An Advanced Plant Data Collection System

Best Practices for Tablet Selection, Data Collection, and Software Architecture Diagram

NCPTT Grant MT-2210-12-NC-06

AGAA

Tablet Selection

AAAA

Tablets Tested

Missouri Botanical Garden

- iPad 2
- The New iPad
- Samsung Galaxy Tab 10.1
- Asus Transformer
- Asus Transformer Prime
- Motorola Xoom
- Kindle Fire





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Tablets Tested



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	Date	Size	Wt	CPU	Display	Camera	Battery	Software
	released			GHz			(hours)	
Asus Transformer	2011/4	10.1	1.5	1.0	1280x800	5MP	9.5	Android 3.0/4
Asus Transformer Prime	2011/12	10.1	1.29	1.4	1280×800	8MP AF/F	10	Android 3.2/4
Motorola Xoom	2011/3	10.1	1.6	1.0	1280×800	5MP F	10	Android 3.0/4
Samsung Galaxy Tab	2011/6	10.1	1.26	1.0	1280×800	3MP AF/F	10	Android 3.1
Kindle Fire	2011/11	7.0	0.41	1.0	1024×600	NA	7.5	Android
iPad 2	2011/3	9.7	1.33	1.0	1024x768	<imp< td=""><td>10</td><td>iOS5</td></imp<>	10	iOS5
New iPad	2012/3	9.7	1.44	1.0	2048×1536	5MP AF	9	iOS5

Tablet Assessment

MBG Tablet Assessment - Horticulture

	ဉ်amsung	Asus A	Asus B	Motorola	Kindle	iPad2	iPad3	Weig
Size	5	4	5	5	4	5	5	10
Weight	5	4	5	4	5	4	4	- 11
Screen visibility	3	3	4	2	2	4	5	13
Camera	5	3	4	2	0	2	5	12
Battery life	3	3	3	3	3	5	5	8
Speed	2	2	5	4	4	5	5	9
Ease of use	3	3	3	3	3	5	5	15
Longevity of hardware	2	2	2	2	3	5	5	7
Longevity of software	2	2	2	2	3	5	5	6
Stability in daily operation	2	2	4	3	3	5	5	16
Memory expansion ³	0	I.	I.	- I	0	0	0	1
Flash ^a	• I	I.	I.	1	1	0	0	2
ESRI mapping AP	2	2	3	3	2	5	5	14
File management	5	5	5	5	3	1	1	5
Multi-user support	4	4	4	4	3	3	3	4
Available app:	3	3	3	3	I.	5	5	3
Maintainabilit ₎	2	3	3	4	1	1	1	12
Supportabilit ₎	2	2	2	2	2	2	2	12
Manageabilit ₎	3	3	3	3	1	4	4	12
Unweighted points tota	54	52	62	56	44	66	70	
Unweighted rank	5	6	3	4	7	2	1	
Weighted points tota	513	481	600	526	421	661	710	
Weighted rank	5	6	3	4	7	2	1]

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The NEW iPad won!

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Android vs. Apple

Where Apple Won

- Ease of use
- Stability in day to day operation
- Device longevity
- Outdoor visibility
- Standardized accessories
- ESRI mapping API
- Camera

Where Android Won

- Flash
- File management
- Multi-user capabilities
- Variety
- Memory expansion





Data Collection Workflow

AGAN

What You Need to Collect Data

- iPhone, iPad, or Android phone or tablet with internet access
- i-nigma App (QR code reader that lauches Safari)





Access the LCMS Mobile Tools on your mobile device (e.g. iPad)

- On your mobile device, open the web browser. For iPad users, tap on the Safari app to open it.
- 2. Tap in the address bar and type test.livingcollections.org.Tap Go or Enter.
- 3. Tap on Missouri Botanical Garden. If your location is requested, tap Yes.
- 4. Tap on the Tools menu, and tap Mobile Tools.

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Planting 2011-0412-4] 💿	
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2011-0412-4 Rosa 'Gruss an Aachen'		
Inventory Date		
6/28/2013		
Alive		
Condition		
Plant Count		
Appr Note	oximate	
Primary Cause of Death		
Click a location on the man	to calent Area, Red. Coordinates and Lat/Lange	
s	Basemaps	
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	P13 36	
20 - 20 J	1 10	
-	13 W0220 20 H	
	12 TO5 20 G	
05	Rot	
19 J	03 02 701	
т01	19 / 101 CSTIC	
Current Planting Location (if a	available)	
Surrounding Plantings (if avai	ilable)	
V	lable)	
Your Current Location (if avail		
Your Current Location (if avail Property		
Property		

Retrieve a planting record and update inventory data

- In the Planting field, enter number 20120310 and tap Go or Enter.
- Note that inventory date is updated. Change any other fields as you wish.
- To map or re-map a plant's location, simply tap on the map where the plant is located. Change the basemap if you wish.
- 4. Tap Save when complete. PLEASE NOTE: Since you are logged in as a guest, you will not see your changes. They are stored in a "completed" state but need to be "approved" by an appropriate user to be committed to the database.

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Click a location on the r	y (if available)	
Current Planting Location Surrounding Plantings (i	n (if available)	
Current Planting Location (ii Your Current Location (ii	n (if available) ¹ available)	
Current Planting Location (II Property	r (if available) * available)	

Use a QR code to retrieve a planting records and update inventory data

- In the App Store (or Google Play Store), download the i-nigma app, if you haven't done so already.
- 2. Launch the i-nigma app on your mobile device and scan the QR code on the plant's accession tag that you want to inventory.
- 3. Update inventory data as appropriate and tap the Save button.



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Planting 2011-0412-4		
2011-0412-4 Rosa 'Gruss an Aachen'		
Height		
Height Length Unit		
Diameter at Breast Height		
Diamotor at Broast Height	Logath Unit	
inches		
Spread A		
Spread B		
Spread Length Unit		
Note		
Save		

Measure a planting

- I. Tap on the ruler icon.
- 2. Enter measurements in one or more fields.
- 3. Tap save.



Photograph a planting

- I. Tap on the camera icon.
- 2. Tap Choose File.
- 3. Select appropriate option to either take a photo or choose an existing photo.
- 4. Tap the shutter button to take a photo.
- 5. Tap Use (or check mark). Wait for the image to upload to the database (large icon and additional fields will appear). This can take a few seconds depending on your connection.
- 6. Add a caption or other data, if desired.
- 7. Tap Save.



Access the full living collections management database (LCMS)

- 1. Tap on the detail icon.
- 2. Navigate as necessary to view desired information.

Software Architecture Diagram



Software Architecture Diagram

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Lessons Learned

- Many QR code apps use internal browsers that did not properly render our site
- There are many situations you should review a URL before allowing it to be launched, but we skipped this step
- Leveraging third-party tools/apps saved us lots of time and money, but leaves you dependent on them
- Photo integration was the most complicated part; iOS 6 alleviated some of this

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Technical Information: SQL Server Windows Server 2008 Internet Information Services (IIS) for Windows Server ESRI ArcGIS 10.1 ArcGIS Javascript API for embedded maps in web pages ASP.NET web application framework (C# code) Symantec Mobile Management 7.1 (MMS); plugs into Altiris 7.1 infrastructure



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