interaction design

Thanks to JoEllen Kames
Motorola Mobility | Consumer eXperience Design
for presenting earlier versions of these slides in
our on-campus version of this course

before we start…a word on citations

Just including the name of a paper at the end of your document is not a citation! You must actually cite it! (refer to it in the text and say how it relates to what you're writing about)

Studies of numeracy and statistical literacy have shown that many lack the ability to understand and apply data from graphs. Galesic and Garcia-Retamero [2011] found that 41% of Americans as well as 44% of Germans had low graph literacy skills in understanding very simple bar and pie charts. Ancker and Kaufman [2007] take a broader look at health numeracy and discuss not only problems in interpreting graphs, but also problems in understanding statistical data. These studies motivated us to consider alternate methods to present the complex interactions between wellbeing data streams over time and between sensors.

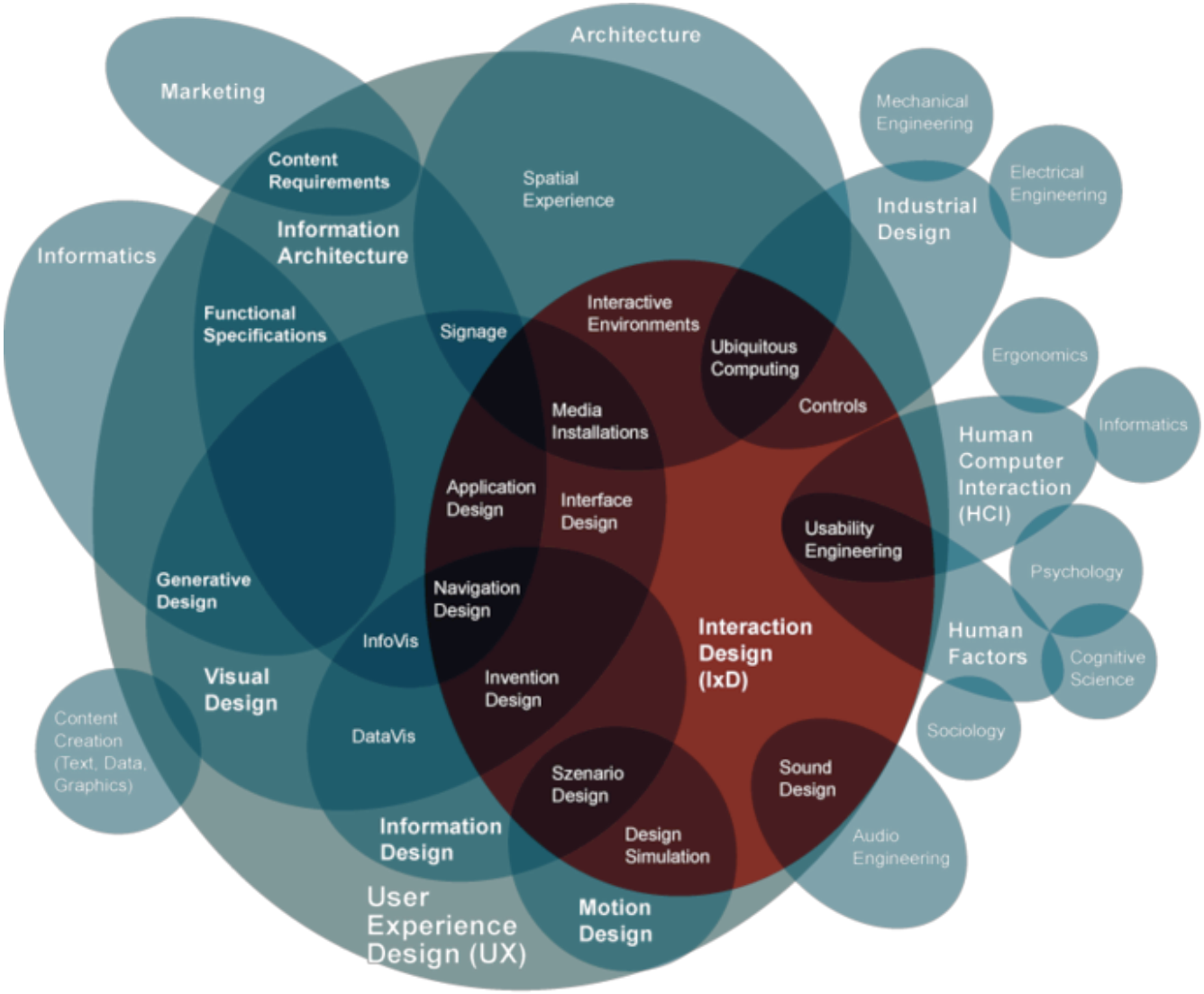
While there appear to be no clear practices on how to verbally convey statistical data [Gigerenzer et al. 2007], several suggestions have emerged from the literature. Lipkus [2007] discusses using variations on the phrase "likely" to discuss risk or statistical certainty. We chose to adopt this in appending "very likely" on the end of any observation with high statistical certainty ($p < 0.01$). For the rest of the formulation of the natural language sentences that we presented to the user, we were largely on our own. We debated several formats and settled on forms that were quite neutral and did not convey a particular need for action, leaving this to the user's interpretation. This resulted in sentences of the form "On days when you X, you Y" or "On Wednesdays you X more than usual."

Consolvo et al. have explored mobile systems to encourage people to be more active in their daily lives. They have built and field-tested several prototypes in this domain starting with Houston, a system to track step counts and share them with friends or family to create a competition/game around being active in daily life [Consolvo et al. 2006]. In another system, they used the mobile homescreen to display physical activity logged by UbiFit [Consolvo et al. 2008a], a system that allows people to visualize their individual physical activity in the form of a garden that grows on the homescreen of the phone as a user performs a wide set of physical activities. They showed that users with the awareness display were able to better maintain their level of physical activity compared with those who did not use the display. These systems showed the promise of the mobile platform for wellbeing-related behavior change, even while focusing only on physical activity.

Consolvo et al. [2009] have also developed a set of design guidelines for systems that support health behavior change and Klasnja et al. [2011] have explored guidelines for evaluating these systems. While many of these guidelines focus on systems for people already making change, some are relevant to consider for systems that are focused on initiating change, especially those around being reflective, positive, controllable, historical, and comprehensive. We focused on these guidelines when creating our system.

Fogg [2002, 2003] has created a series of guidelines for behavior change and has been exploring the mobile device as a platform to encourage behavior change [Fogg and Allen 2009]. He has explored text messaging as a means to encourage behavior change and the power of triggers in notifying users of potential change opportunities in addition to learning about their current progress [Fogg and Allen 2009].

interaction design



interaction design > interface design

Structured ways for effectively taking what you have learned about people and transforming it into something that provides value + delight

Modeling

Framing the solution space

What is it? How does it connect to other things? How does it meet users' goals?

Structure…Flow…Process

Designing how the system will work

How big is it? What can I do with it?

Screen design

Designing how the screens will work

What goes where? Why?

modeling

modeling: what is it + why is it important

Modeling

Defining an visual abstraction of your solution that provides the big picture of your system

Framing the solution in context of the environment + other systems

Frames the solution in the end user's context

Why do it?

Helps define initial scope of the system

Defines other influences on the system or on users of the system

Builds consensus among team members

Frames big ideas for stakeholders

modeling: human centered concept models

How do users think about your system?

What are the activities that they can do?

What are the different types of users that will use your system?

What are the different modes in which they might use it?

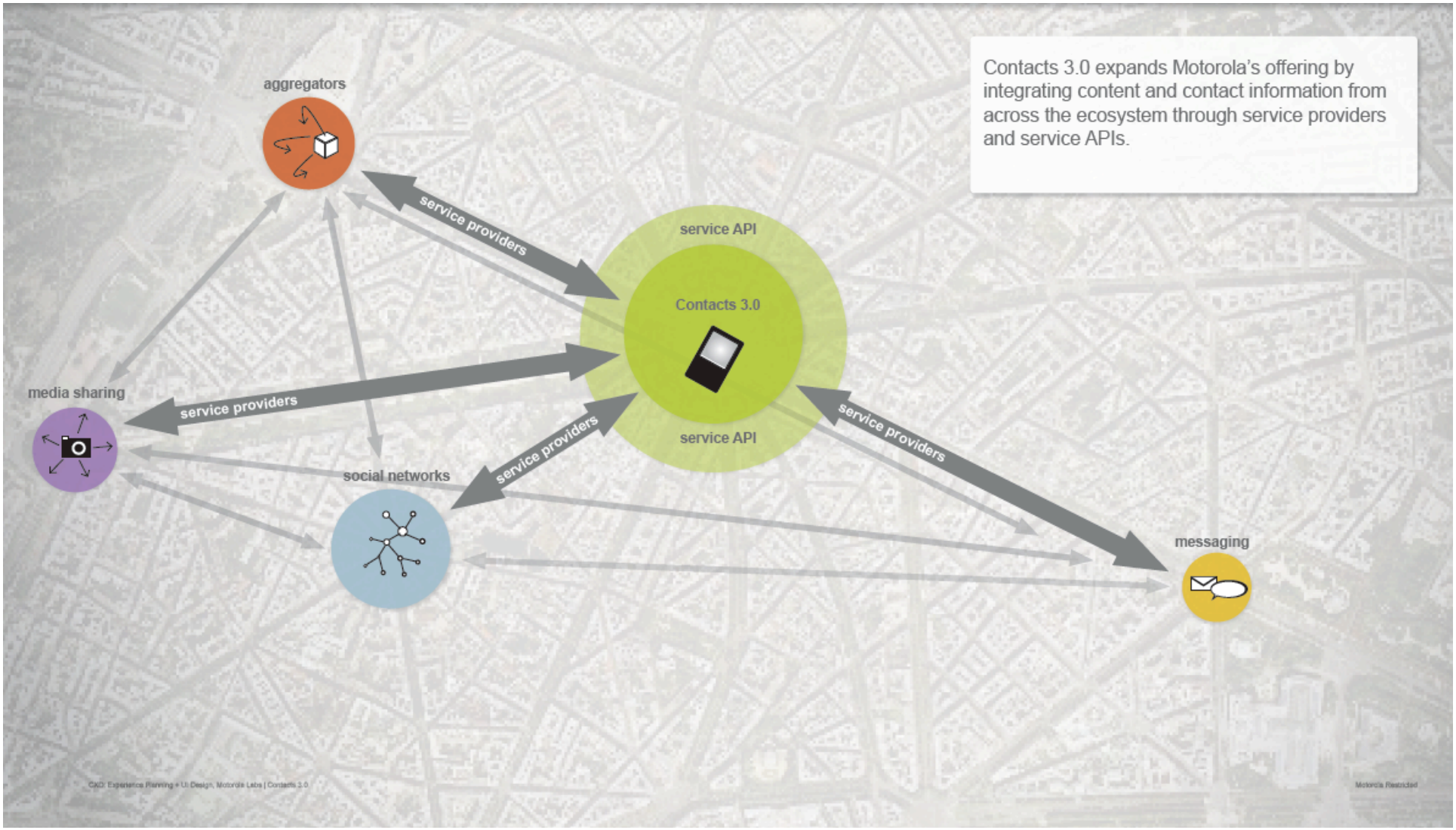
What are the different phases that your system might address?

How is it different than what they used before?

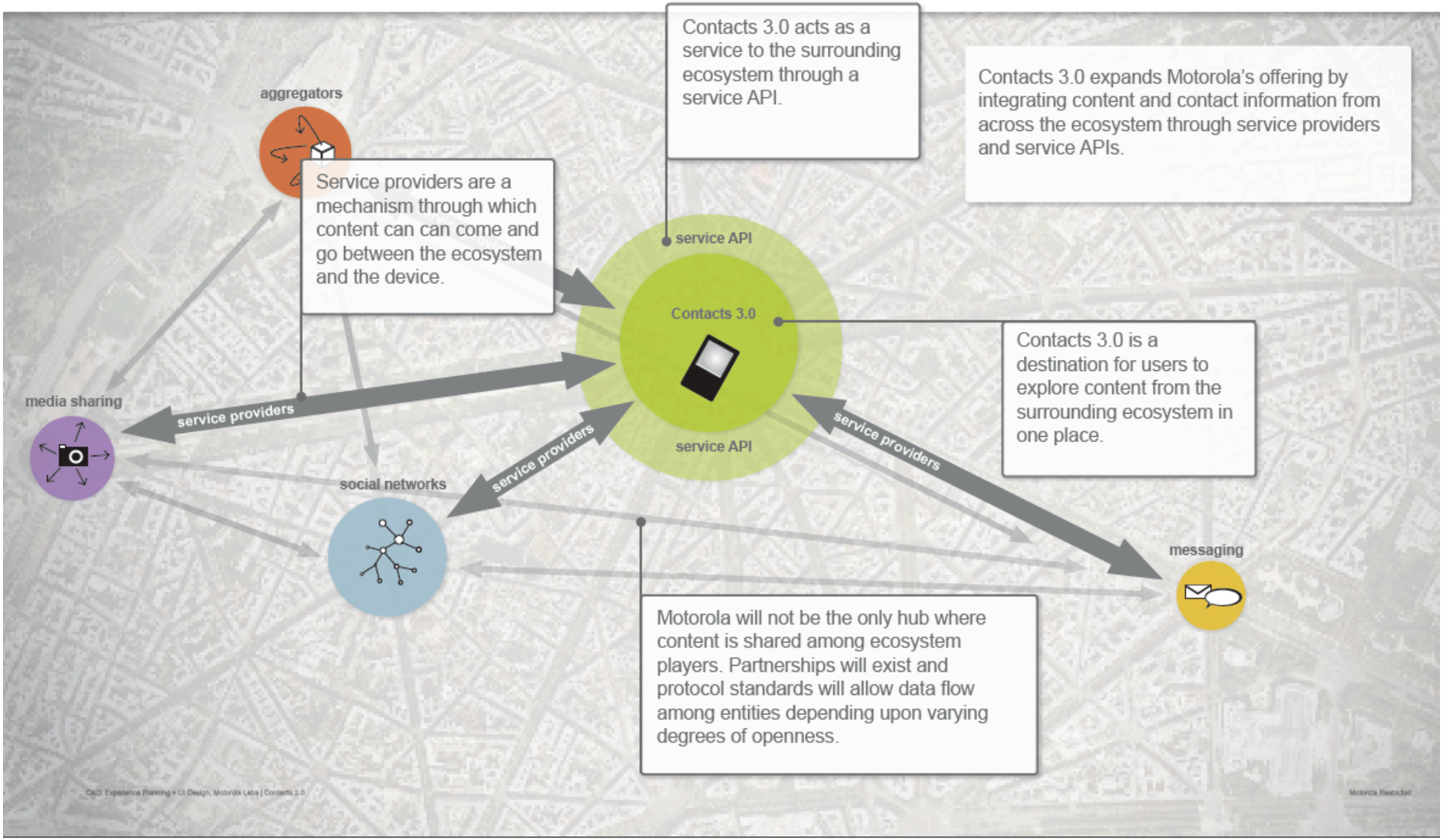
Is there a familiar metaphor that will help users understand your system?

modeling: using metaphors

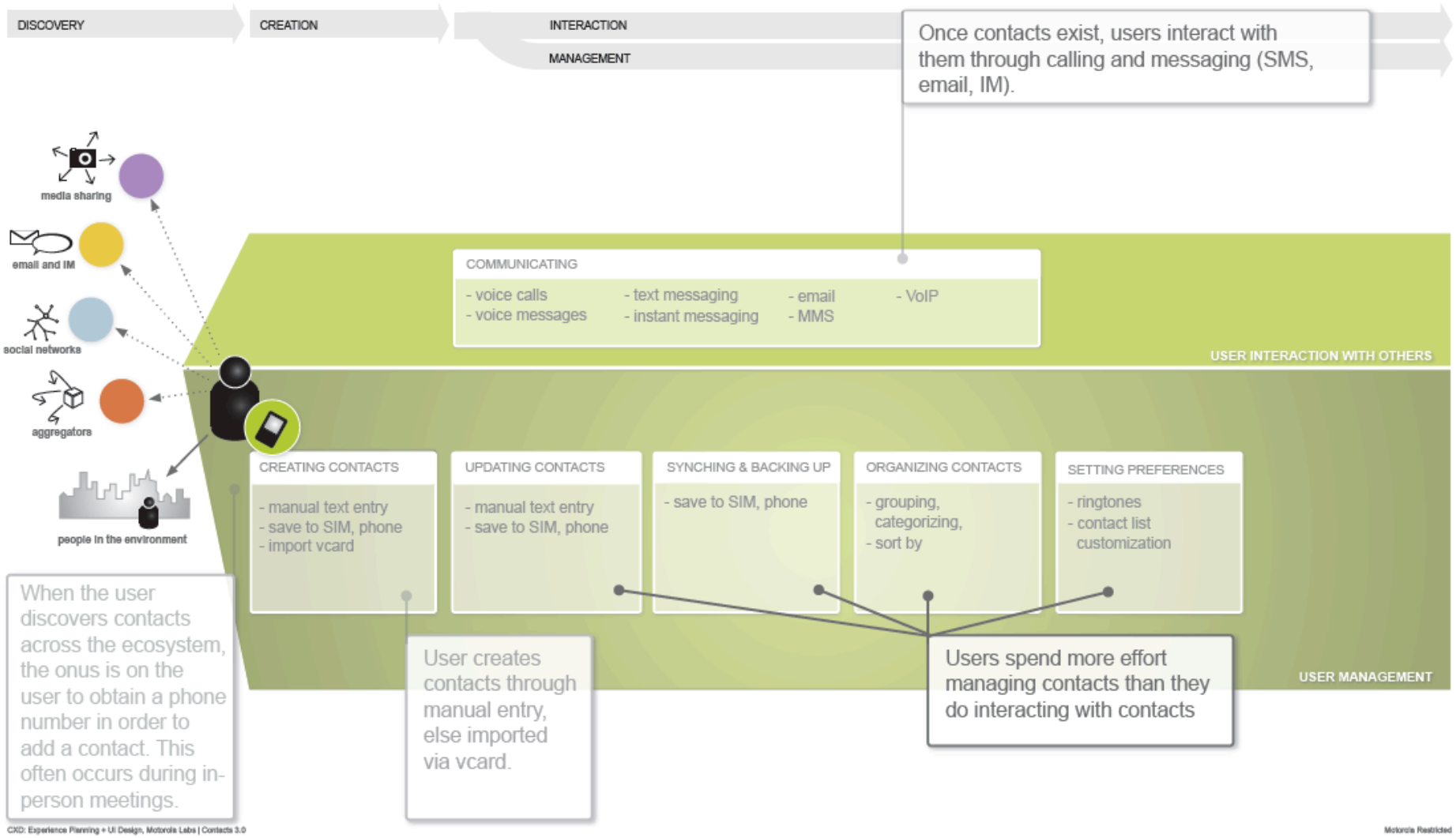
modeling: using metaphors



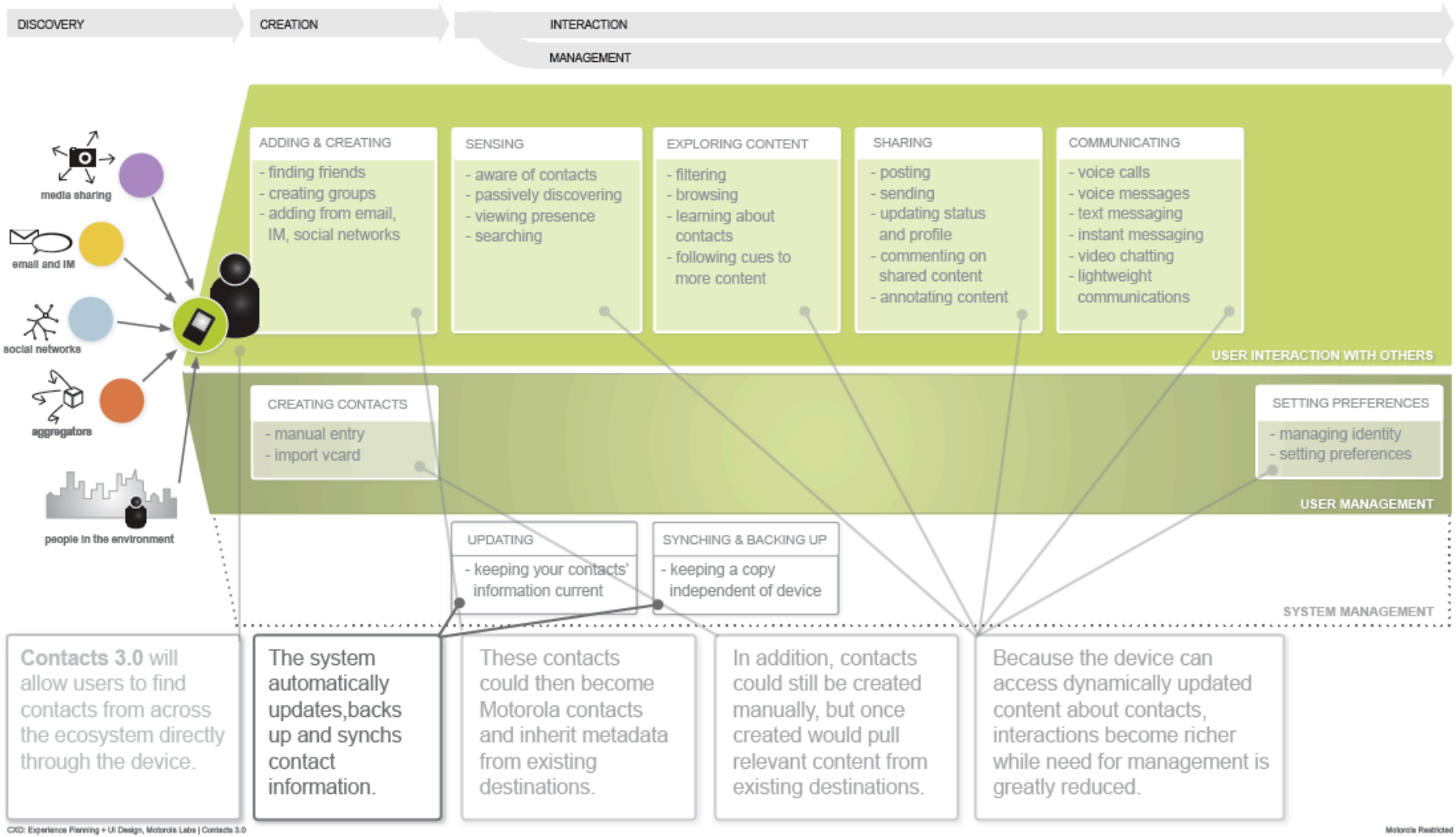
modeling: using metaphors



modeling: before + after



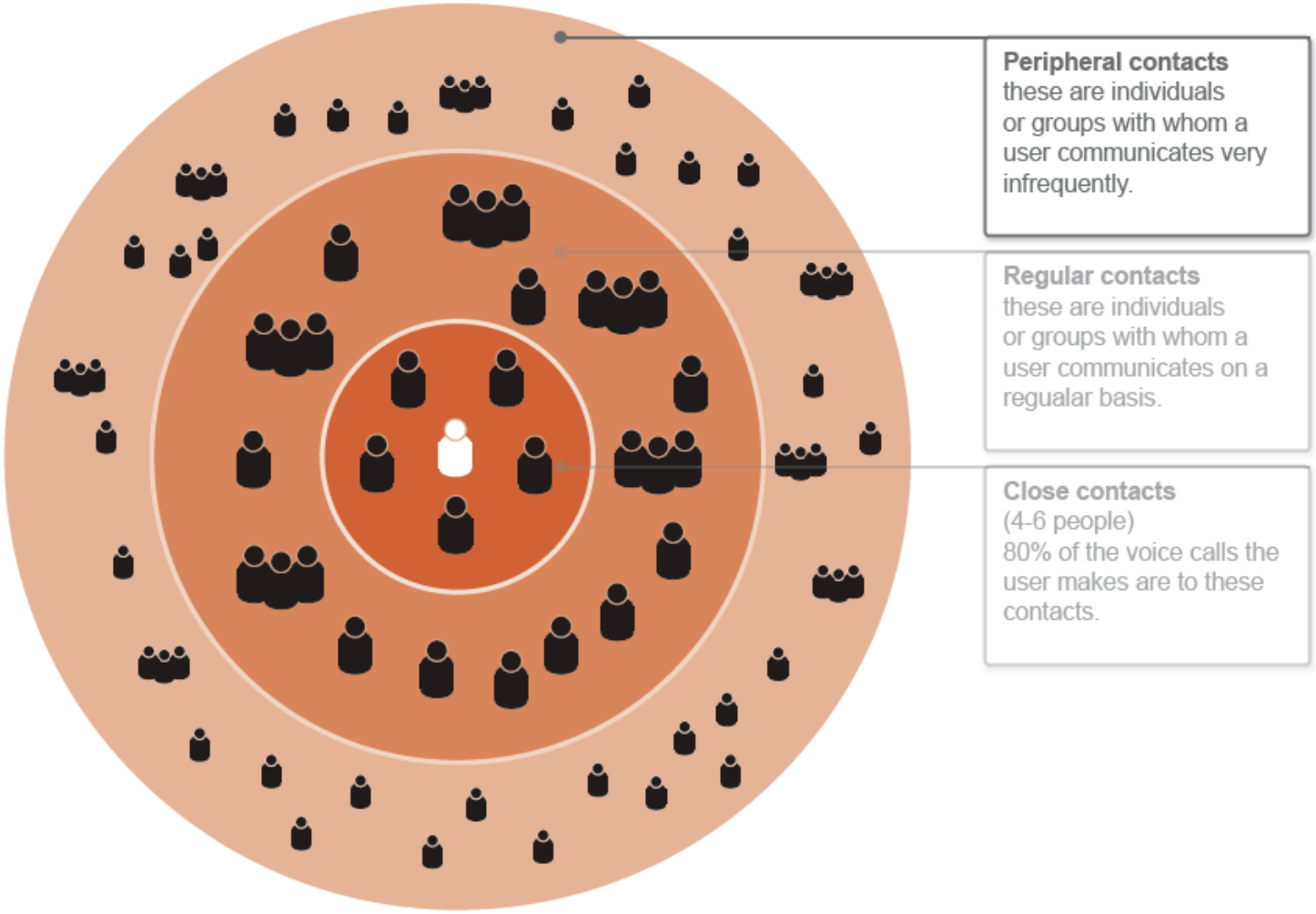
modeling: before + after



modeling: mental models

User Mental Model

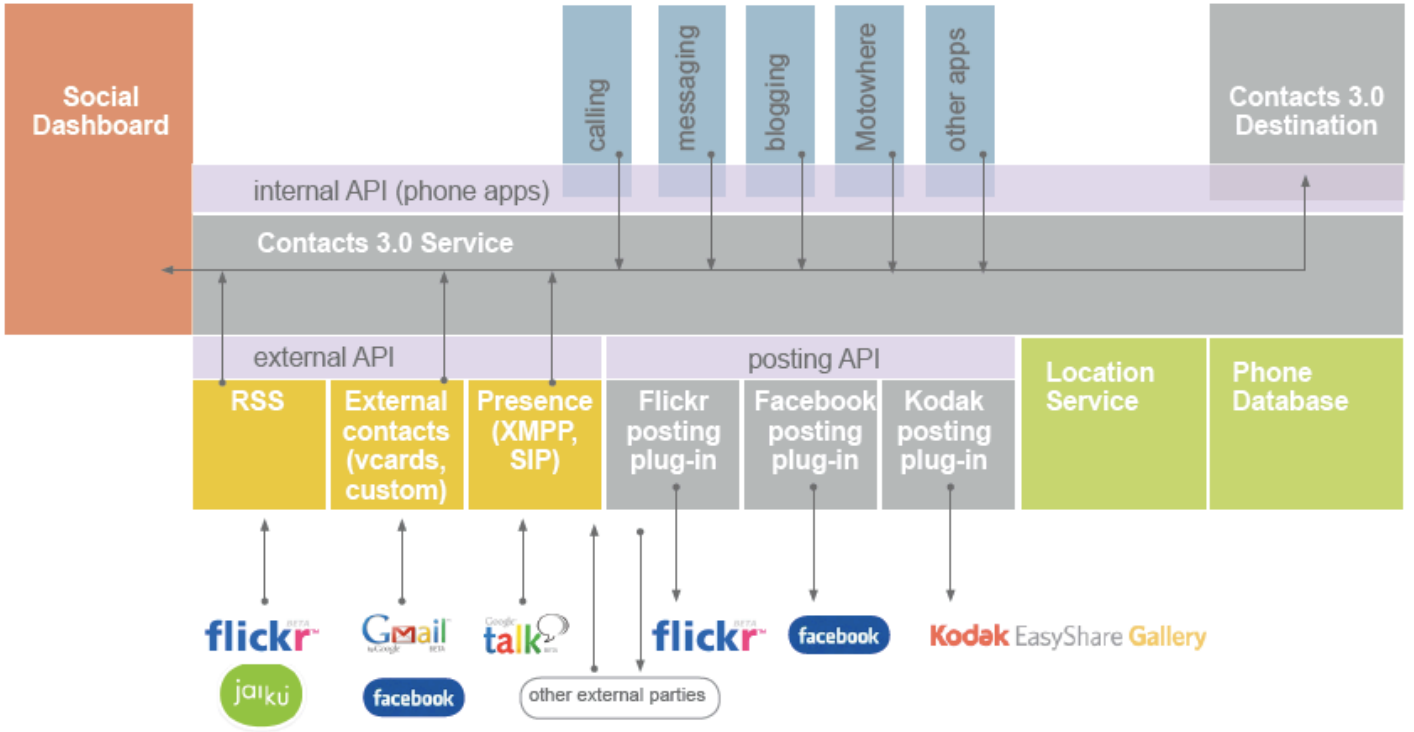
> Close contacts
> Regular contacts
> Peripheral contacts



modeling: system diagrams

Software Architecture: Destination *and* Service

No more silo-ed applications



CXD: Experience Planning + UI Design, Motorola Labs | Contacts 3.0

Motorola Restricted

modeling: content types

Demanding

You need to know about me right now!

Things I have to or should acknowledge

- Calls
- Messages
- Reminders

Patient

I'm here when you need me.

Tracking information

- Weather
- Call logs
- Location information
- Battery
- Patterns of use

Collected

I've got what you need to know and you *should* know this.

Tapping the collective consciousness: learning, connecting, discovering…

…with a librarian

- Structured, organized information
- News
- SN updates

Cool

Let's go check some stuff out.

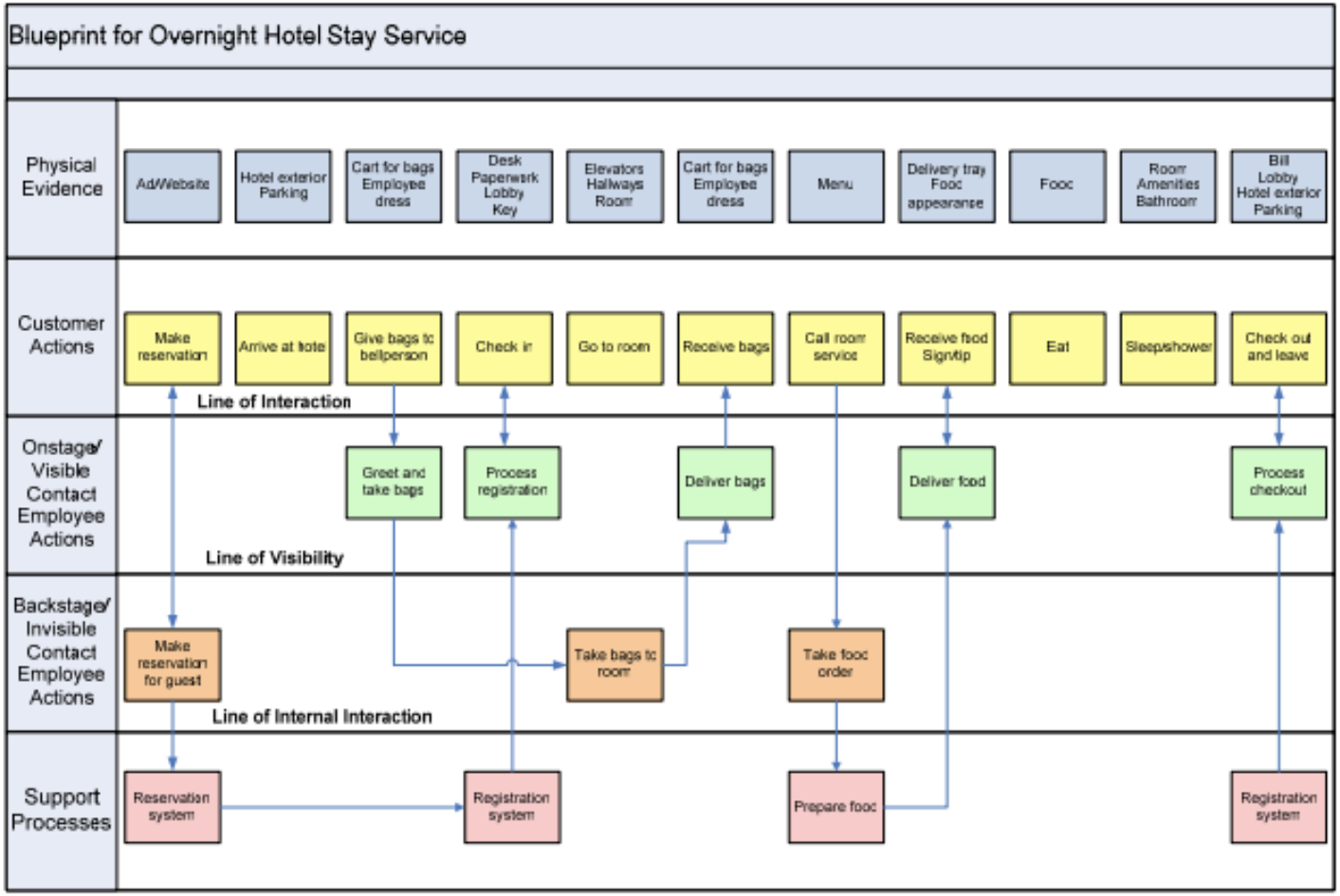
…with a DJ

- Recommended content
- Media from friends

modeling: user types

modeling : service blueprints

Actions users take and steps needed to support these actions by various parts of your service



http://digiservices.files.wordpress.com/2009/11/blueprinting2.png

making models

Take 15 minutes in your groups and
create some simple models for
your app

before + after (how is life different with your app)

mental models (how do users think about a key part of your system)

system model (how is your system architected)

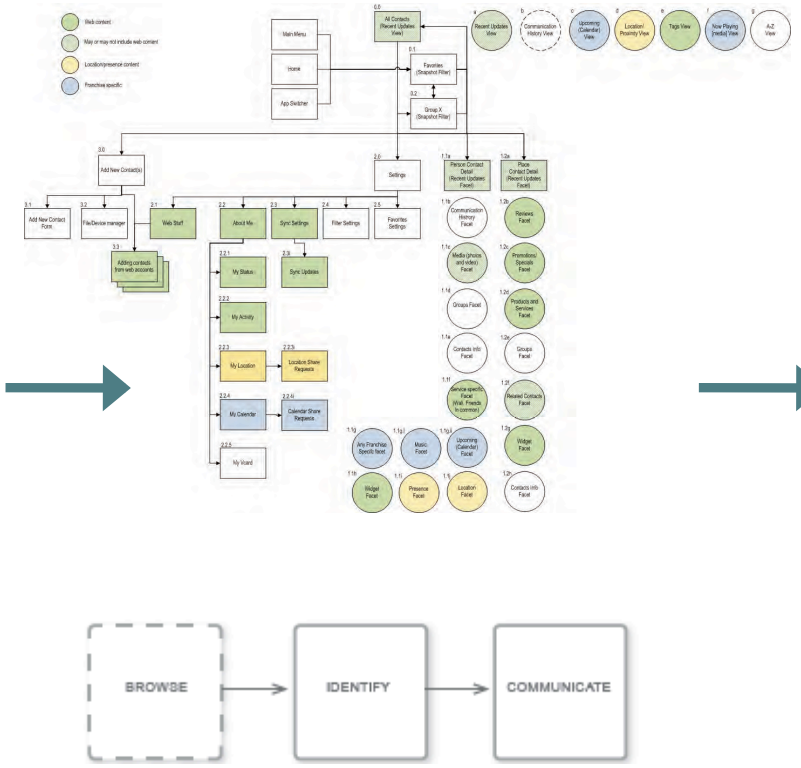
user types (what different types of users would use your app in what ways)

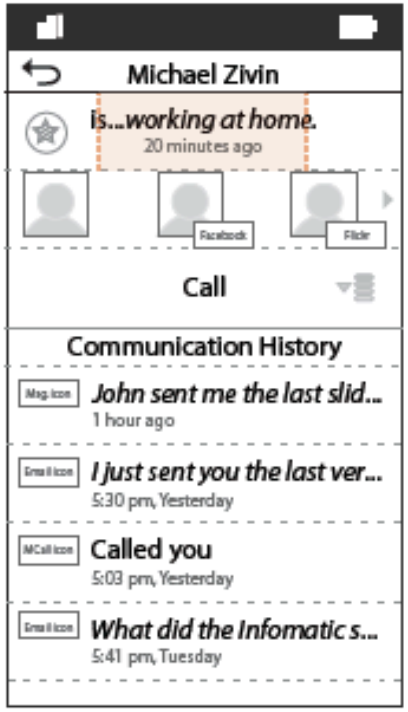
content types (what different types of content and interactions are in your app)

service model (what are all of the user touchpoints with your system)

structure…flow…process

structure…flow…process: putting it all together





concept models

information architecture
use cases + user flows

screen wireframes

structure…flow…process: user goals

What should your system do?

Functionality should map to user goals

life goals: beyond the system, but help explain why trying to accomplish end goals

experience goals: how someone wants to feel while using the product

end goals: outcomes users expect from using the system

structure…flow…process: interaction framework

How should your system be structured?

Cooper's Interaction Framework

1. What is the form factor and input methods?
2. What are the different views?
3. What are the functional and data elements? (basically, parts of a larger key path)
4. What are the functional groups and hierarchy? (sequence, groupings of containers, functionality – based on form factor and input methods)
5. What does the interaction framework begin to look like?
6. What are the key path scenarios? (primary actions and pathways through the system, e.g. viewing and composing emails)

structure…flow…process: a few notes

It's not a linear process – iterate back and forth between user flows + preliminary wireframes

Showing user experience flows vs system/business flows

Flows demonstrate users movement through time – how the user begins,
ends and the clearly marked path that they take

Demonstrating cause + effect

Consistency is key in diagramming systems – there is no "right" visual language

Visual vocabulary – borrowing and adapting to make it your own

use cases

What will a user do in your application/service?

- Aspirational/Emotional Use Cases
  - Feel closer to friends and family
  - Feel entertained on a commute
  - Laugh
- Functional Use Cases
  - See which friends are nearby
  - Play/Pause a movie
  - See a list of movies playing nearby
  - Sort list by distance

use cases

Creating a full list helps to plan structure of your application

Keeps you focused on “core” use cases and keep feature bloat in check

structure…flow…process: use cases

Use Case Catalog

Click here to access this document on Compass.

Key
C = Core
I = Important
N = Nice to have

Communicating	*Priority*
Call a Contact	C
Send Message (or reply to) a Contact (SMS/MMS)	C
Send Message a Group (SMS/MMS)	C
Email a Contact	I
Email a Group	I
Send Lightweight Communication to Contact	N
Send Lightweight Communication to Group	N
Instant Message a Contact	N
Instant Message a Group	N
Send Voice note to a Contact	N
Send voice note to a Group	N
Send Message to a Contact through an online service (i.e. Facebook)	C
Post on someone's Wall on Facebook (or equivalent for another Service)	C
Request info from a contact (Location, Contact Info, etc.)	I
Comment on Contact's media	C
Learning	
View Contact's Status Message from online services (i.e. Facebook)	C
View Contact's Mood	N
View Contact's exact Location (cross-streets, address, dot on map)	I
View Contact's vague Location (City, State)	I
View Contact's user-defined Location (home, store, tag, etc.)	I
View Contact's time zone	I
View Contact's distance from me (exact - .2 mi)	I
View Contact's distance from me (general - same city, near, etc.)	I
View Contact's Motion Presence (moving/not moving; duration)	I
View Contact's preferred communication method	I
View Contacts Music Status	I
View Contact's current/recent photos	C
View Contact's comment on a photo	
View Contact's recent posts/online activities (short: eg. Twitter)	C
View Contact's recent posts/online activities (long: eg. Blog)	C
View Contact's comment on a Blog post	
View Contact's Facebook Profile update	
View Communication History with Contact (Recent Calls, etc.)	C
View Business specific data (Hours, Locations, etc.)	I
View Contact's IM Status now	I
View Contact's Calendar availability	I
View Contact's Calendar	N
View Contact's contacts, network	N
View Contact's online profiles (Facebook, Myspace, LinkedIn)	C
View Contact's weather where they are (attach Widget to a Contact?)	I
View Contact's Ring Profile (Ring, Vibrate, etc.)	N
View basic Contact Information (Phone number, Email, IM, etc.)	C

Sharing	
(From My Info section on the Social Dashboard)	
Set my Status (make avail. OR push)	C
Set my photo (to appear in others' Contact lists)	C
Set my Mood (make avail. OR push)	N
Share (make avail. OR push) my exact Location	I
Share (make avail. OR push) my user-generated Location	I
Share (make avail.) my Motion Presence	I
Share (make avail. OR push) my vague Location (City, State)	I
Share (make avail. OR push) my Time Zone	I
Share (make avail. OR push) my Calendar	I
Share (manage permissions for) my current media (what I'm watching, Blogs, Music?)	C
Share my preferred communication method	N
Share (make avail.) my IM Status	I
Share my online identities (url to any online profiles that a user has)	C
Share myself as a Contact (my Vcard)	I
Share my Contacts/my Network	
Make an introduction to a Contact (like LinkedIn) (sending Contact Info (like sending Vcard))	I
Send content to a contact (link to media, Blogpost, etc.)	C
Send content to a group (link to media, Blogpost, etc.)	C
Send Meeting/Event invite	I
Share business-specific data (if Contact is a business)	N
Searching/Finding/Browsing	*Priority*
Search for a Contact on-Device	C
Search for a Contact off-Device	
Search by Tag	
Browse Contacts	C
Filter/sort Contacts Main by:	C
Tag	C
Location	I
Now (or recently) Playing [media]	I
Recency of communication	C
Recent Updates	I
Calendar (Upcoming)	
Franchise Specific activity (Now playing media)	
Group	
Favorites (suggested by frequency)	C
Filter/sort Social Dashboard Content (Device + Social/Web updates) by:	C
Group (from Contacts App)	C
Media Type (off-Device)	C
Recency (time-based by default)	C
Communication Type (on-Device: Calls, Messages)	C
Web (off-Device)	
Phone (all on-Device)	
Web Service	C

Creating	
Create a Group (from Tags)	C
Create a Group from a shared group (a Contact send/shares the Group with another member)	C
Create a Group from a Message (sending to multiple recipients)	C
Publish Group (notify Contact that they are in a Group and give option to add group)	I
Create a Group from scratch	C
Create a Contact from Web Service (custom API for Facebook, etc.)	C
Create a Contact from another Device (including "kissing" and tagging location)	N
Create a Contact from scratch	C
Create a Contact from Structured Data	C
Request an Introduction to a Contact (requesting Contact Info for another person)	I
Rate Contacts (make Favorite)	N
Block a Contact	C
Block particular feeds for a Contact	C
Block a Group	C
Disband a Group	C
Syncing/Backing up/Storing	
Sync/update Contacts with Web Service	C
Sync/update Contacts with another Device (PC or second phone)	I
Save Contacts to SIM	C
Save Contacts to Phone	C
Save Contacts to Service (NGP - back-up?; carrier?; 3rd party?)	I
Customize/set preferences for Contacts Detail	C
Customize/set preferences for Contacts Main	C
Setting up	
Import Contacts from Online Service	C
Reconcile/merge Contacts across information sources (matching John on Facebook to John in Contact List)	C
Set which content sources I want from a given Contact	I
Receive notification that a Contact has edited their Contact Info and there is a conflict (following Auto-Sync)	I
Respond to conflict alerts following automatic sync/updateswith online services (in background)	I
Set sync (Web services) option to manual	C
Configure Automatic Sync	
Choose who to add from a given Service	C

8

structure…flow…process: use cases

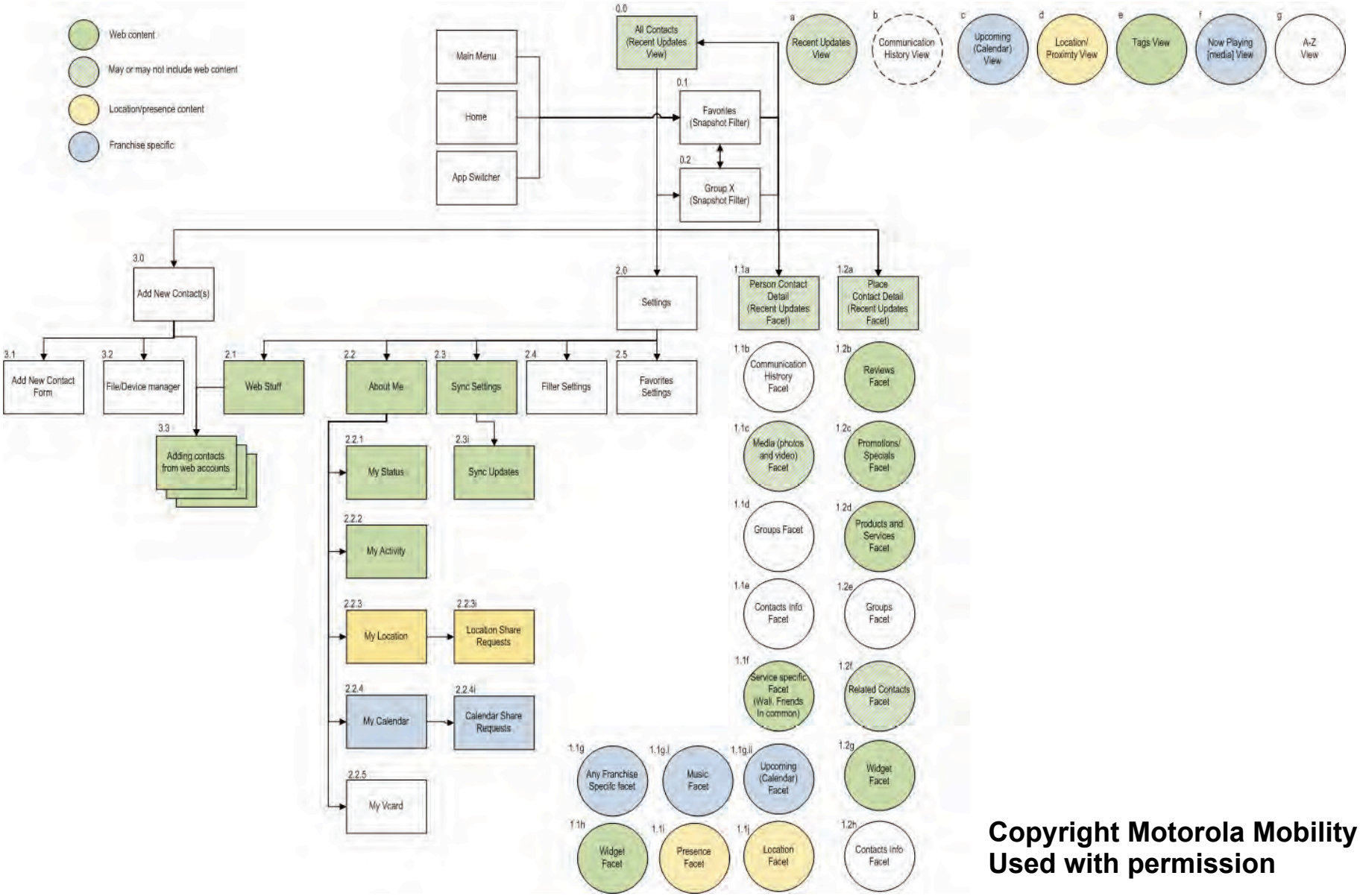
Identifier	Use Case	Priority		
Communicating				
A	Call a Contact	C	x	x
B	Text Message (or reply to) a Contact (SMS/MMS)	C	x	x
C	Text Message a Group (SMS/MMS)	C	x	x
D	Email a Contact	I	x	x
E	Email a Group	I	x	x
F	Send Lightweight Communication to Contact	N	x	x
G	Send Lightweight Communication to Group	N	x	x
H	Instant Message a Contact	I	x	x
I	Start a Group chat from Group Detail	I		x
J	Send voice note to a Contact	N		x
K	Send voice note to a Group	N		x
L	Message a Contact on online service (i.e. Facebook)	C	x	x
M	Communicate via service specific methods (i.e. Post on someone's wall on Facebook)	C	x	x
P	Request information from a Contact (exact location; duration, contact info)	I	x	x
	Request information from a Contact (Introduction to another Contact)			x
Q		C	x	x

use cases

Take 10 minutes in your groups and list out all the use cases you can think of for your app

If you have time, prioritize these as Core, Important, or Nice to Have

structure…flow…process: information architecture



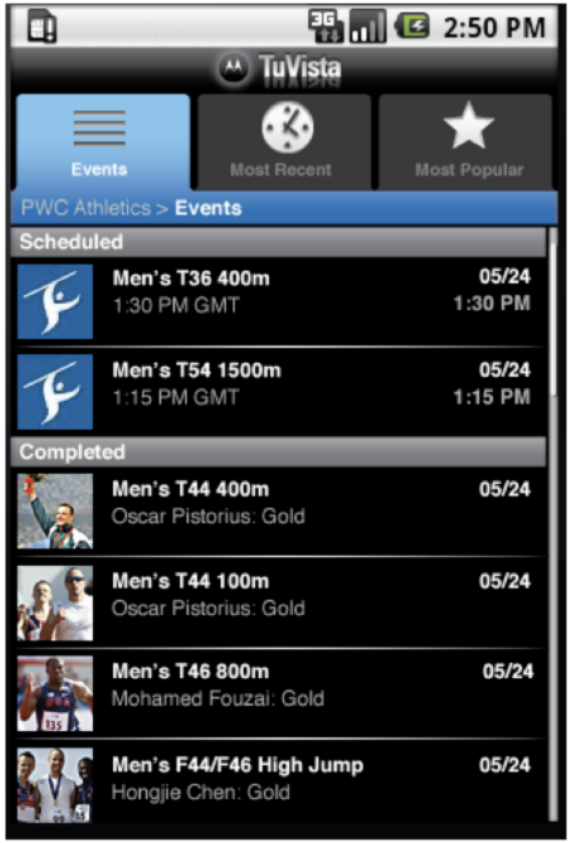
structure…flow…process: know your sandbox

Android

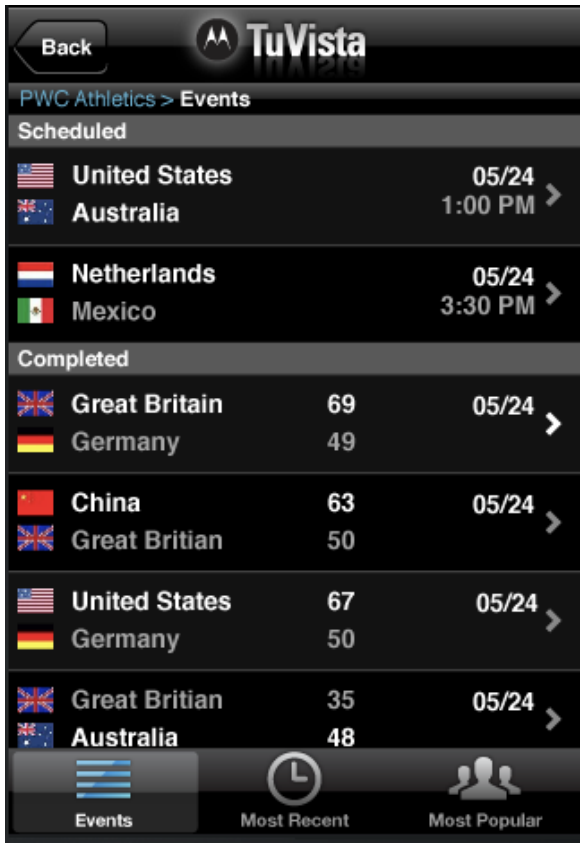
iOS

Windows Mobile

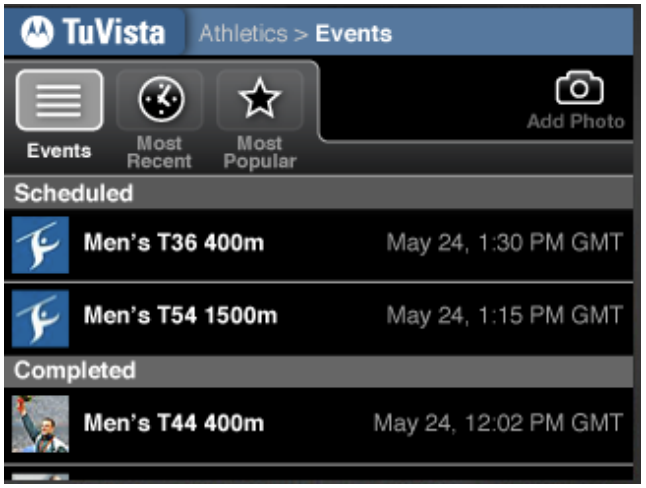
structure…flow…process: know your sandbox



Android



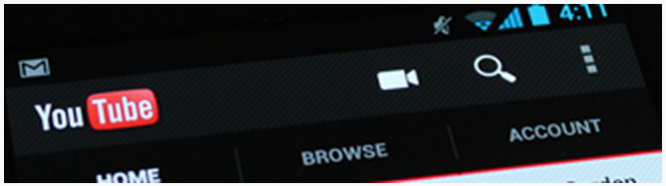
iOS



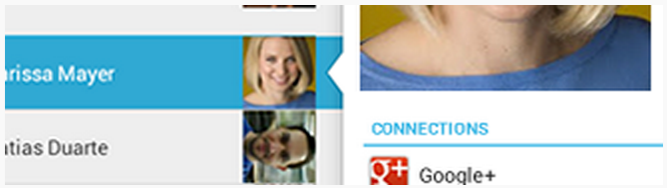
Blackberry

structure…flow…process: patterns + guidelines

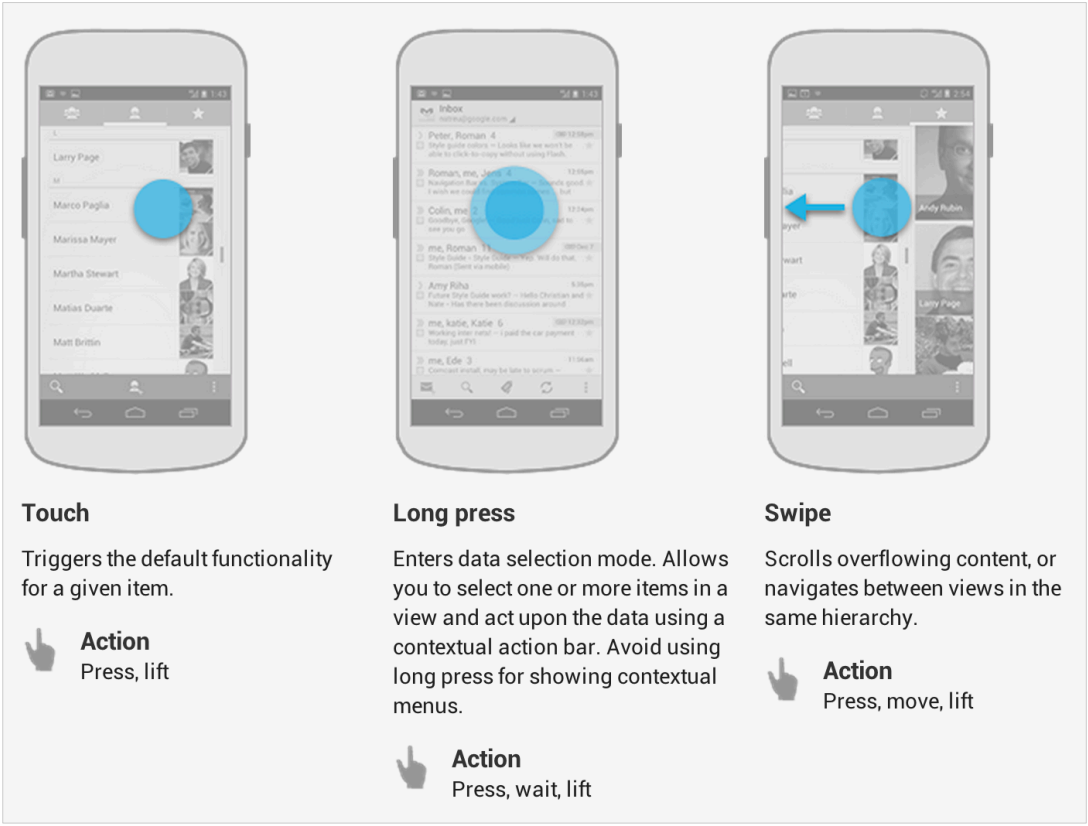
Navigation bar



Action bar

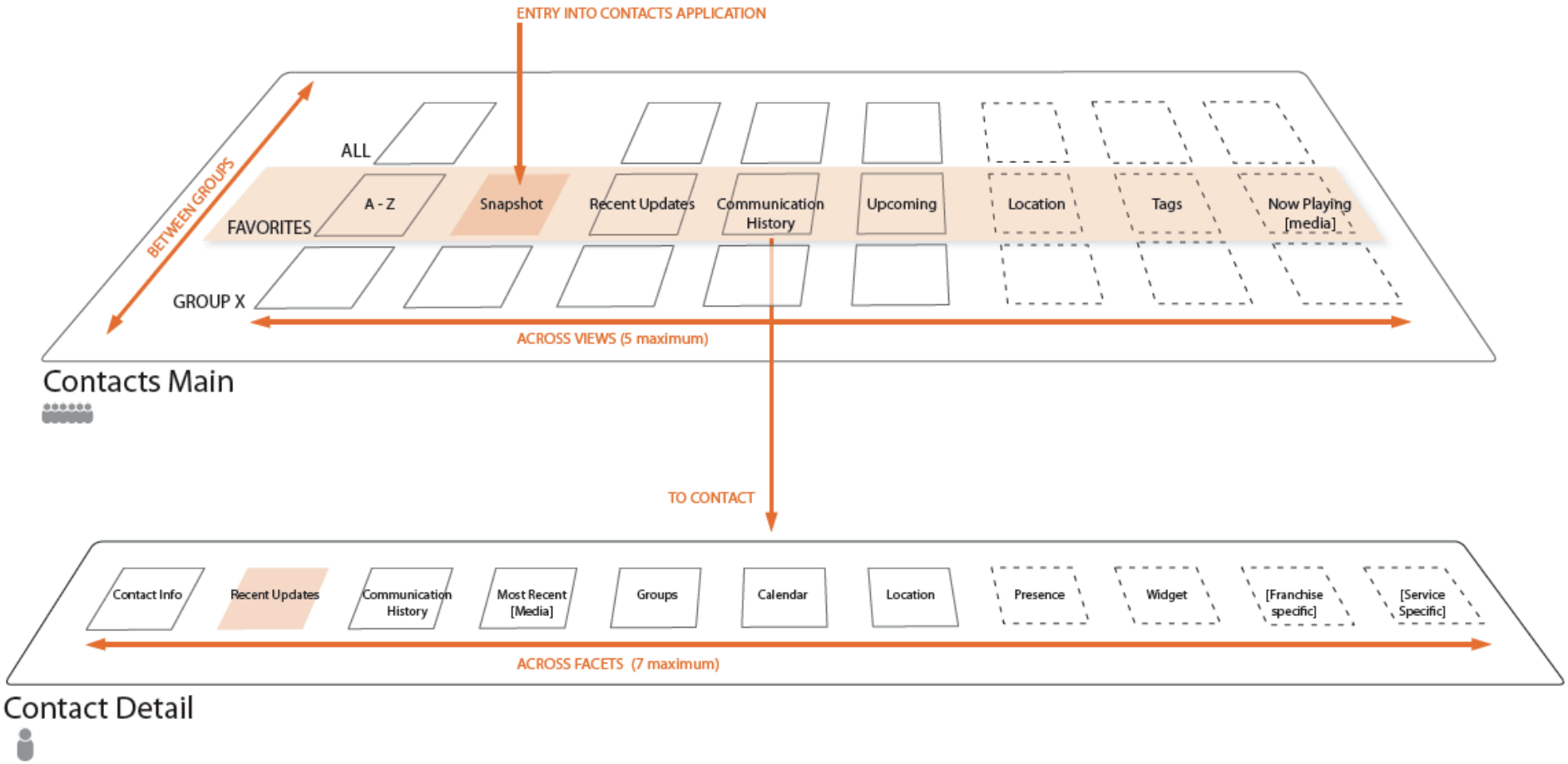


Multi-pane layout



Gestures

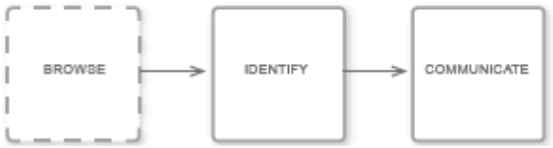
structure…flow…process: interaction model



affordances/interface design: early definition + sketches

Basic Call

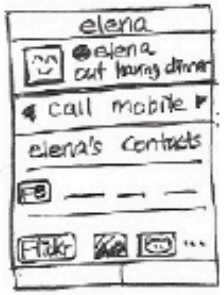
A user could place a basic call directly from the Social Dashboard if a contact shows up as a result of a recent update. Otherwise, the user would go into Contacts Main to find a contact and place a call.



d1. Calling contact directly from Social Dashboard through send key

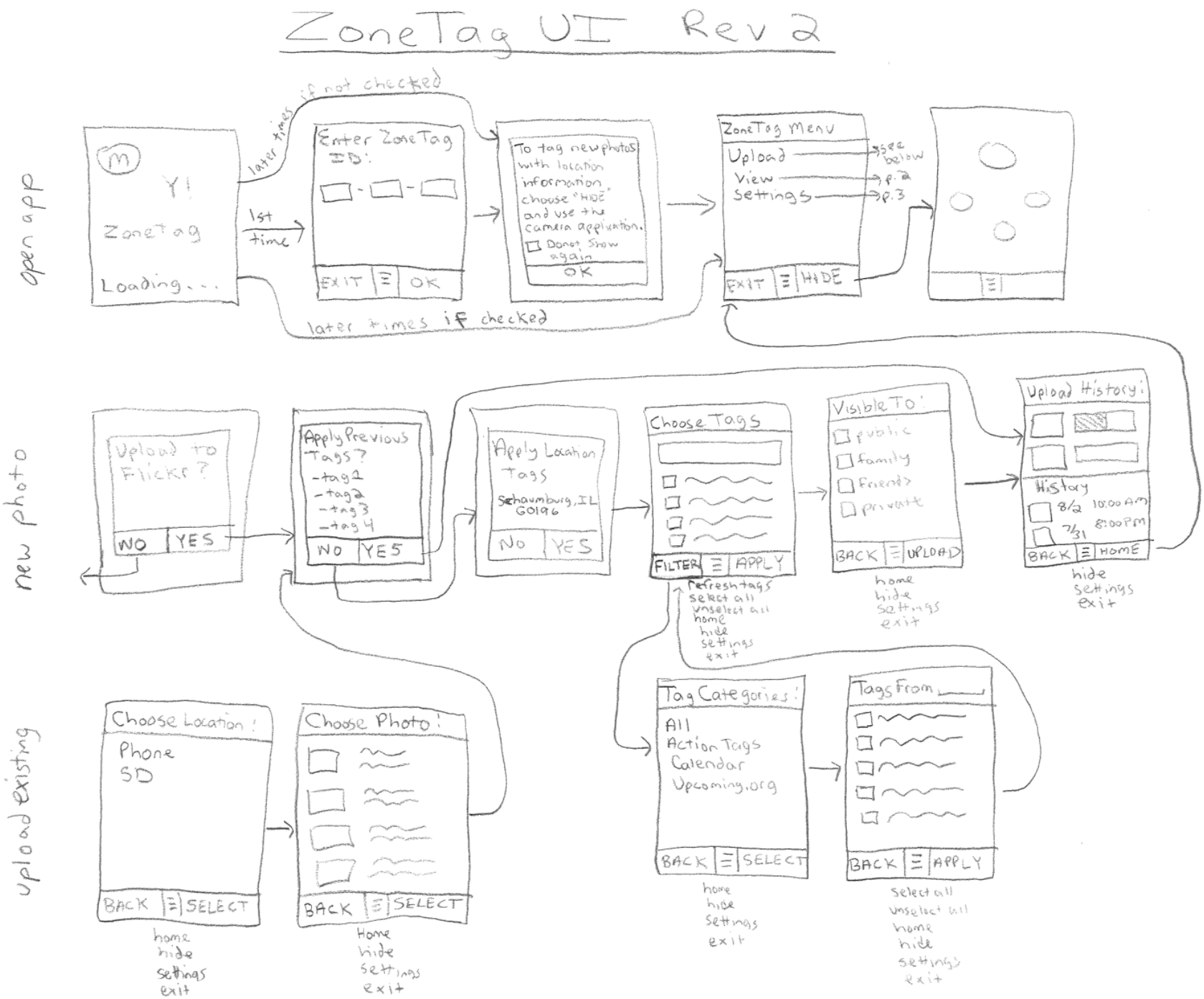
d2. Calling screen with presence information to provide context

d3. Contacts Main



d3. Contact Detail shows a voice call is suggested method

d3. Calling screen with presence information to provide context



flow models

In your groups, take 15 minutes to create a flow model for your app

What are the screens involved?

How do you move from screen to screen to complete a task?

screen design

affordances/interface design: interface design principles

Wodtke's 8 principles

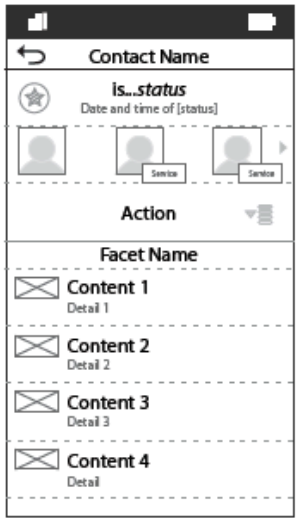
1. Design for way-finding – where you are, where you can go, how to get there
2. Set expectations and provide feedback
3. Ergonomics design
4. Be consistent and consider standards
5. Provide error support – prevent, protect, and inform
6. Rely on recognition rather than recall
7. Provide for people of varying skill levels – intermediate is fine
8. Provide meaningful and contextual help and documentation

Blueprints (or user flows and wireframes) are just good thinking written down

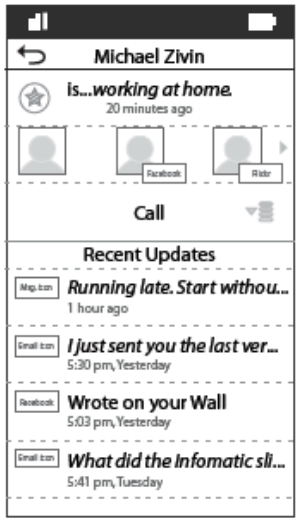
affordances/interface design: screens

Anatomy of the Contact Detail screen (for a person - 1/6)

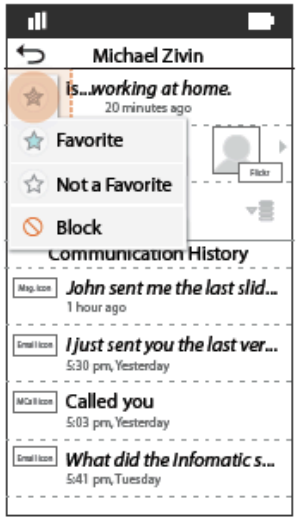
1.1 Person Contact Detail (*Generic*)



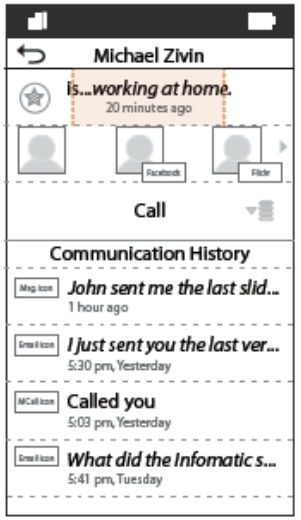
1.1a Person Contact Detail (*Example*)



1.1b Person Contact Detail, Favor/Block Dropdown



1.1b Person Contact Detail + Status touch area



Section 1: Favorite, Block, and Status

Basic

The next six pages will step you through the Contact Detail screen, explaining necessary widgets and interactions.

Favorite/Block functionality

In this example, the contact has been nominated by the system as a "suggested Favorite" (striped star indicates their nomination). Go to ***Groups Settings*** (2.4II) for more on how a contact becomes nominated a Favorite.

If the selects nominates the friend as a Favorite, they will appear in the Contacts Main "Favorite list".

If the "Not a Favorite" option is picked, the user goes back to being just an average Yoo-hoo.

If the block option is picked, the Contact profile will grey out and only this dropdown will be accessable to the user (to Unblock).

The icon of whichever option is picked, will remain on-screen to show what's active.

The Favor/Block Dropdown will time-out after a few seconds of inactivity. Otherwise, closed by pressing the top of the menu (top star).

The "Blocked" strategy requires proper investigation and design solution (see the Next Steps section).

Facebook Status

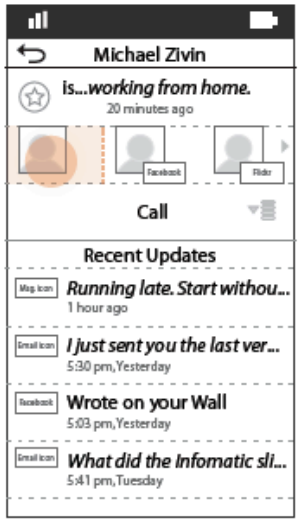
This area contains the latest update to the Contact's status (coming from Facebook, or other services that provide live presence/status information). If the Contact does not have an account with one of these services, this space will display the last contact/communication (sent or received) with that Contact or their last social update (Web activity).

affordances/interface design: screens

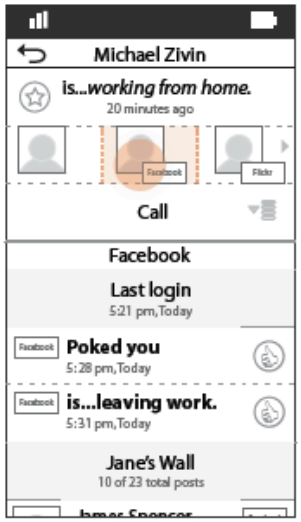
Anatomy of the Contact Detail screen (for a person - 2/6)

Section 2: Account Profile Images

1.1a Person Contact Detail



1.1f Person Contact Detail



Find Contact's [x] Account

The first photo in the row is the default profile photo for that Contact (what appears with incoming communication, such as the photo you see when Michael Zivin calls).

When the first photo in the row pressed the Recent Updates Facet (1.1a default) is displayed.

Rule: The profile image of the first service added to the Contact automatically becomes the default image for that Contact.

The default photo can be changed via the Contact Information Facet (1.1e) or the Media Facet (1.1c) within the Contact Detail. This may seem redundant, but the reason for both is to keep what's familiar while providing an alternative that just makes more sense.

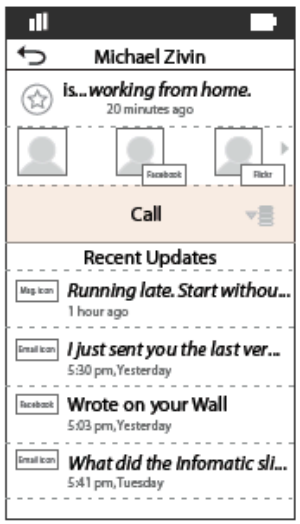
Account Profile

Users can scroll horizontally through multiple accounts if more than two accounts are linked to the contact.

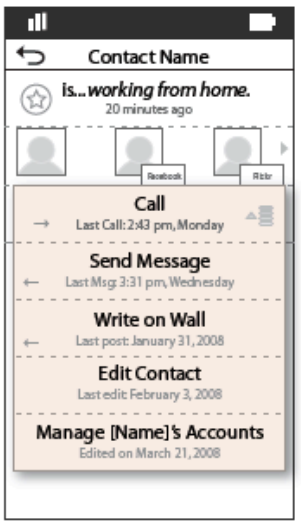
When pressed, the Facet for that Service becomes visible (i.e. when the Facebook Profile Photo is pressed, the Facebook Facet (1.1f) appears).

Section 3: Action Dropdown

1.1a Person Contact Detail



1.1a Person Contact Detail, Action Dropdown



Action line item

If a phone number is stored for the Contact, the Action line item will be 'Call'. If pressed a call will be placed to the Contact in view.

If there is no phone # for the Contact but the user has an email address or is a friend on Facebook, the Action line item will be 'Send Message.'

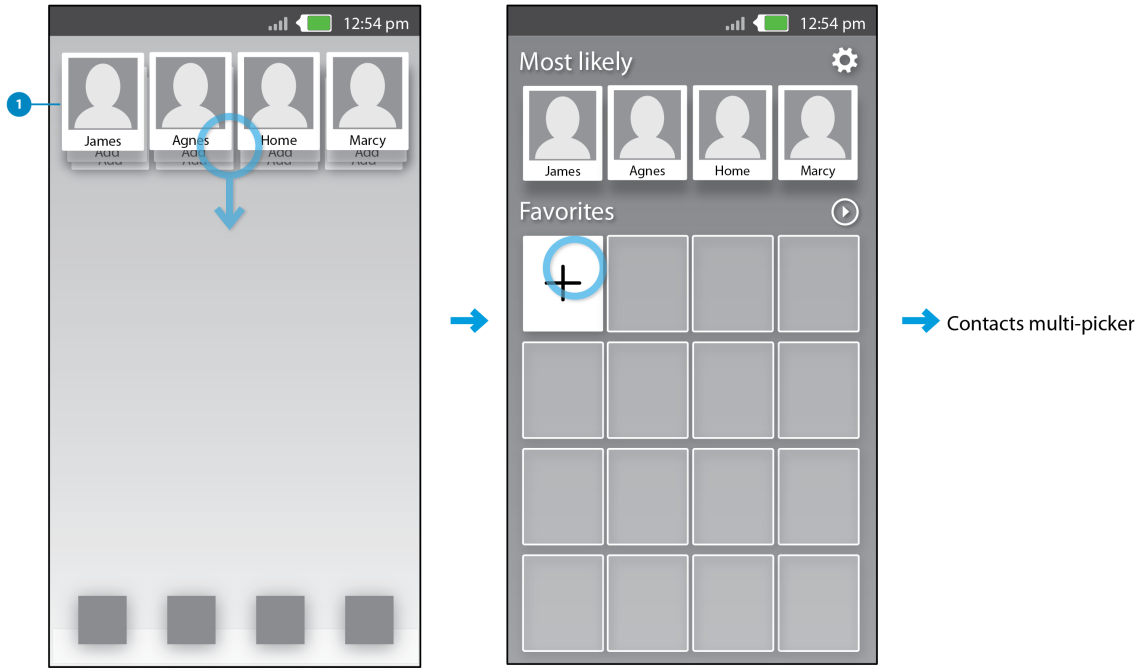
Action Dropdown

The Action Dropdown is lightly dynamic. The first option will always be 'Call' (if a # is stored) or 'Send Message', but the remaining options will vary based on the facet that's available.

See the Action Dropdown Detail section of this document for the rules around what options will appear, when.

affordances/interface design: screens

Out-of-box experience: Contacts on device, Most likely contacts *are* appearing, no Favorites

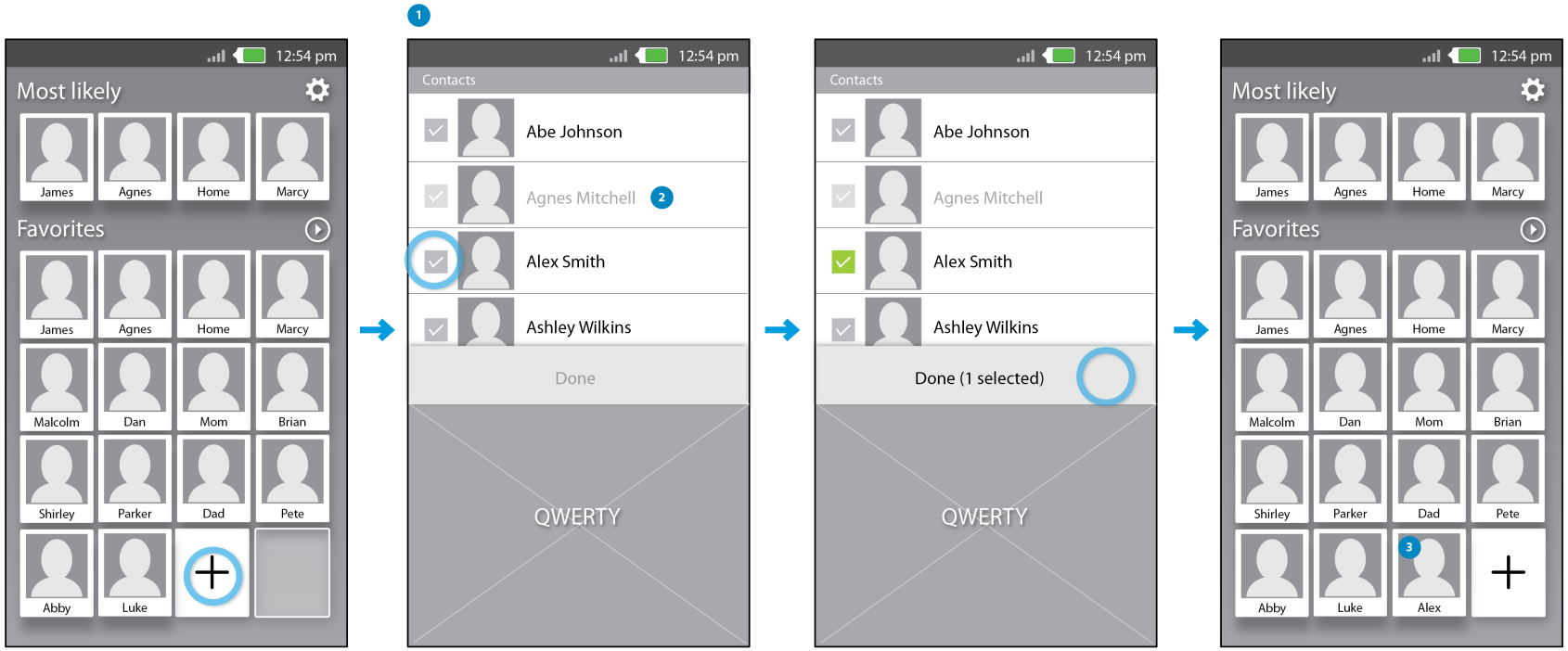


1 Out-of-box widget, contacts on device but no favorites, and Most likely are appearing
Swiping down on the widget invokes the quickview animation. If no favorites are selected on device, then the favorites sections displays a 4x4 grid of tiles with an"Add" tile in the upper left that links to Contacts' multi-icker. Once any favorites are selected, those appear in the grid and only one "Add" thumbnail appears in the last position and he other placeholder tiles drop away.

affordances/interface design: screens

Adding a Favorite from the widget via the Contact Multi-picker

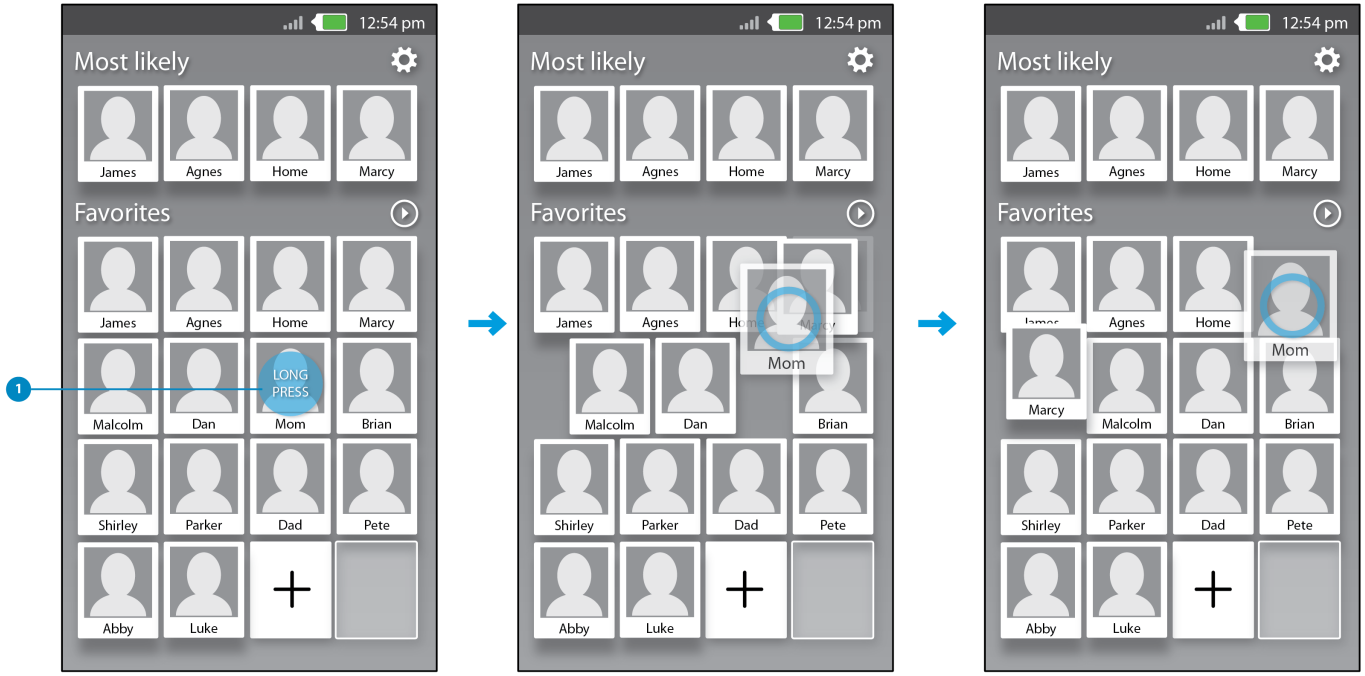
v. 17, 3/9/2011



1. **Contacts Multi-picker**
   This is a framework element from the Contacts app
2. **Current Favorites grayed out**
   If possible, disable current Favorites. This is a nice to have feature.
3. **The added Favorite shows up in the widget**
   If the user selects more contacts in the multi-picker than can display in the widget, then the allowable number will display in the widget (prioritized alphabetically). So if there was room for 2 more contacts, and the user selected 5, then the first 2, in aphabetical order, would display in the last 2 available slots of the widget.

affordances/interface design: screens

Primary screens: Contacts widget quickview state, rearranging Favorites



1 Longpress to reorder

Longpressing on a contact tile allows the user to reorder favorites via insert. The user cannot drag a Favorite into the Most likely row. Longpress on a Most likely contact does not allow reordering, but does allow user to add the contact to favorites.

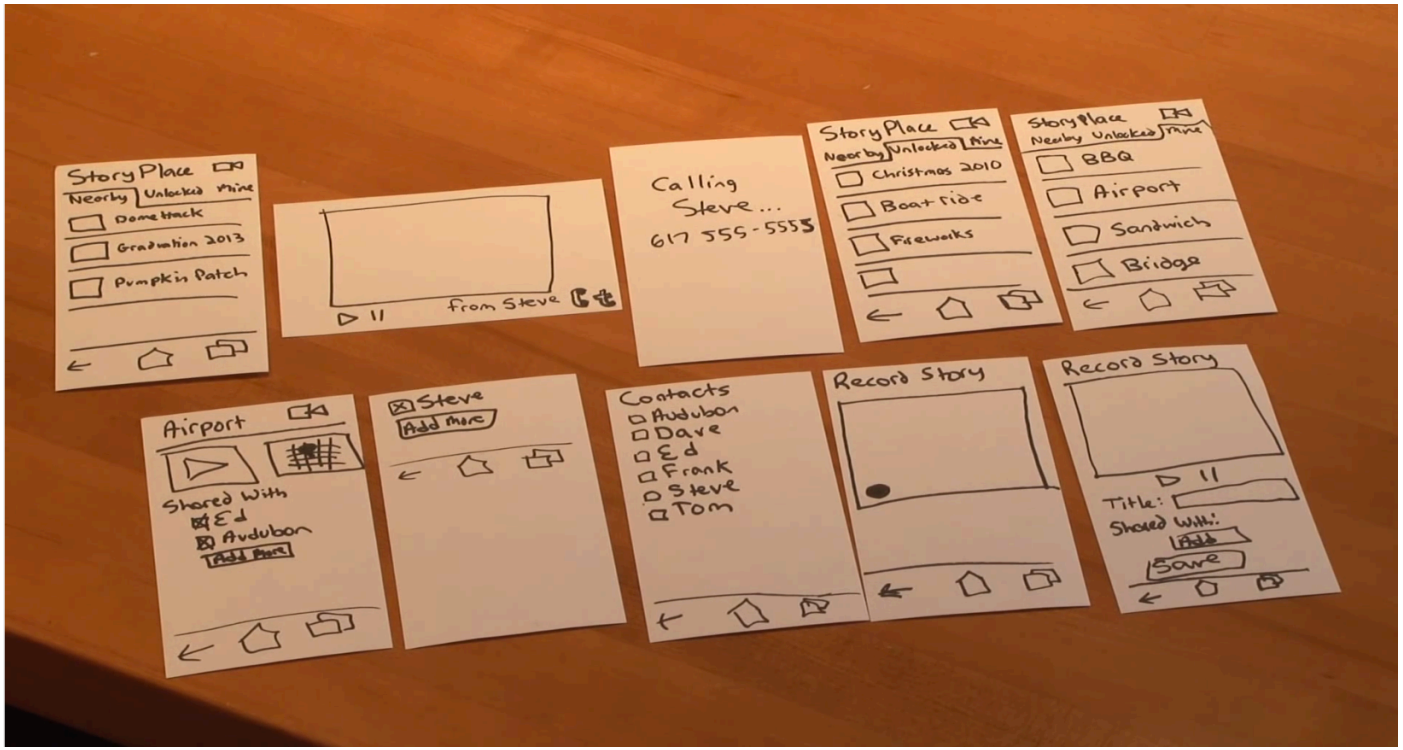
affordances/interface design: screens

iterating with users

paper prototypes

Create every screen on a separate index card (roughly the size of a phone screen!)

If there are any overlays, places for information to be entered, create separate pieces for these



usability evaluation

Next class!

Come in with 3-4 key use cases that you want to test

Often:

- First time user experience
- Key use of the application
- 2nd Key use of the application
- 1 thing that you're not happy with in the design (strange corner case, setting, etc.)

iterating with users: prototyping framework

Prototype	*Function*	*Characteristics*	*Communicates with...*	*Design stage*	*Examples*
Conceptual	• externalizes idea • shows overall plan with interrelationships • instrumental for getting early team focus and agreement	• often diagrammatic • highly abstract • holistic presentation of idea • goes through many quick iterations	• client • team members	early and when substantial structural changes are needed	
Behavioral	• supports interaction • uncovers users' intuitive cognitive operations and expectations	• seldom holistic • often a critical segment of the design idea • often crudely designed but with enough context for use • often looks nothing like the object being designed	• users (elicits natural action and feedback) • client (shows alternatives) • designers (answers questions) • team members (facilitates decision-making)	early and intermittment as behavioral questions arise	
Procedural	• verifies the logic of sequences • identifies patterns of use	• exhaustive integrated presentation of options and consequences	• users (elicits choice and planned consequences) • team members (facilitates execution)	later, but much before production — iterate as often as needed	
Appearance	•assists in aesthetic development • confirms sensory impact	• highly detailed • highly realistic • selected functionality • to scale, often 1:1	• users (verify quality) • team members (explore visual detail and consistency) • client (proof of concept)	late, but before production — iterate as often as needed	
Scenarios	• establishes context for use • connects early vague idea with details of life • embeds developed idea into daily life	• narrative • real-to-life story • sufficient detail to be believable	• team members (helps to establish context) • client (helps to understand concept) • public (promotes idea)	early, to understand how the concept fits in user lives middle, to communicate real life issues to team late, to spin the idea in a public setting	
Games	•supports speculation on relationships between complex and interactive aspects of a situation	• rule driven • includes chance, decision and consequence • simulates key aspects of a situation	• team members • key stakeholders	early, to uncover major conflicts a	

structure…flow…process: a few web resources

Android User Interface Guidelines
http://developer.android.com/guide/practices/ui_guidelines/index.html

Android Design Patterns
http://developer.android.com/design/patterns/index.html

Google I/O 2010: Android UI design patterns
(older but good video for how to think about design patterns)
http://www.youtube.com/watch?v=M1ZBjlCRfz0

iOS Human Interface Guidelines
http://developer.apple.com/library/ios/#documentation/UserExperience/Conceptual/MobileHIG/Introduction/Introduction.html

iOS Mobile Patterns Library
http://pttrns.com/

structure…flow…process: a few web resources

UX Sketching And Wireframing Templates For Mobile Projects
http://uxdesign.smashingmagazine.com/2012/09/18/free-download-ux-sketching-wireframing-templates-mobile/

A visual vocabulary for describing information architecture and interaction design
http://www.jjg.net/ia/visvocab/

First Principles of Interaction Design
http://www.asktog.com/basics/firstPrinciples.html

Views and Forms: Principles of Task Flow for Web Applications Part 1
http://www.boxesandarrows.com/view/views_and_forms_principles_of_task_flow_for_web_applications_part_1

Wizards and Guides: Principles of Task Flow for Web Applications Part 2
http://www.boxesandarrows.com/view/wizards_and_guides_principles_of_task_flow_for_web_applications_part_2

A few good books

About Face 3: The Essentials of Interaction Design, Alan Cooper

Designing with the Mind in Mind: Simple Guide to Understanding User Interface Design Rules, Jeff Johnson

Designing for Interaction: Creating Smart Appliances and Clever Devices, Dan Saffer

Elements of User Experience, Jesse James Garret

Information Architecture: Blueprints for the Web, Christina Wodtke

Designing Interactions, Bill Moggridge

Sketching User Experiences, Bill Buxton

in sections

Finish models, flows, screen design

For next week, create a full paper prototype of your system, each screen hand drawn on a separate sheet of paper with separate cut outs for overlays/menus/etc.

Have 3-4 use cases that you want to test

Next week's class will cover usability testing of prototypes