed for multiple platforms? What are the costs and benefits of separate designs for each one vs a "design once and adapt" approach?

Device Families and Capabilities -- WURFL

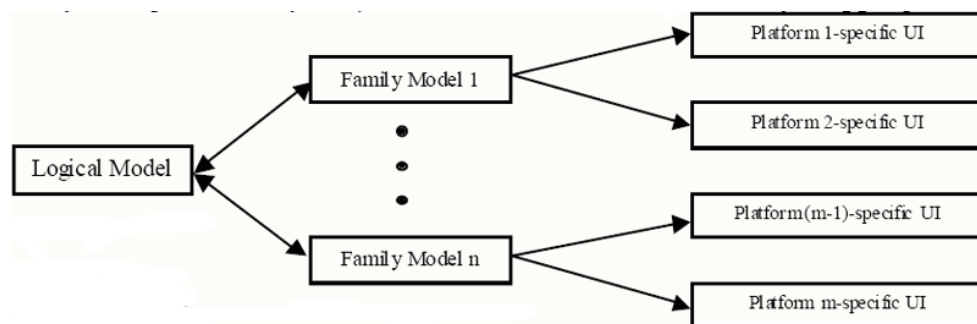
<http://wurfl.sourceforge.net/>

The WURFL is an XML configuration file that contains information about capabilities and features of many mobile devices

The WURFL is based on the concept of family of devices. All devices are descendent of a generic device, but they may also descend of more specialized families.

How does something like WURFL change the process of developing applications for multiple devices?

"Device Families" and UIs



Can We Achieve Consistency or Continuity of User Experience?

"Users expect to be able to reuse their knowledge of a given version of the system when using the same service on another platform"

Alternatively, if "capabilities vary so greatly...it makes sense for users to expect varying functionality on the different devices"

The "Graceful Degradation" Design Principle

Fault-tolerance or graceful degradation is the property that enables a system (often computer-based) to continue operating properly or at a reduced level in the event of the failure of some of its components... as opposed to failing completely

Applied to multi-platform user interfaces, GD implies that users can carry out some functions on all devices, even those with limited interaction or display capabilities

Florins, M. and Vanderdonckt, J. 2004. "Graceful degradation of user interfaces as a design method for multiplatform systems." In Proceedings of the 9th international Conference on intelligent User interfaces.(DOI= <http://doi.acm.org/10.1145/964442.964469>)

The Graceful Degradation Design Method

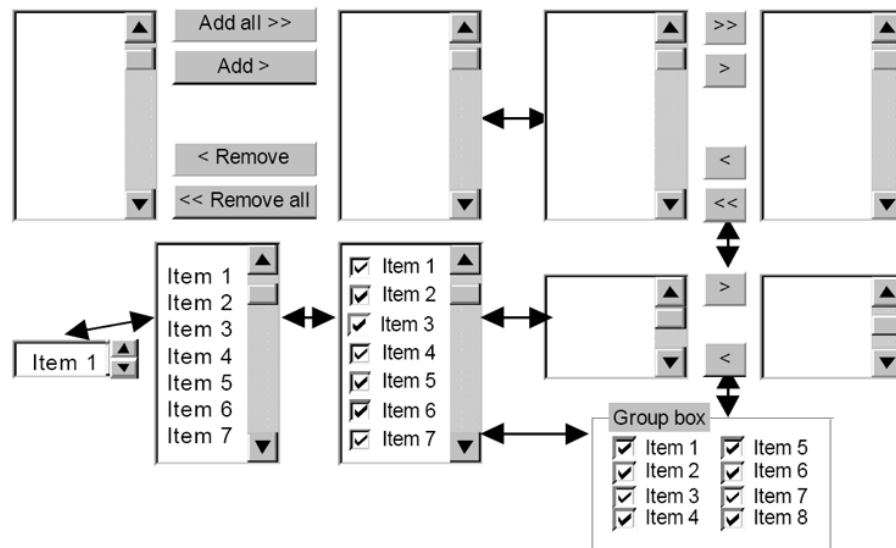
The user experience consists of tasks that can be carried out, how they are grouped and supported in a UI, and the particular "interactor types" and layouts with which they are realized

Experience consistency is measured first in terms of tasks, then at abstract interaction level, and finally at physical or presentation layer

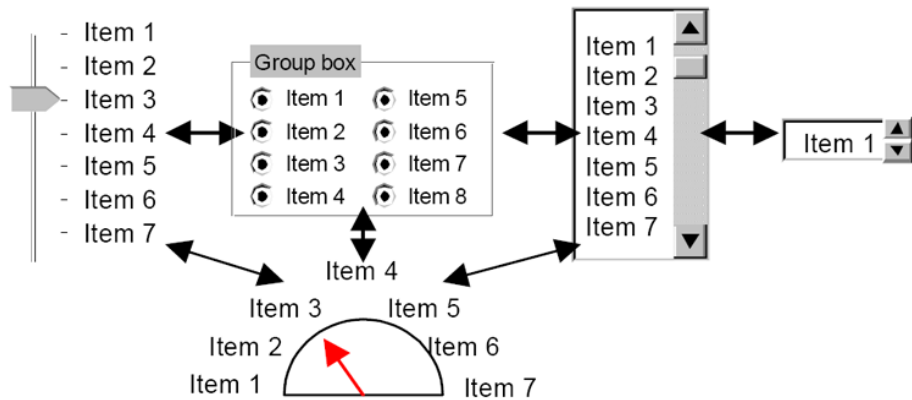
An abstract user interface design for the most capable platform is tailored to less capable ones by transformation rules

But Jill Lin isn't completely convinced. Why not?

UI Alternatives for "Multiple Choice"



UI Alternatives for "Single Choice"



The Challenge of "Phone Interfaces"



E-government Architecture

How do E-government system and service initiatives differ from private sector ones?

Why is XML necessary but insufficient to prevent data lock-in?

What design techniques enable "accessibility" of systems and services?

What design techniques enable incremental automation?

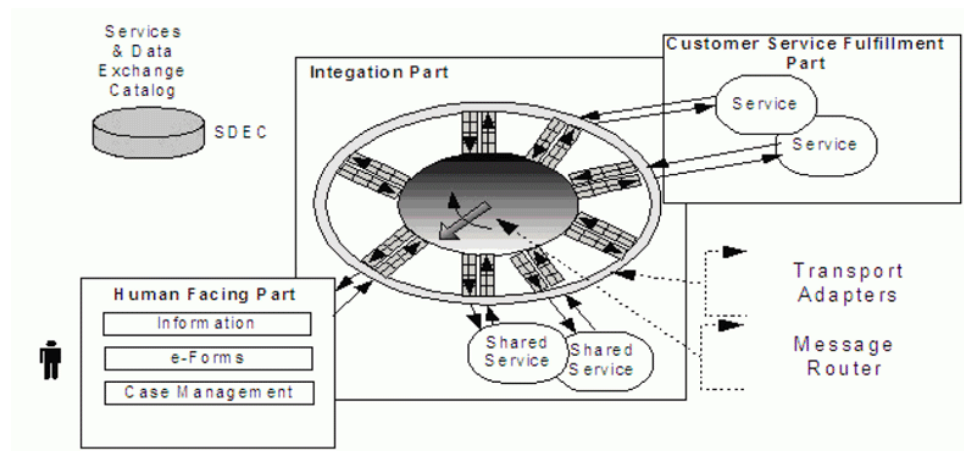
SOA for E-Government in Ireland

Design case study about the use of SOA and Web Services to implement e-Government services in Ireland

Uses a "hub" architecture to make services more readily reusable / composable

Abstractions of "service," "message," and "hub" make it easy to understand technology and business benefits and their interrelationships

The E-Government "Hub" or "Public Service Broker"



Services from the Customer's Perspective

A "customer facing service" is split into three distinct components:

- The user interface through which people interact with the service
- The integration part (at the hub) that orchestrates the routing of messages to the (one or more) services that provide the information to the user interface
- The fulfillment part -- "where the work gets done" to create / compute / process information that gets put into a message

Some Example Messages and Integrated Services

Messages like:

- This child has been born...
- Please look up the following car registration...
- Is the person with the following identifier entitled to a free telephone allowance...

Instead of requiring a new mother to apply for benefits when her child is born, the "new child message" can be directly sent to the agency responsible for child benefits

- This made 30,000 annual applications for benefits unnecessary

M-government

Why do we distinguish a subset of e-government services as m-government?

What kinds of services are inherently m- rather than just e-?

What factors facilitate m-government initiatives? What factors inhibit them?

What Devices Can Be Smart?

"Virtually any product that uses electricity -- toys, coffeemakers, cars, medical diagnostic machines -- possesses inherent data processing capabilities. Each has a wealth of information about its current status, usage history, and performance"

"The necessary technologies, while critical to the task, are well-enough established at this point"

- Microprocessors
- GPS
- RFID
- Wireless networking

New "Smart Service" Concepts with "Connected Devices"

Remote monitoring (of environments or products)

Vendor-managed inventory ("remote monitoring" of retail shelf space)

Monitoring + capability upgrading (like "software as a service")

Location information as a service

Remote monitoring + Location Information

Remote monitoring + Interactive control

Otis Remote Elevator Monitoring



A Diagnostic software monitors elevators continuously and sends data to the REM unit located in the machine room.

B The REM unit sends this information to the OTISLINE center.

C Data is categorized by urgency and reviewed by OTISLINE representatives.

D An OTISLINE representative alerts the field mechanic, if necessary.

E The mechanic arrives at the job site with specific information, tools and parts to work on the elevator.

GM Onstar (onstar.com)

To: Sam Sample
Cc:
Sent: 08/26/2006
Subject: As requested, your OnStar Vehicle Diagnostics report

OnStar
by GM

HOME PLANS & SERVICES PRIVACY POLICY

OnStar Vehicle Diagnostics for your 2007 Chevrolet Tahoe LS as of 08/26/2006

Dear Sam Sample,
Welcome! We're glad you enrolled in OnStar Vehicle Diagnostics to help keep your vehicle ready for the road.

- Each month you will receive a new diagnostic report.
- Green, yellow and red symbols tell you if you need to act.
- Notification Information includes recall and subscription reminders.

We hope you enjoy the many benefits of OnStar Vehicle Diagnostics.

No Issues Found Action Suggested Immediate Attention

Goodwrench Service **DIAGNOSTIC INFORMATION** **NOTIFICATION INFORMATION**

Engine and/or Transmission System
• Diagnostic: Completed. • No action needed.
[More information](#)

Emissions System
• Diagnostic: Completed. • No action needed.
[More information](#)

OnStar Subscription
• Account #: 123-4567-890
• Safe & Sound Plan
• Expires 06/25/2007

Hands-Free Calling
• Phone #: 123-456-7890
• System active, 20 minutes

Pictured: 2007 Tahoe LS
VIN: 2CNDL7E256083927

Scanning RFID Tags on Vegetable Boxes



"Smart Services" -- Opportunities and Limitations

What contexts are most appropriate for smart services?

What design contexts are not appropriate for smart services?

How do customer perceptions and expectations make the design of smart services a challenge?

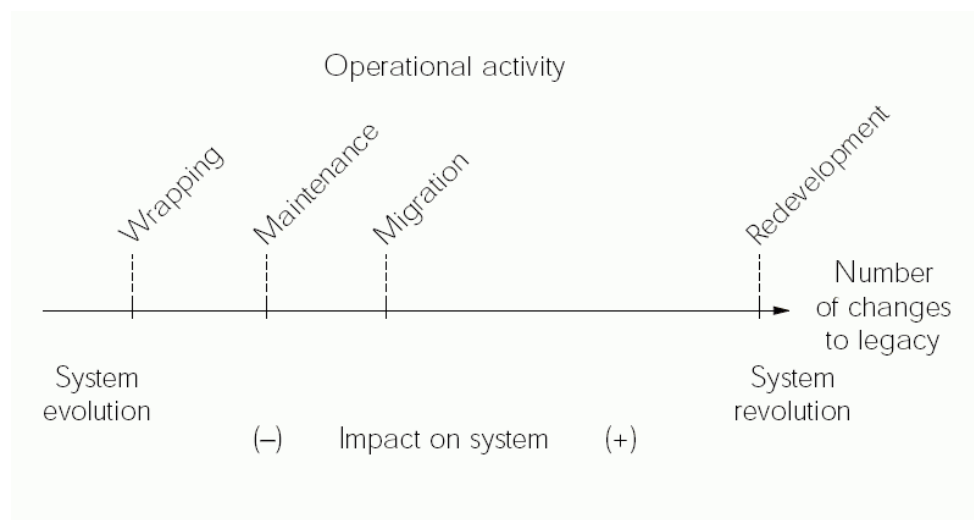
What are the difficult technical challenges to overcome in the design of smart services?

Legacy Information Systems

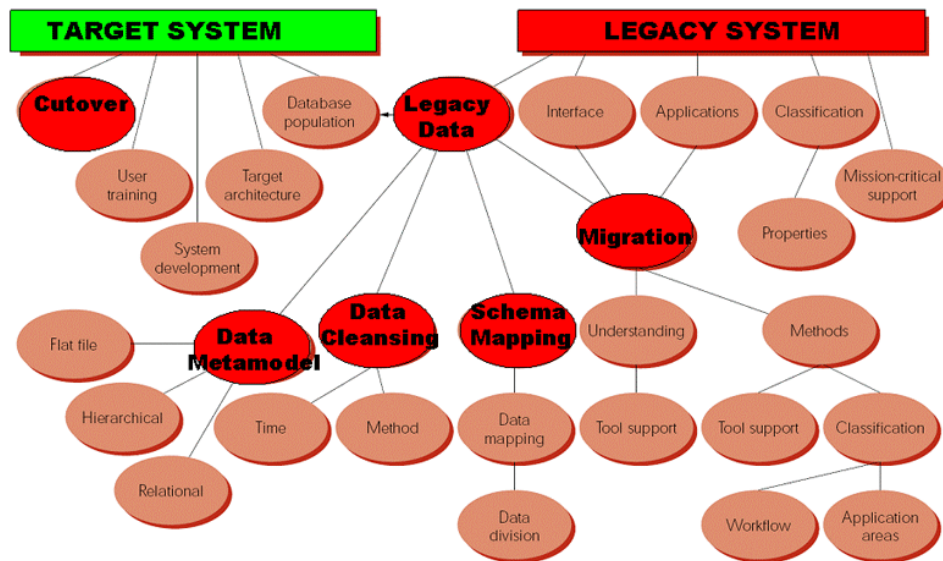
What kinds of problems are faced or caused by legacy information systems?

What is "screen scraping" not a viable long-term strategy for extending the life of a legacy system?

The Legacy (Re)Design Continuum



Legacy Migration



Legacy Migration

What design concerns are most important in a legacy migration?

What are the alternative strategies for "cut over" when a target system has been implemented?

Readings for 8 September

Carl Kessler & John Sweitzer, Preface and Chapter 1, Outside-in Software Development, IBM Press, 2008.

Melody Badgett, Maureen Boyce, & Herb Kleinberger, "Turning shoppers into advocates: The customer focused retail enterprise," IBM Global Business Services, 2006.

Hugh Dubberly & Shelley Evenson, "The experience cycle," Interactions, May-June 2008