



Accessibility Conformance
– Accessibility and Visualization
CTS Customer Command and Control (C3)

Gravitant, Inc.



Agenda

Section 1: C3 – a quick overview

Section 2: Accessibility Requirements

Section 3: Testing Approach

Section 4: Solutions implemented

Section 5: Useful References



Section 1

C3 – A quick overview



About Gravitant, Inc.

Gravitant, Inc., based in Austin, Texas

- A leading Cloud management and Enterprise Performance Management company
- Helps clients plan, manage, and govern the entire IT including IT outsourcing processes
- Consistently delivered next generation, standards-based, distributed infrastructure, applications and consulting services.

Signature programs:

- **Cloud Management platform:** A SaaS platform and services to enable cloud adoption
 - Plan, Manage and Govern IT applications in the Cloud
- **Multi-sourced Performance Management:** End-to-end managed services to provide Performance Visibility and Management of Enterprise IT
 - Plan, Monitor and Govern IT applications and vendor managed services
- **IT Consulting:** Technology Strategy, IT and operational consulting, and Cloud Training



What is C3?

The Customer Command and Control (C3) Portal - a monitoring and decision support system for DIR Communications Technology Services group.

Provides dashboards, scorecards, reports and analysis capabilities from the following perspectives:

- Operations Management – ACD, Incidents Analysis, Order Analysis
- Executive Dashboards
- Financial Analysis and Customer Spend Analysis
- Service Catalog administration

For DIR customers, the following functionality is enabled:

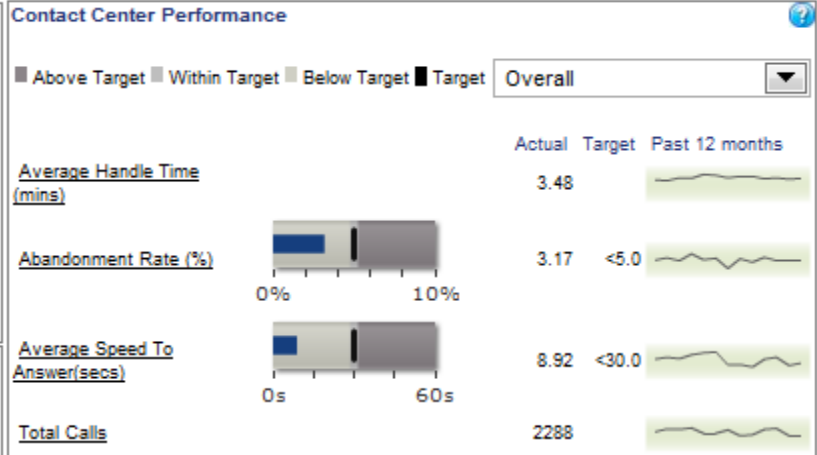
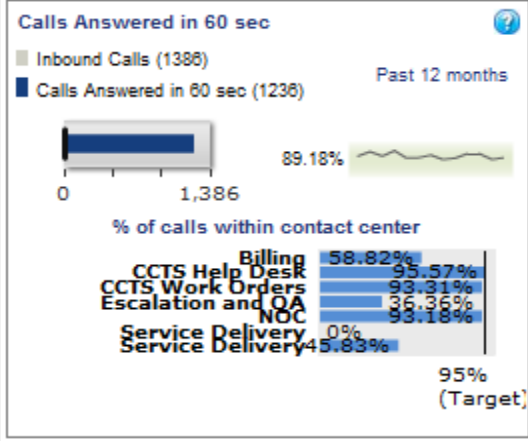
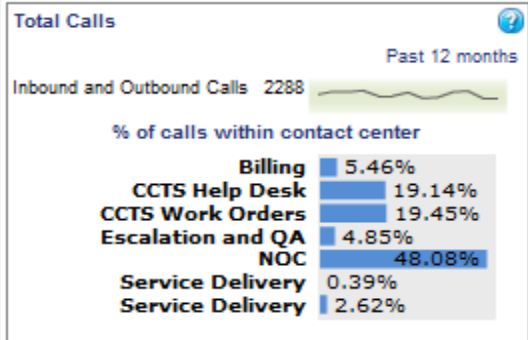
- Anonymous and registered customer access to services catalog
- Customer Self-service portal with notifications from DIR CTS staff, and access to their services spend and trend dashboards

Screenshot - 1



Notes

For Dec, 2011



Screenshot - 2

Notes
For Dec, 2011

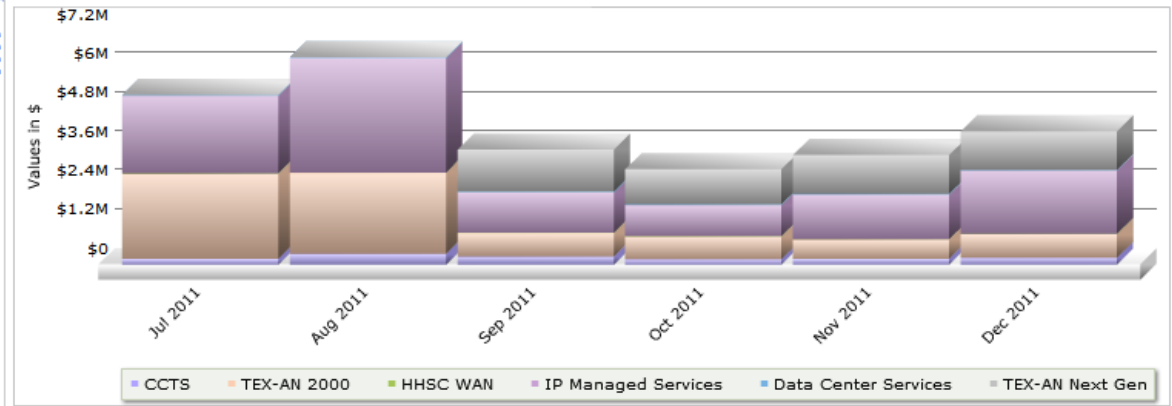
All financial numbers are representative test data only

Market Segment: All-Markets
Customer: Search [] Select a Customer: All-Customers
Vendor: All-Vendors

Monthly Charges - December 2011

Billing Categories	MRC	NRC	Usage	OCC	Total Charges
CCTS	\$176,300	\$33,999	\$0	\$0	\$210,299
TEX-AN 2000	\$725,617	\$972	\$0	(\$1,306)	\$725,283
HHSC WAN	\$7,606	\$0	\$0	\$0	\$7,606
IP Managed Services	\$1,284,474	\$2,298	\$0	\$656,286	\$1,943,059
Data Center Services	\$24,920	\$0	\$0	\$0	\$24,920
TEX-AN Next Gen	\$633,652	\$6,198	\$549,957	(\$1,088)	\$1,188,717
Total	\$2,852,568	\$43,467	\$549,957	\$653,893	\$4,099,885

Trends - July 2011 to December 2011



Screenshot - 3

Notes
For Dec, 2011

Market Segment: All-Markets

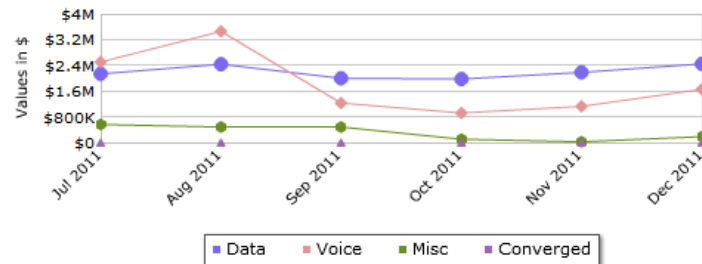
Customer: Search Select a Customer All-Customers

Vendor: All-Vendors

Charges by Service Type - December 2011

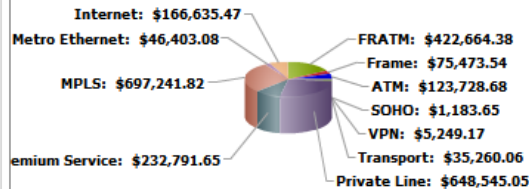
Service Type	Charges
Data	\$2,455,775
Voice	\$1,668,115
Misc	\$207,210
Converged	\$0
Total	\$4,331,100

Trends - July 2011 to December 2011



Service Categories - Data - December 2011

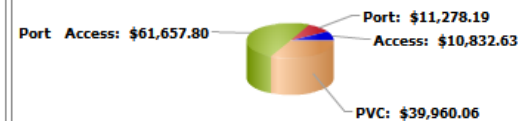
View sub category for: Select



Click on pie to view related sub category(s).

Total = \$2,455,775

Service Subcategories - Data - ATM - December 2011



Total = \$123,729

Screenshot - 4



Notes
 For Dec, 2011

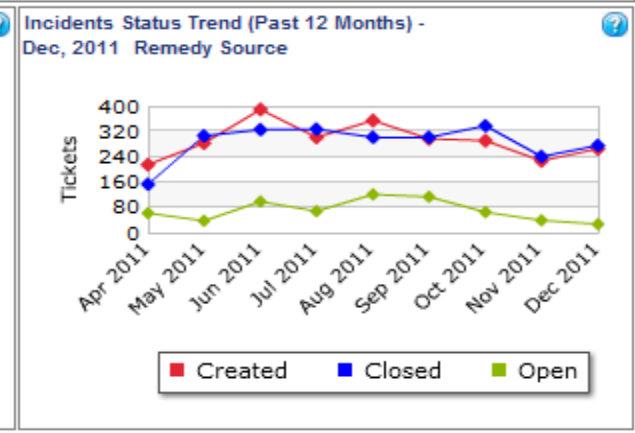
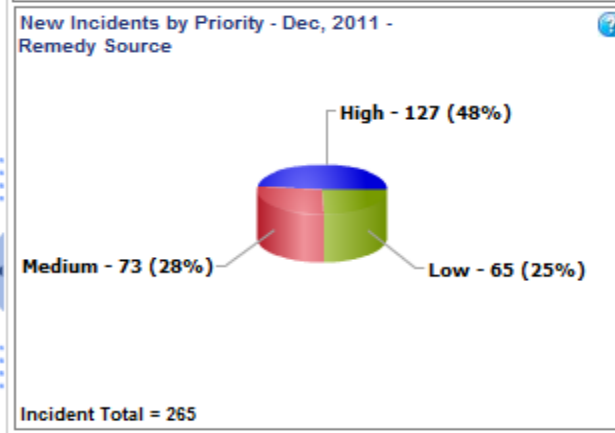
Filter by:

Customer: Search [Input] Select a Customer [Dropdown] [All-Customers] [Dropdown] [Search >>]

Vendor: [All-Vendors] [Dropdown]

Product/Service Category Service Area [All] [Dropdown] Category [All] [Dropdown] [Refresh]

Resolution Category



Incident Aging Summary - Dec, 2011 - Remedy Source

Aging Period	Ticket Priority			
	Critical	High	Medium	Low
0 to < 1 Day	0	2	0	0
1 to < 5 Days	0	3	1	0
5 to < 10 Days	0	0	2	0
10 to < 20 Days	0	0	8	1
20 Days or more	0	2	7	1

MTTR for Incidents (in Hrs) - Dec, 2011 - Remedy Source

Categories	MTTR (in hrs)
ATM	0.0
Frame	0.0
FRATM	0.0
INTERNET	0.0
n/a	0.0
Other Credits	0.0
ROLLUP	0.0

Screenshot - 5

PDF Export Functionality

Overall-Financial_FILE_NUMBER_1328635085167.pdf - Adobe Reader

File Edit View Window Help

Tools Sign Comment

1 / 1 100%

State of Texas
Department of Information Resources
Leadership for Texas Government Technology

Proprietary and Confidential

Overall Financial Summary Dec-2011

(Values in \$m)

(Note: The terminology and results reported in these tables used on these reports are intended to be from the perspective of CTS business areas and may not be consistent with those normally used by DIR Finance.)

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Gross Service Revenue	\$3.88	\$5.33	\$5.25	\$6.43	\$3.76	\$3.06	\$3.40	\$4.33
(Cost of Services)	\$3.36	\$8.08	\$4.49	\$5.59	\$2.85	\$2.26	\$2.66	\$3.33
Opr Rev before DIR Exp	\$0.52	(\$2.75)	\$0.76	\$0.84	\$0.91	\$0.80	\$0.74	\$1.00
(Expenses)	\$0.65	\$1.45	\$2.43	\$4.19	\$1.45	\$0.87	\$0.70	\$0.77
Operations Surplus (deficit)	(\$0.13)	(\$4.21)	(\$1.67)	(\$3.35)	(\$0.54)	(\$0.06)	\$0.04	\$0.23

Overall Financial Summary

Overall Trend - Jun 2010 to Dec 2011

Screenshot - 6

Text View for Overall-Financial_FILE_NUMBER_1328635386270 - Windows Internet Explorer

C:\Documents and Settings\Vamsi\Local Settings\Temp\Overall-Financial_FILE_NUMBER_1328635371055.html

Google

Text View for Overall-Financial_FILE_N...

Overall Financial Summary Dec-2011 Report

(Values in \$m)

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Category	(Cost of Services)	(Expenses)	Operations Surplus (deficit)
May 2011		3,361,050	648,367
Jun 2011		8,082,434	1,451,707
Jul 2011		4,486,127	2,430,911
Aug 2011		5,587,803	4,186,546
Sep 2011		2,848,871	1,453,995
Oct 2011		2,262,883	865,144
Nov 2011		2,658,820	700,948
Dec 2011		3,327,802	769,003

Category	(Cost of Services)	(Expenses)	Opr Rev before DIR Exp	Operations Surplus (deficit)	Gross Service Revenue
Sep 2010	3,072,894	1,854,560	786,456	-1,068,104	3,859,350
Oct 2010	2,752,672	1,419,959	173,162	-1,246,797	2,925,834
Nov 2010	2,864,000	270,500	270,500	500,000	2,814,500

Done My Computer 100%



C3 – Technologies used

- J2EE System
- Java Server Faces is the view that renders output to browsers
- Icefaces – Ajax implementation of JSF
- Java Beans to connect to the model Database for all data views
- Fusion Charts to represent data graphically
- Help+Manual 5 from EC Software GmbH



Section 2

Accessibility Requirements



Accessibility Requirements

- State of Texas Accessibility requirements for Electronic and Information Resources specified in 1 TAC Chapters 206 and 213
- The following sections of 1 TAC 206 and 1 TAC 213 are applicable to the C3 solution:
 - Section 206.50 – Accessibility and Usability of State Web Sites
 - Section 213.10 – Software Applications and Operating Systems
 - Section 213.15 – Functional Performance
 - Section 213.16 – Information, Documentation, and Support



Key Principles followed

- All information is available to all users
- No loss of usability for users who are able to see and understand visualizations through charts and other paradigms
- Information is not only available, but also is meaningful and clear for users using screen readers



Screen readers

- On all dashboards, pages and pop-ups, incorporate usable language/text to be used for screen readers such as JAWS
- The application should support alternative navigation using keyboard
- The application should support screen readers for reading alternative content for images
- All charts need alternate representation using text/data tables which can be read by screen readers
- All PDF export functions need equivalent 'Text export' function which has html/text instead of PDF and visual charts
- Help content should support screen readers



C3 Accessibility - Other

- Color Contrast
 - Support for low vision users by using the correct color contrast.
- Text Resizing
 - Support standard browser font resizing features
 - ‘A’, ‘AA’, ‘AAA’ font sizes – one click from browser
- PDF Export



Section 3

Testing Approach



Accessibility Testing Tools

- JAWS 13 Professional
 - A widely used Screen reader software
- WAVE - Web Accessibility Evaluation Tool (free)
 - [Webaim website](#)
 - Wave Toolbar for Firefox
- WCAG contrast checker (free)
 - Web Content Accessibility Guidelines (w3.org)
 - Toolbar for Firefox
- WAT (Web Accessibility Toolbar) for IE 7 (free)
- Manual Testing



Testing Approach

- Tested all pages using WAVE in Firefox for Web accessibility compliance
- For the same using WAT toolbar in IE
- Test all pages for Navigation and content using screen reader JAWS with Firefox and IE
- Check for color contrast issues in every page for foreground/background color combinations using WCAG analyzer
- Visual inspection by independent Testers to ensure emphasis and information is not color specific



Sample Summary Report

	A	B	BF	BG	BH	BI	BJ	BK	BL
1	Test Case #	Test Condition	Pages Tested	# Compliant	# Non Compliant	% Compliant	Risk Assessment	Accessibility Standard	Comments
2									
3	IMAGES								
4	1a1	Do all <image> tags have proper alternate text (alt attributes)? (Text Equivalents > List of Images)	32	32	0	100%	Low	206.5-A(1), 206.5-A(13(D))	
5	1a2	Do all link text appropriate text associated with the image link	31	31	0	100%	Low	206.5-A(1), 206.5-A(13(D))	
6	1b	Is the information communicated by complex images (graphs, flowcharts, etc.) also communicated in text format (either in the content or in a separate page linked from the image)?	15	15	0	100%	High	206.5-13(K) & 206.5-A(11)	Alternative has been provided to make the flash chart readable in Table Format(Skip Flash Chart Link)
7	IMAGE MAPS								
8	2a	Do <area> tags in client-side image maps have proper alt attributes?	0	0	0	NA	Not Applicable		
9	2b	Are server-side image maps only used when the regions cannot be defined with an available geometric shape?	0	0	0	NA	Not Applicable		
10	2c	Are redundant text links provided when a server-side image map is used?	0	0	0	NA	Not Applicable		



Sample JAWS Test results

	A	B	C	D	E	F
1	Test Case ID	Accessibility Standard	Function Area	Description/Title	Expected Result	Status
2	GR_JW_TC_01	JAWS	Quick Navigation Keys	Verify that previous page is loaded by hitting ALT+ Left or Backspace Arrow key of keyboard	Previous page should be loaded by hitting ALT+ Left Arrow key of keyboard	Pass
3	GR_JW_TC_02	JAWS	Quick Navigation Keys	Verify that Next page is loaded by hitting ALT+ Right Arrow key of keyboard	Next page should be loaded by hitting ALT+ Right Arrow key of keyboard	Pass
4	GR_JW_TC_03	JAWS	Quick Navigation Keys	Verify that cursor control is moved to Adress Bar by hitting ALT+ D key of keyboard	Cursor control should be moved to Adress Bar by hitting ALT+ D key of keyboard	Pass
5	GR_JW_TC_04	JAWS	Link Navigation	Verify that list of the links are displayed in blue color by hitting INSERT +F7 key of keyboard	List of the links should be displayed in blue color by hitting INSERT +F7 key of keyboard	pass
6	GR_JW_TC_05	JAWS	Heading Navigation	Verify that headings are listed by hitting INSERT +F6 key of keyboard	Headings should be listed by hitting INSERT +F6 key of keyboard	pass
				Verifv that cursor control is moved to		



Summary Results

Test Condition	Pages Tested	# Compliant	# Non Compliant	% Compliant	Risk Assessment	Accessibility Standard
IMAGES	32	32	0	100%	Low	206.5-A(1), 206.5-A(13(D)), 206.5-13(K) & 206.5-A(11)
IMAGE MAPS	0	0	0	N/A	Not Applicable	
TABLES	32	32	0	100%	Med & High	206.5-A(7)
FORMS AND PROMPTS	32	32	0	100%	Med & High	206.5-13(L) & 206.5-A(14), 206.5-13(L) & 206.5-A(14), 206.5-A(13(A)),
FRAMES	0	0	0	N/A	High	
CLIENT-SIDE SCRIPTING (such as JavaScript, Java applets, VBScript)	0	0	0	N/A	Not Applicable	
VIDEO	0	0	0	N/A	Not Applicable	
AUDIO	0	0	0	N/A	Not Applicable	
PLUG-INS OR EXTERNAL APPLICATIONS (such as Adobe Reader, Flash, MS Word, etc.)	0	0	0	N/A	Not Applicable	
ADDRESSING BLINDNESS, LOW VISION AND MOTOR SKILLS DISABILITIES	15	15	0	100%	High	206.5-A(3), 206.5-A(4), 206.5-A(15), 206.5-A(13(G)), 206.5-A(13(A))
OTHER						206.5-A(11), 206.5-13(K)



Section 4

Solutions Implemented



Navigation on a dashboard

- Complex navigation, that extensively used mouse more than keyboard.
 - Provide an alternative “hidden” navigation mechanism.
 - This “hidden” alternative navigation mechanism is only accessible by screen readers.
 - Provide mechanisms in the “hidden” navigation to directly access preferred section, in other words skip redundant sections.



Navigation example

Notes
For Dec, 2011

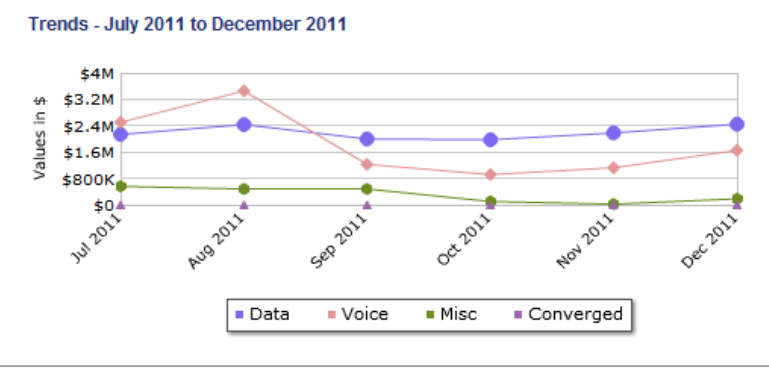
Market Segment: All-Markets

Customer: Search Select a Customer: All-Customers

Vendor: All-Vendors

Charges by Service Type - December 2011

Service Type	Charges
Data	\$2,455,775
Voice	\$1,668,115
Misc	\$207,210
Converged	\$0
Total	\$4,331,100



Service Categories - Data - December 2011

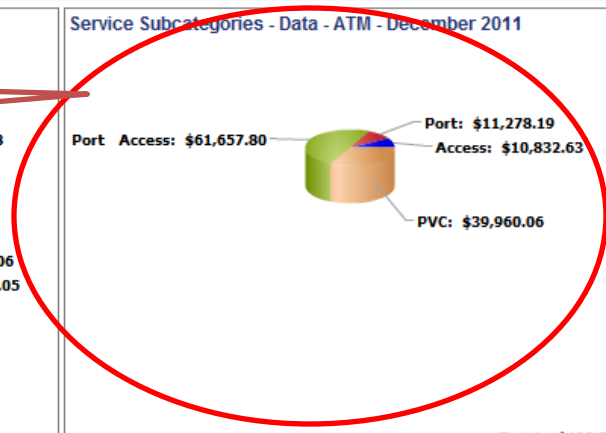
View sub category for: Select

Total = \$2,455,775

Service Subcategories - Data - ATM - December 2011

Total = \$123,729

Ability for users to jump directly to specific sections when using screen readers





Navigation - 2

- Converted all the auto submit fields into button action driven submits.
- Provided hidden labels for all submits.
- Enabled tab navigation using `` tags to manually control the tab order of navigation
- Ensured that alt text for images is meaningful and accurate



Navigation - 3

- Wherever an action is available by mouse click, enabled using “Enter key”
- All the titles in the pages to have separate titles
- Verified all headings in pages, and proper nesting of header tags.



Text Resizing

- Re-size text
 - Provided a text re-size mechanism
 - Ensured that layouts were not affected because of word wraps in the CSS that results in overlapping text when text size is increased
 - Single Javascript function across all the pages to increase/decrease the size of the text

Text Resizing example



Change Text Size
using these
controls or CTL+
and CTL- keys

DIR CTS Home

CTS Dashboards

Choose from the options below:

- Executive
- Operations
- Financial Analysis
- Service Catalog Administration
- Customer Cost Summary

CTS Dashboards

Choose from the options below:

- Executive
- Operations
- Financial Analysis
- Service Catalog Administration
- Customer Cost Summary

Latest Updates

- New C3 branding color and font changes
- Navigation changes Autocomplete changed to 'search' paradigm
- Navigation changes New 'GO' button for dashboard selection
- Orders & Incident Analysis loaded through Dec 2011
- Financial data loaded through Dec 2011
- Tex-AN NG Procurement is complete

Quick Links

- Remedy Login Page
- CTS Service Catalog Public View
- Texas.gov Website
- DIR Website
- Capitol Complex Telephone Directory
- Salesforce.com Login Page

Dept. of Information Resources

300 W. 15th St. Ste. 1300
Austin, TX 78701 [View MAP](#)
(512) 475-4700

Latest Updates

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- Navigation changes Autocomplete changed to 'search' paradigm
- Navigation changes New 'GO' button for dashboard selection
- Orders & Incident Analysis loaded through Dec 2011
- Financial data loaded through Dec 2011
- Tex-AN NG Procurement is complete
- Service Catalog updated to include amended pricing

Capitol Complex Telephone Directory

Salesforce.com Login Page

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Charts to Text View

- Approximately 70 charts/visualizations used in the system across 57 pages
 - The framework abstracted the source data for charts into a single series or a multi series (two models)
 - Eg., single series - a pie chart or a bar chart
 - Eg., multi series - a multi bar chart or a stacked bar chart
 - This basic feature of the framework allowed us to convert the “source” data into data tables
 - Finally our single point of rendering allowed us to render the data hidden right below the flash chart



Exports

- Each dashboard had a PDF export where the charts/dashboard info could be exported into a PDF for saving, emailing, printing etc.
- Implemented an alternate Text Export for all dashboards which could be used by a screen reader or a visually impaired user for saving, emailing and printing
 - Developed a generic text only export capability that rendered a pure text view of the charts and tables as just HTML that is readable by screen readers
 - Our frameworks allowed us to template the dashboard's layout as meta data structures
 - From that we extracted data to render text only output

PDF Export example

PDF Export Functionality

Overall-Financial_FILE_NUMBER_1328635085167.pdf - Adobe Reader

File Edit View Window Help

Tools Sign Comment

State of Texas
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Overall Financial Summary

Overall Trend - Jun 2010 to Dec 2011

Equivalent Text Export

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Oct 2010	2,752,672	1,419,959	173,162	-1,246,797	2,925,834
Nov 2010	2,864,000	2,370,500	270,570	5,000	2,211,540

Done My Computer 100%

- Auto Complete fields
 - Replaced autocomplete functionality with a type & search capability that is accessibility compliant
- “In Window” popup screens
 - Re-factored the screens that used ‘in window’ popup windows to open in a separate browser window
 - Opening in a new window allowed JAWS to pick it up



Debugging

- CSS was used extensively to debug the development to check the alternative data for the charts
- Toggle the CSS during development to view the data rendered



Section 5

Useful References



Useful References

- <http://www.section508.gov/>
- <http://www2.dir.state.tx.us/management/accessibility/Pages/Overview.aspx>
- <http://www.w3.org/standards/webdesign/accessibility>
- <http://www-03.ibm.com/able/guidelines/web/accessweb.html>
- <http://www.w3.org/WAI/>
- <http://www.w3.org/TR/WCAG/>
- Online website accessibility tool <http://wave.webaim.org/>
- Wave tool bar <http://wave.webaim.org/toolbar>
- Mozilla color contrast checker. <https://addons.mozilla.org/en-US/firefox/addon/wcag-contrast-checker/?src=search>
- List of tools for checking accessibility
<http://academics.georgiasouthern.edu/accessibility/docs/tools.html>
- WAT Toolbar: The Web Accessibility Toolbar is provided by the Web Accessibility Tools Consortium
<http://www.paciellogroup.com/resources/wat-ie-about.html>



Thank You!

Raghunath Sapuram
Chief Technology Officer
Gravitant, Inc.

©: (512) 731-9885

<http://www.gravitant.com>

DIR Cooperative Contracts

- DBITS - Application Maintenance and Support DIR-SDD-1757
- DBITS - Service Oriented Architecture (SOA) DIR-SDD-1757
- DBITS - Business Intelligence/Data Warehouse DIR-SDD-1757