SMARTPHONE

TABLET

LAPTOP

DESKTOP

TOUCH/GESTURES

CURSOR/KEYBOARD
SMARTPHONE

4.0"

HTC Windows Phone 8S

TABLET

7.0"

Google Nexus 7

9.7"

Apple iPad
Lenovo IdeaTab Lynx

Lenovo ThinkPad Twist

Lenovo IdeaPad Yoga
40M licenses sold Dec 2012

6% Surface share of Windows 8 devices

6% of notebook sales are hybrids
Lenovo IdeaTab Lynx

Lenovo ThinkPad Twist

Lenovo IdeaPad Yoga
SMARTPHONE

TABLET

LAPTOP

DESKTOP

TOUCH/GESTURES

CURSOR/KEYBOARD

3”  5”  7”  9”  11”  13”  15”  17”  19”  21”  23”  25”  27”
lenovo® FOR THOSE WHO DO.
Will be bundled with Asus computers.
SMARTPHONE

TABLET

LAPTOP

DESKTOP

3”  5”  7”  9”  11”  13”  15”  17”  19”  21”  23”  25”  27”

TOUCH/GESTURES

CURSOR/KEYBOARD
TOUCH MATTERS

How do we design for it?
TOUCH

PRINCIPLES

• Content is the UI (the action)
• Enable direct manipulation of objects & content
• Reduce the distance as much as possible between user & content
• Reduce visuals that are not content
• Guessable, predictable, physical

GUI Paradigm

WINDOWS

ICONS

POINTERS

MENUS
Touch Paradigm

Content
Direct Manipulation
Gestures
Feedback

Touch Target Sizes

23x23px ➜ TOUCHABLE
minimum control size (6mm)

5px
minimum spacing between (2mm)

40x40px ➜ TOUCH-ENABLED
commonly used control size (10mm)

Target Size Influences Error Rate

<table>
<thead>
<tr>
<th>% OF MISSED TAPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
</tr>
<tr>
<td>20%</td>
</tr>
<tr>
<td>15%</td>
</tr>
<tr>
<td>10%</td>
</tr>
<tr>
<td>5%</td>
</tr>
</tbody>
</table>

Target size | 3 mm | 5 mm | 7 mm | 9 mm | 11 mm |
-------------|------|------|------|------|-------|
1 in 30 taps (3%) will miss the target | 1 in 100 (1%) | 1 in 200 (0.5%) |

Fat Fingers

Average index finger width

Baby

Basketball Player

KEYBOARD/MOUSE FIRST

5mm minimum control size

7mm recommended size

10mm common controls size

TOUCH FIRST

7mm minimum control size

10mm recommended size

10mm+ common, errors, edge size

2mm minimum spacing between

Keyboard/Mouse First
The quick brown fox jumps over the lazy dog.
Touch First

Touch Optimized

Mail

Hotmail 2

Exchange 1

Inbox 2

Drafts

Sent items

Outbox

Junk

Deleted items

Jetsetter
It’s a Shore Thing 5/29/12

Bing
Plan a movie night with friends, now... 5/29/12

Tim Epling
Contact 5/29/12

Tim Epling
Contact 5/29/12

Lisa Epling
RE: Madeline’s b’day party 5/28/12

Lisa Epling
RE: Madeline’s b’day party 5/28/12

Relationship Church Care Ministry Project 5/28/12

auto-confirm@amazon.com
Your Order with Amazon.com 5/27/12

Lisa Epling
RE: Madeline’s b’day party 5/27/12

Redesigning for Touch

Adapt existing desktop application to be touch-optimized
“Having a laptop with touch is having a laptop with an extra gear.”

77% touchscreen
12% mouse
8% keyboard
3% trackpad

Source: http://intel.ly/KlJ4Lv
Luke Wroblewski
Ended up staying in KS and saw some nice wall clouds! Spending the night in Topeka KS.

Oswego Chasers
92/68 according to our measurements just west of Alva, OK. We're keeping an eye on some distant Cu to our west.

Chim Hansen
Based on our forecast team's research yesterday, it looks like south central Nebraska is a likely target.

Benny LaHonda
Some nice thunderstorms have developed north of Dallas and Tarrant counties expect heavy rains downburst winds and dangerous lightning the area drifting to the south.

Jenny Willston
We're considering going back into chase mode to check out a storm near St Louis MO. Mother nature just doesn't want this chase to be over.

Oswego Chasers
We didn't luck out with daytime convection
Large Targets

**Luke Wroblewski**
10min
Ended up staying in KS and saw some nice wall clouds! Spending the night in Topeka KS.

**Oswego Chasers**
12min
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**Chim Hansen**
15min
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**Benny LaHonda**
17min
some nice thunderstorms have developed north of Dallas and tarrant counties expect heavy rains downburst winds and dangerous lightning the are drifting to the south.

**Jenny Willston**
18min
We're considering going back into chase mode to check out a storm near St Louis MO. Mother nature just doesn't want this chase to be over.

**Oswego Chasers**
12min
We didn't luck out with daytime convection.
| Location | | Update |
|----------|-----------------|
| **Lat** | E | -82 | 17 | 28.4208 |
| **Long** | N | -102 | 11 | 41.3658 |
| **Date & Time** | | |
| Date | 07/20/2012 |
| Time | 12:34 | PM |
| **Storm Info** | | |
| F-Scale | -- |
| Damage | |
| Conditions | |

Small Targets

Text, not Touch Optimized
92/68 according to our measurements just west of Alva, OK. We're keeping an eye on some distant Cu to our west.
“But I have lots to fit on the screen...”

- Touch forces simplification & reduction
- Decide which actions are most important
- What stays on the screen, what goes away
- Big targets work for mouse, small targets don’t work for touch
TOUCH TARGETS

- Use appropriately sized targets
- Maintain spacing between targets
- Consider touch optimized controls
- Embrace simplification
Tap
Briefly touch surface with fingertip.

Double Tap
Rapidly touch surface twice with fingertip.
Swipe/Drag
Move fingertip over surface without losing contact.

Flick
Quickly brush surface with fingertip.

Source: http://www.lukew.com/touch
Pinch
Touch surface with two fingers and bring them closer together.

Spread
Touch surface with two fingers and move them apart.

Source: http://www.lukew.com/touch
Press
Touch surface for extended period of time.

Press & Tap
Press surface with one finger and briefly touch surface with second finger.

“Avoid [these] because they are often triggered accidentally and difficult to time correctly.”

Press surface with one finger and move second finger over surface without losing contact.

Source: http://www.lukew.com/touch
Rotate

Touch surface with two fingers and move them in a clockwise or counterclockwise direction.

Source: http://www.lukew.com/touch
### BASIC ACTIONS

<table>
<thead>
<tr>
<th>user action</th>
<th>gesture</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change mode</td>
<td>press</td>
<td>Touch surface for extended period of time</td>
</tr>
<tr>
<td>Open</td>
<td>double tap</td>
<td>Rapidly touch surface twice with fingertip</td>
</tr>
<tr>
<td>Select</td>
<td>tap</td>
<td>Briefly touch surface with fingertip</td>
</tr>
</tbody>
</table>

Source: [http://www.lukew.com/touch](http://www.lukew.com/touch)
# OBJECT-RELATED ACTIONS

<table>
<thead>
<tr>
<th>user action</th>
<th>gesture</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Delete</strong></td>
<td><img src="https://via.placeholder.com/150" alt="Drag gesture" /></td>
<td>Move fingertip over surface without losing contact (across item or off-screen)</td>
</tr>
<tr>
<td><strong>Move</strong></td>
<td><img src="https://via.placeholder.com/150" alt="Drag gesture" /></td>
<td>Move fingertip over surface without losing contact (and drop)</td>
</tr>
<tr>
<td></td>
<td><img src="https://via.placeholder.com/150" alt="Multi-finger drag" /></td>
<td>Move two to five fingertips over surface without losing contact</td>
</tr>
</tbody>
</table>

Source: [http://www.lukew.com/touch](http://www.lukew.com/touch)
<table>
<thead>
<tr>
<th>User Action</th>
<th>Gesture</th>
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</thead>
<tbody>
<tr>
<td>Scroll</td>
<td>drag</td>
<td>Move fingertip over scrollbar without losing contact</td>
</tr>
<tr>
<td></td>
<td>two-finger drag</td>
<td>Move two fingers up or down across surface</td>
</tr>
<tr>
<td></td>
<td>press</td>
<td>Touch scrollbar for extended period of time</td>
</tr>
<tr>
<td>Scroll (fast)</td>
<td>flick</td>
<td>Quickly brush surface with fingertip in the direction you want to scroll</td>
</tr>
</tbody>
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18min

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We didn’t luck out with daytime convection yesterday, but we did get some nice lightning pictures on our way back to Wichita last night.

12min
Allow any number of fingers

- People often touch with more than one finger
- Touch interactions shouldn’t change radically based on the number of fingers

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Gestures as keyboard shortcuts in touch interfaces

- Consider gesture-based access to common actions or information
- Maintain non-gesture support

Source: http://bit.ly/MqXTvQ
Provide feedback

• Immediate visual feedback for touch gestures
• Change color, size, or move interactive elements

Content follows fingers

- Elements that can be moved or dragged should follow touch gestures

Browsing content with touch

- Use large canvases that support panning & zoom

“But how will anyone know these gesture-based interactions are possible?”
Discovering Gestures

1. Removal of Options
2. Content Teases
3. Animation Cues
4. Just-in-time Education
Just pinch anywhere to leave the gallery

Ok, Thanks
Big screens invite big gestures

- Let people use entire screen as control
- Swipe and paw instead of precise tapping
TOUCH GESTURES

• Don’t be afraid to experiment
• But be aware of discoverability issues
• Use affordances (teases, just in time education) appropriately
THANKS

LUKEW.COM @LUKEW