

WebTAS User's Group 2004

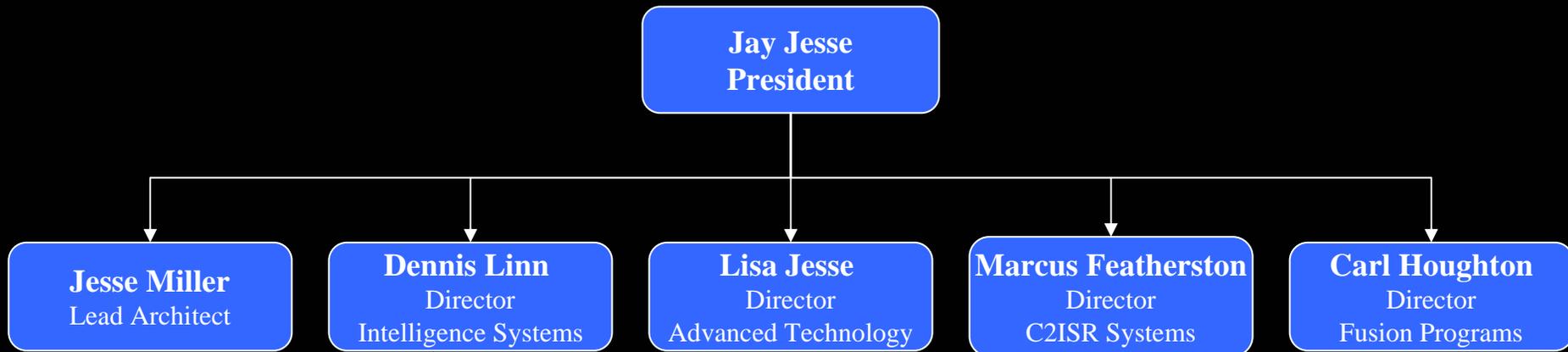
August 17, 2004



Our Team

- WebTAS Integrated Product Team
 - ISS Acts as the prime contractor
 - Northrop Grumman
 - Booz Allen
- Other WebTAS partners
 - Syracuse Research Corporation
 - Sierra Nevada
 - Lockheed Martin
 - SAIC
 - MITRE

ISS Organization by Project



• AF SPACECOM

- Task 22
- CIFA (Decker)
- CENTCOM
 - Several
- NSA, Homebase
- Sea Eagle
- Task 39, 40 JEFX
- Task 47
- Coast Guard
 - Several
- JIATFE
- SOUTHCOM
- MASINT – Ball
- MASINT- Kodak
- SOCCENT
- CENTAF

- FOCUS
- FEBO
- STORY PLANNER
 - One
 - Two
 - Three
- Jaguar
- ATL AOC
- AKMC

- TBMCS 1.1.3 (Decker)
- TBONE
- ICE-T
- SPATE (Moffatt, McLean)
 - Several
- OPEL
- FAST MAAP
- ARTK
- ACT
- TBMCS 1.1.4 Prep
- JTT
- TC Portal
- ICETOC
- JWIS Integration

- TUT
- MSDEC
- FSIS
- Rivet Joint
- EIFS
- NCSFIE
- FSNC

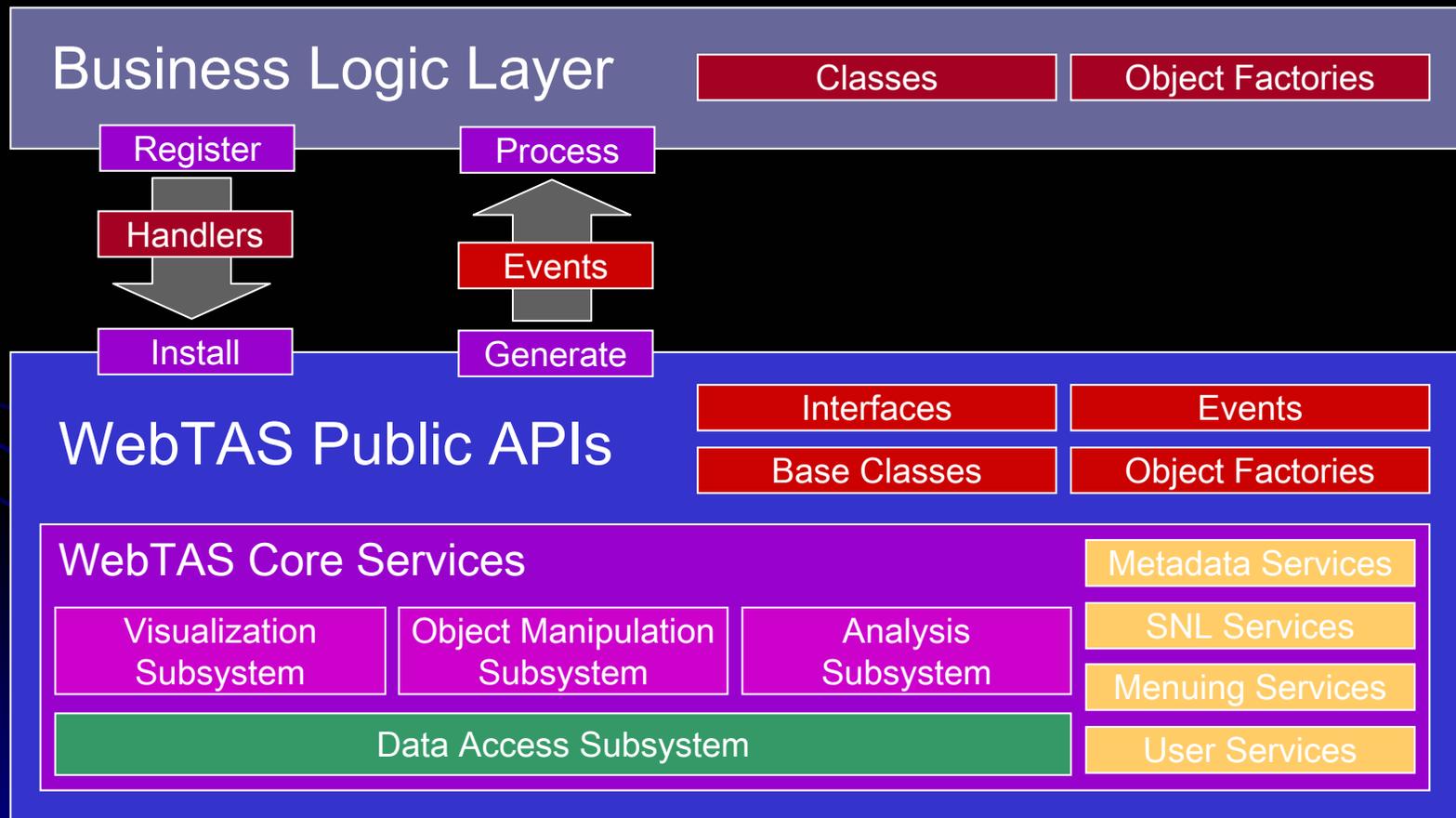
WebTAS Agility

WebTAS is both an out-of-the-box application that can be customized for many environments and a framework to build custom applications

- Configured Deployments
 - The WebTAS Domain Editor provides an administrative tool to register and setup existing data sources for use by WebTAS subsystems
 - User developed projects are work spaces that personalize WebTAS to an organization or individual
- Developed Deployments
 - Business work flow plug-ins can be developed to snap into the WebTAS framework and provide an organization with seamless integration with other systems and custom feel to meet a specific problem.
 - Custom JSP Web pages and applications can be built to provide pointed browser-based functions and reports.

Business Rule Plug-ins

The WebTAS framework allows for the development of workflow-specific plugins.



MAAP Toolkit

MAAP Toolkit is an example of a work-flow specific plug-in snapped into the WebTAS framework.

The screenshot displays the MAAP Toolkit interface within a Project Tool window. The main window title is "Project Tool - C:\WebTAS\projects\MAAP Lite\MAAP Planning Starter.wtprj - MAAP (ATO ID:MLF TNL:FD02 ACO:FD02)". The interface includes a menu bar (File, Edit, Project, Analysis, View, Window, Help, MAAP Toolkit), a toolbar, and a status bar showing the date "26 Sep 2002 06:00".

The central "Planning Map" shows a geographical map with various markers and flight paths. A "Deployed Units" table is overlaid on the map, listing aircraft types, unit IDs, base names, and available time ranges.

Row	AC Type	Unit ID	Base Name	N.	Time Range
1	B52H	11BS	DIEGO GARCIA	2	Sep 26 2002 07:34:27 - Sep 2...
2	A10	123FS	SHAIKH ISA	43	Sep 26 2002 07:34:27 - Sep 2...
3	F15E	123FS	SHAIKH ISA	38	Sep 26 2002 07:34:27 - Sep 2...
4	F16C	123FS	SHAIKH ISA	60	Sep 26 2002 07:34:27 - Sep 2...

A "Mission Parameters" dialog box is open, showing the following settings:

- Mission Type: ATK
- SCL: F15E 1
- Time Over (first) Target (TOT): 26 Sep 2002 08:30
- Use Simultaneous TOT for all Targets:
- Duration of Task (minutes): 15
- Package ID: ML3
- Number of Aircraft: 1

The "Package Timeline" at the bottom shows a sequence of mission events labeled ML1 through ML8. A "View Manager" on the right side of the interface lists various views and their counts, such as "Missions" (14), "Planning Map" (22), and "Assigned To Mission" (51).

Some of the Gov't Organizations ISS works with

- CENTCOM
- SOCOM
- NORTHCOM
- SOUTHCOM
- PACOM
- JIATFS
- NORAD
- USAFE
- JICPAC
- DIA
- CIFA
- NRO
- NSA
- State LEA (various)
- On Board A/C
 - Rivet Joint
 - EP3
- AFRL, AF C2B, NSWC
- NCIS
- AF OSI
- ONI
- AFCERT
- Air Force Air Operation Centers
 - PSAB/AI Udeid
 - 7th AF
 - 9th AF
 - 8th AF
 - CAOC/X
 - CAOC/N
 - 32AOG
 - More in progress
- SOCCENT
- CENTAF
- US Coast Guard
- Dept Homeland Security
- Various Special Ops orgs
- Various black orgs
- Marine Corps
- State Department
- Many other smaller orgs
- As a part of or cooperating with these programs
 - MAAP Toolkit
 - Air Refueling Toolkit
 - OPEL
 - NRO W3
 - AF SIPRNET Portal
 - Homebase
 - JTT
 - A2IPB
 - GCCS/I3
 - AFWS
 - SOCRATES
 - TBMCS
 - ITS
 - T-BONE

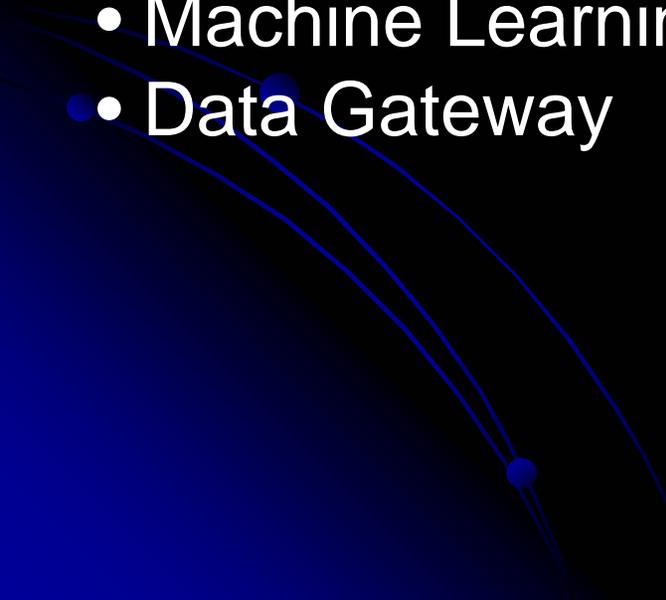
Many more

WebTAS Development Efforts

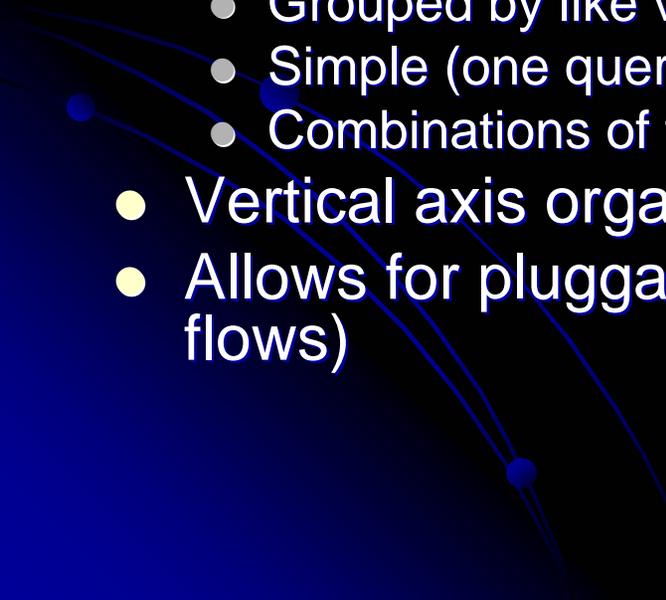
WebTAS is made up of a number of different programs funded by various organizations. At any given time there are approximately 30 different tasks in progress

- These projects fall into the following categories
 - Organizations funding enhancements to meet specific mission goals.
 - Organizations funding on-site support activities
 - Research and Development efforts to insert new technologies into the WebTAS baseline
 - O&M support to the WebTAS program (currently there is no formal, funded effort to sustain WebTAS. It is accomplished ad-hoc)

Some of the currently funded new developments

- New Time-Table Display
 - New Web/Browser Capabilities
 - Advanced Link Analysis Features
 - Dockable Windows and Displays
 - Machine Learning / Automated Model Creation
 - Data Gateway
- 

Timetable

- Timelines are more useful if combined with a Table
 - Vertically scrollable
 - Sortable
 - Easy to understand and use
 - Timeline vertical axis organization is data-driven and can be specified as:
 - Hierarchical (tree-based, recursive)
 - Grouped by like values (a la the Grid)
 - Simple (one query result per row, a la the Table)
 - Combinations of the above
 - Vertical axis organization de-clutters timelines
 - Allows for pluggable temporal renderers (e.g., mission flows)
- 

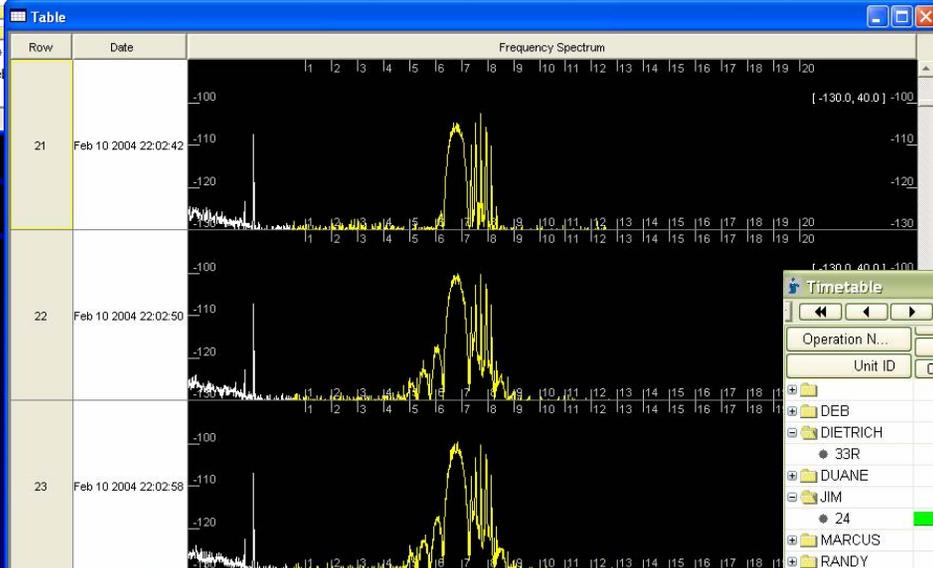
Timetable

Tree Table Timeline Example

Name	...	Wed 19 Feb	Thu 20 Feb	Fri 21 Feb	Sat 22 Feb	Sun 23 Feb	Mon 24 Feb	25/Tue
		AM	PM	AM	PM	AM	PM	AM
my model								
Feb 21 2003 12:46:49 - Feb 23 2003 06:32:28								
Feb 22 2003 06:18:19 - Feb 24 2003 08:29:39								
Feb 22 2003 14:13:46 - Feb 25 2003 11:59:47								
Feb 21 2003 12:07:54 - Feb 24 2003 06:12:40								
Feb 19 2003 22:23:21 - Feb 21 2003 05:08:09								
Feb 20 2003 23:33:52 - Feb 21 2003 12:56:35								
Feb 22 2003 12:15:05 - Feb 24 2003 11:41:00								
Feb 20 2003 21:30:52 - Feb 22 2003 04:32:05								
Feb 19 2003 00:24:50 - Feb 21 2003 07:46:35								
Feb 22 2003 04:59:51 - Feb 24 2003 09:01:47								
Feb 19 2003 23:00:25 - Feb 22 2003 06:19:39								
Feb 22 2003 19:21:46 - Feb 23 2003 11:19:17								
Feb 21 2003 15:37:23 - Feb 23 2003 05:12:47								
Feb 20 2003 00:07:34 - Feb 22 2003 22:55:05								
Feb 21 2003 11:16:06 - Feb 21 2003 21:43:07								
Feb 21 2003 04:54:59 - Feb 21 2003 19:36:00								
Feb 20 2003 21:21:29 - Feb 23 2003 12:34:18								
Feb 18 2003 22:42:32 - Feb 19 2003 23:40:57								
Feb 20 2003 04:47:35 - Feb 22 2003 09:11:40								

Timeline 1

Ref Number	Modify Date	MET Status	Qtr1			Qtr2		
			Jan	Feb	Mar	Apr	May	J
Root								
MET 1	Mar 17 2003 20:52:00	IN PROGRESS						
MET 2	Mar 17 2003 20:52:33	IN PROGRESS						
MET 2.1	Mar 17 2003 20:37:51	IN PROGRESS						
MET 2.2	Mar 17 2003 20:14:14	COMPLETE						
MET 2.3	Mar 17 2003 16:56:19							
MET 2.4	Mar 17 2003 16:56:19							
MET 3	Mar 17 2003 20:31:55	IN PROGRESS						
MET 4	Mar 17 2003 20:49:27	IN PROGRESS						
MET 5	Mar 17 2003 20:50:51	IN PROGRESS						
	Mar 17 2003 20:53:21	TO BE DETERMINED						
	Mar 17 2003 16:56:20							
	Mar 17 2003 16:56:20							



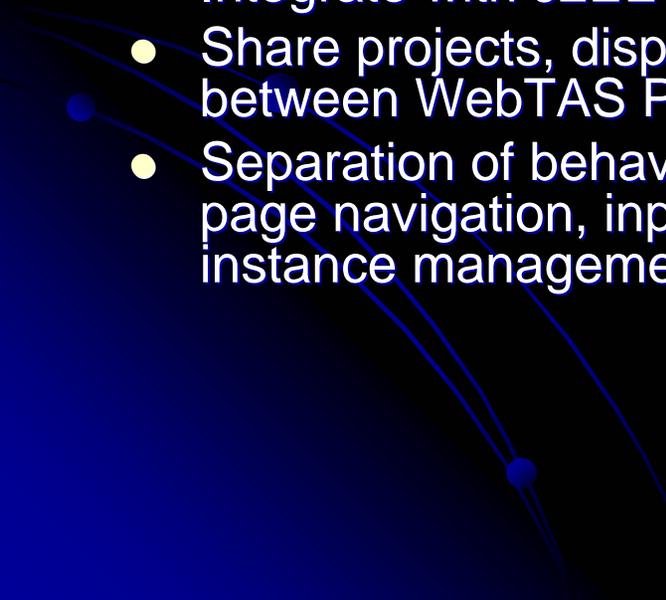
Timetable

Operation N... AM

Unit ID 00 01 02 03 04 05 06 07 08 09 10 11

- DEB
- DIETRICH
 - 33R
- DUANE
- JIM
- 24
- MARCUS
- RANDY
- SCOTT
- SS2

New Web/Browser Capabilities

- Leverage latest Web development technologies – Java Server Faces - to simplify building sophisticated web applications
 - Enable rapid development of custom JSPs to meet project specific objectives by non-programmers - significantly reduce life-cycle costs
 - Provide out-of-the-box portal capabilities that can be easily customized for specific environments
 - Provide new and upgraded components, e.g. TimeTable, Grid, Graph, Link Analysis, Map, Query Tool, and View Manager
 - Integrate with J2EE role-based authentication and authorization
 - Share projects, display properties and other configurations between WebTAS Project Tool and the Web.
 - Separation of behavior and presentation, event driven, easy page navigation, input validation, built-in error handling, bean instance management
- 

Example Portal – New Map Component

The screenshot shows a Microsoft Internet Explorer browser window titled "Display Map - Microsoft Internet Explorer". The address bar contains the URL `http://localhost/focus/tasmap.jsf`. The browser's menu bar includes File, Edit, View, Favorites, Tools, and Help. The toolbar features navigation buttons (Back, Forward, Home, Stop, Refresh), a search field, and various utility icons. The address bar also shows search engines like Google and MSN, and a list of links including My Yahoo!, Apache-Axis, Tomcat Server Administration, TAS IPT, and Colorado Springs Yellow Pages and Colorado Springs White Pages. The main content area displays a web application interface with a navigation bar containing tabs for "My WebTAS", "Query", "Map" (selected), "Time-line", "Graph", and "Table". Below the navigation bar, there are links for "Map Display" and "Save Map". The central part of the interface is a map of a region, likely the Tassal Peninsula, showing a cluster of purple diamond markers. To the left of the map is a control panel with input fields for "Map Height: 400", "Map Width: 600", "Latitude: 5.0", "Longitude: -71.0", "Pan Factor: 2", "Properties: cadrg", and "Scale: 5.0E7", along with a "Submit" button. To the right of the map is a vertical zoom control panel with "ZOOM IN" and "ZOOM OUT" buttons, and a series of zoom level indicators. Below the map, there is a "Queries:" section with a "Show" button and three checked checkboxes: "Show Guerrilla\ Front", "Show Kidnappings", and "Show Subversive\ Movement". The browser's status bar at the bottom shows "Local intranet".

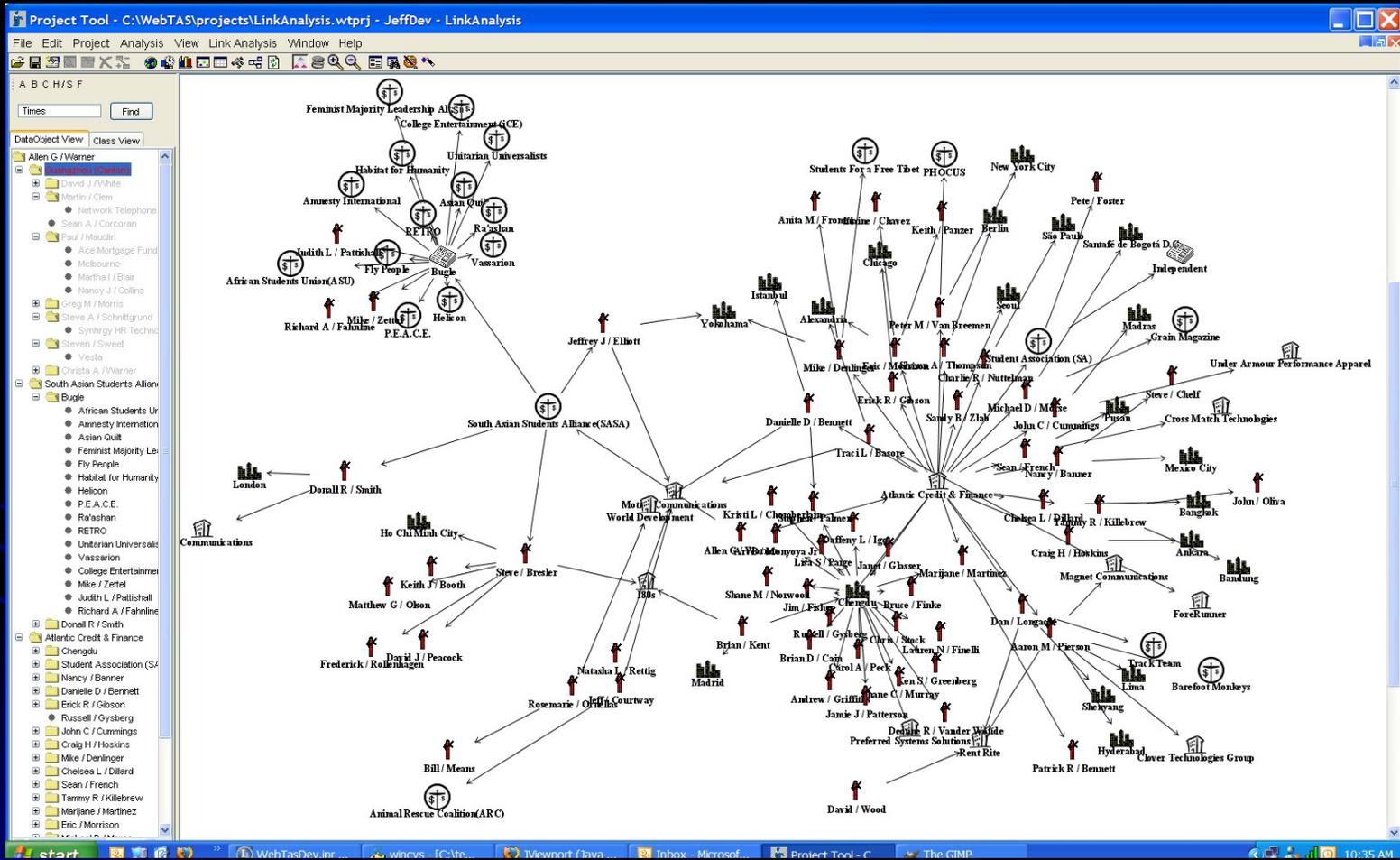
Enhanced Link Analysis Capabilities

- Capability to hide/display specific objects, object classes, and object trees
- Capability to add hypothetical relationships (without saving to database) to allow 'what if' analysis
- Capability to identify two objects and determine if the objects are related in some way.
- Capability to display two objects with a 'same as' relationship as one unit
- Capability to dynamically 'walk' the link chart to open new levels of relationships interactively as desired

Derived Relationships for Link Analysis

- Capability to use time and location to derive potential relationships across data sources.
 - “Show me persons from the Person database where the person was located within 1 mile and within 30 minutes of events in the Events database”
 - Results displayable in Link Analysis or other displays for quick interpretation
- Capability to use ‘fuzzy’ relationships across data sources
 - Domain administrator can define soft relationships between data sources. For example, several databases may have SSN data in them. Link analysis can be done to identify fuzzy relationships between persons in multiple data sources.

Link Analysis



Dockable Displays and Windows

- Dock windows on all four sides of the Project Tool main window
- Dock several windows in one area, displayed with tabs (and tabs within tabs)
- Place windows in auto-hide mode for optimization of screen real estate
- Float windows above the main window
- Dock windows in any combination within floating frames

Dockable Displays and Windows

Project Tool - C:\WebTAS_dev\projects\UG.wtprj - webtasdemo-access

File Edit Project Analysis View Window Help

Aug 08 2004 10:17:52 Aug 11 2004 10:17:52

Comm

Row	Object Id	Class	Source	Comm Level	Source Location	Source Locati...	Source Locati...	Date	Date_Start	Date_Stop	Status	Create Site	Modify Site	Create User
8	32	Communication	JOSE					Oct 07 2000 19:0...	Oct 07 2000 19:0...	Oct 07 2000 19:0...	PENDING	JIATFE	JIATFE	Administrator
9	33	Communication	JOSE					Nov 27 2000 11:...	Nov 27 2000 11:...	Nov 27 2000 11:...	PENDING	JIATFE	JIATFE	Jesseli
10	34	Communication	JOSE					Jan 02 2001 11:4...	Jan 02 2001 11:4...	Jan 02 2001 11:4...	PENDING	JIATFE	JIATFE	Jesseli
11	66	Communication	JOSE					Oct 06 2002 15:0...	Oct 06 2002 15:0...	Oct 06 2002 15:0...	APPROVED	JIATFE	JIATFE	Jay
12	67	Communication	JOSE					Oct 03 2000 15:1...	Oct 03 2000 15:1...	Oct 03 2000 15:1...	APPROVED	JIATFE	JIATFE	Jay
13	26	Communication	FATDOG	OTHER	120959N 071500...	12.17	-71.84	Oct 06 2000 18:3...	Oct 06 2000 18:3...	Oct 06 2000 18:3...	PENDING	JIATFE	JIATFE	Administrator
14	29	Communication	FATDOG		121105N 071515...	12.18	-71.86	Oct 07 2000 15:0...	Oct 07 2000 15:0...	Oct 07 2000 15:0...	PENDING	JIATFE	JIATFE	Administrator
15	30	Communication	FATDOG		121058N 071532...	12.18	-71.89	Oct 08 2000 15:0...	Oct 08 2000 15:0...	Oct 08 2000 15:0...	PENDING	JIATFE	JIATFE	Administrator

Site Activity Comm Tracks

Maritime

Timeline

Graph

SHOW Communication by Source, Name

Source	Communication Count
SUNRISE	2
011-506-456-8989	2
FATDOG	2
JOSE	3

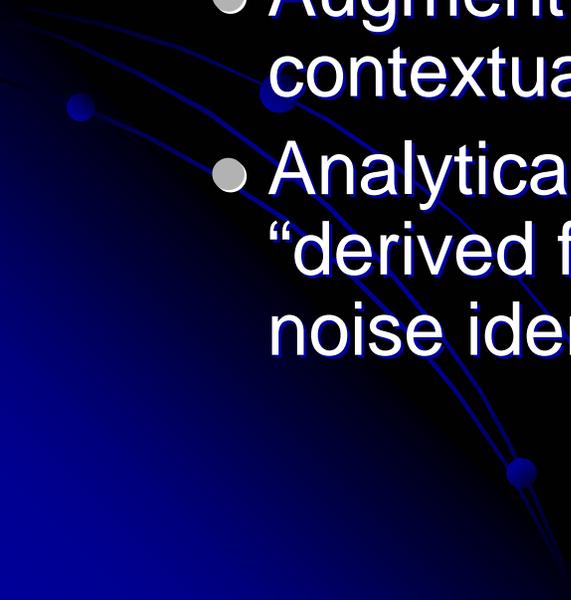
Current Selection: 2 Objects

Model - Trip Indicator [C:\WebTAS_dev\models\UG.wtvmnod] Graph

Automated Knowledge Model Creation (AKMC)

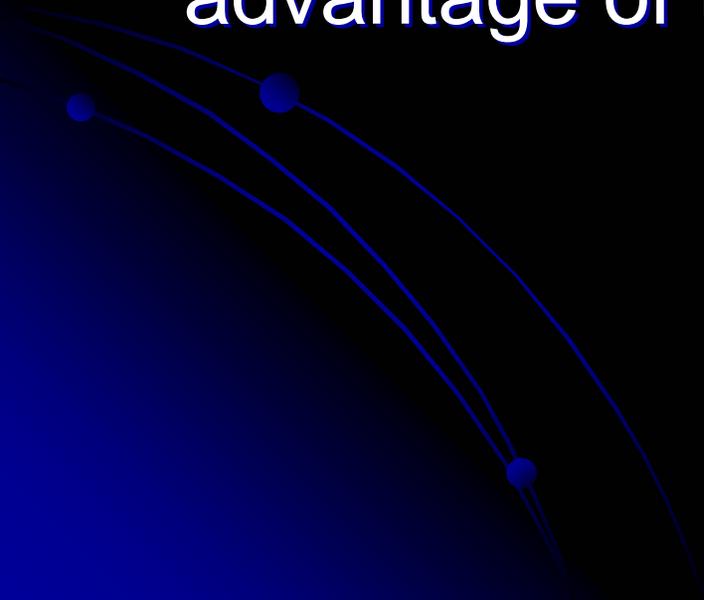
- Develop data mining and machine learning techniques that exploit historical data to define relevant patterns and encode the patterns in WebTAS TTMs for use by Level 2/3 fusion engines (e.g., K-PASA/RT.)
- Develop learning algorithms that evolve these models based upon recognized pattern deviations and anomalies.
- Focus on SIGINT domain as a case study.

AKMC Technical Approach

- Combine inductive and analytical learning methods to derive significant patterns from historical repositories
 - Inductive methods utilize example/counter examples.
 - Augment with analytical learning to exploit contextual knowledge.
 - Analytical methods help in discovering “derived features”, model generalization, and noise identification.
- 

Data Gateway

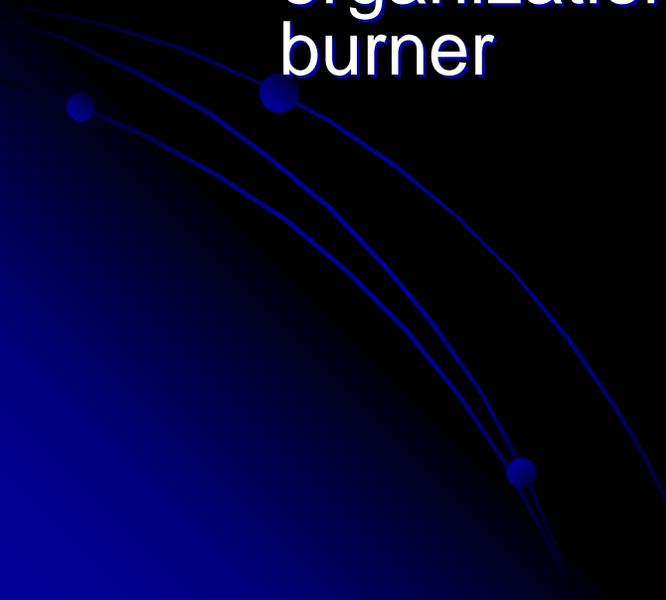
- WebTAS has a powerful, flexible data access infrastructure that allows the easy integration of multiple sources of data.
- Currently external systems cannot take advantage of this architecture.



Data Gateway

- The Data Gateway is a set of software services that provide access to the WebTAS data access infrastructure.
- Provides a platform and language independent client programming model -clients are written in the language of choice.
- Provides both ad-hoc query capabilities as well as a subscription service.
- Single interface that abstracts the details of the underlying sources so that as the data services and sources evolve, only the Data Gateway requires modification to adapt to these changes.

There are many organization-specific enhancements being developed

- Work flow specific features such as T-BONE, ICE-T, Story Planner, etc (Gary Hammond from the AFC2B will discuss some of these next)
 - Development of new data sources.
 - General WebTAS enhancements that organizations wish to bring to the front burner
- 

Some of the planned new developments

These are some of the general WebTAS projects that are in the funding pipeline but have yet to start

- Template-based model generation
- Advanced Alerting
- Object Oriented DB access
- Project Sharing/Collaboration
- C/JMTK Support
- Leverage/Enhance NSA Reasoning engines

- Panacia (discussed later)
- Horizontal Fusion Initiatives

Many more

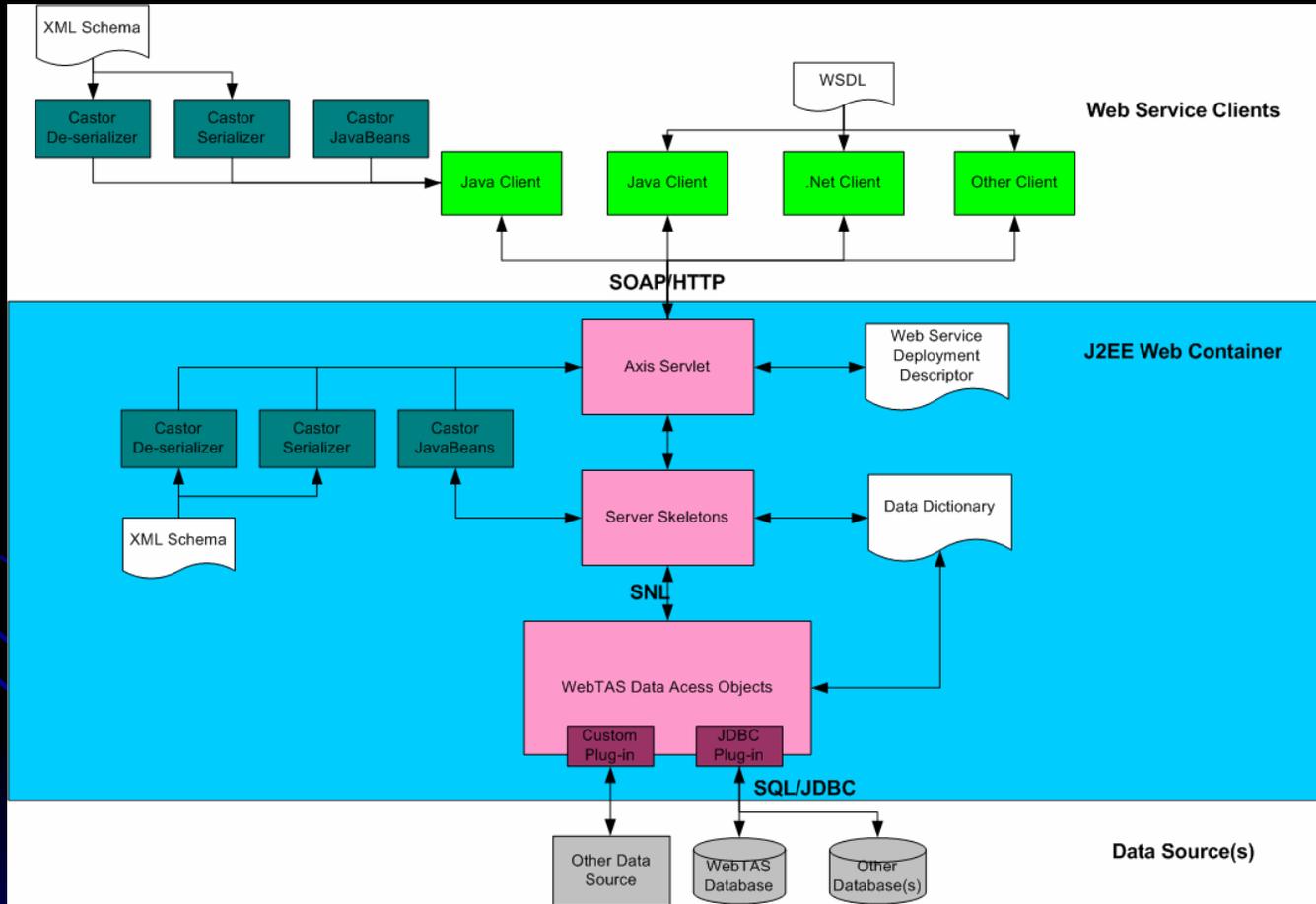
Backups



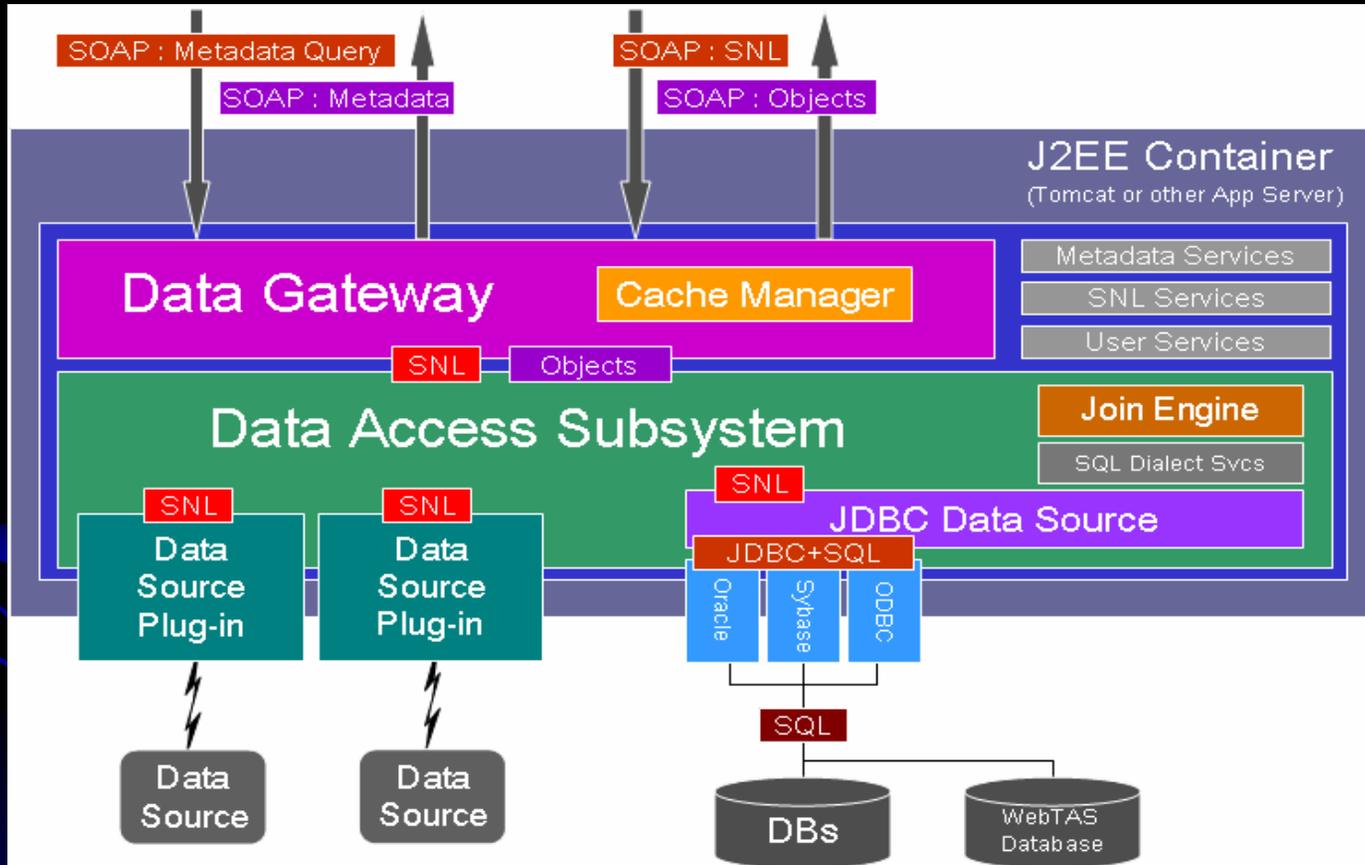
Data Gateway Technical Approach

- Data Gateway services are 'Web Services' and are based on standard, ubiquitous Web technologies; HTTP and XML.
- Built on the J2EE platform for scalability and high availability as well as platform and vendor independence.
- Messages are communicated using Simple Object Access Protocol (SOAP) over HTTP.
- Services are 'exposed' via Web Services Description Language (WSDL) to provide a normalized client programming model.
- Data sources are accessed using the operationally-proven WebTAS data access infrastructure.
- WebTAS Semi-natural Language (SNL) provides an open specification for requesting data regardless of data source.

Data Gateway Architecture



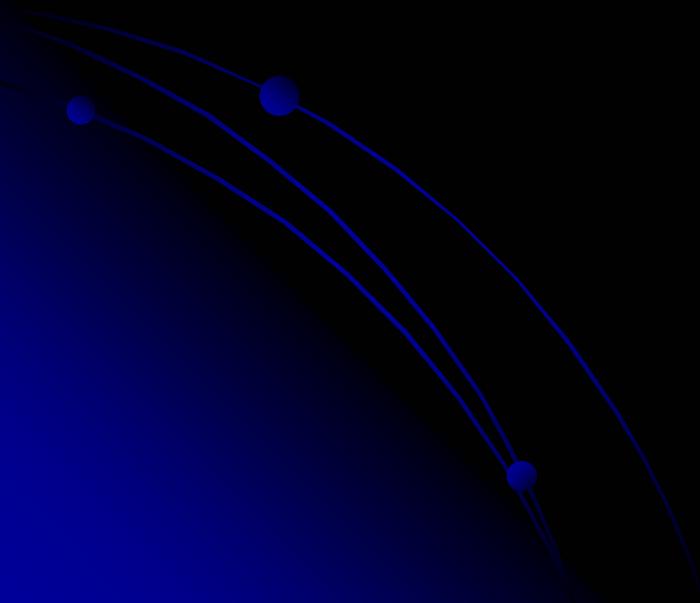
WebTAS Data Access Layer



Enhanced Link Analysis Capabilities

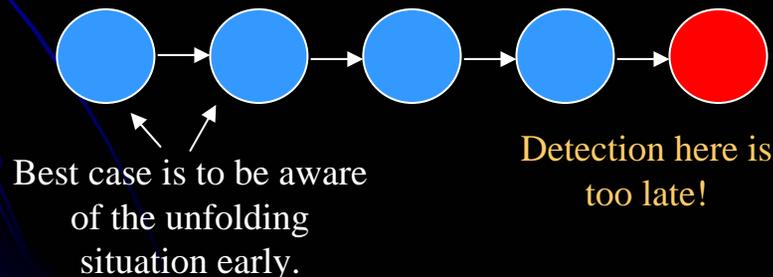
- Added capability to specify specific symbology for node types (Person, Organization, etc.)
- Added capability to tailor labels and links
 - Link Labels/Colors/Fonts
 - Node Labels/Colors/Fonts
- Layouts improved (Spring, Hierarchical.)
- Enhance link analysis capability to support tying data sources together via attribute pairing.
- For example, data source 1 has SSN info, as does data source 2. This capability will allow users to map this connection for exploitation by link analysis.

Machine Learning Background Slides



AKMC

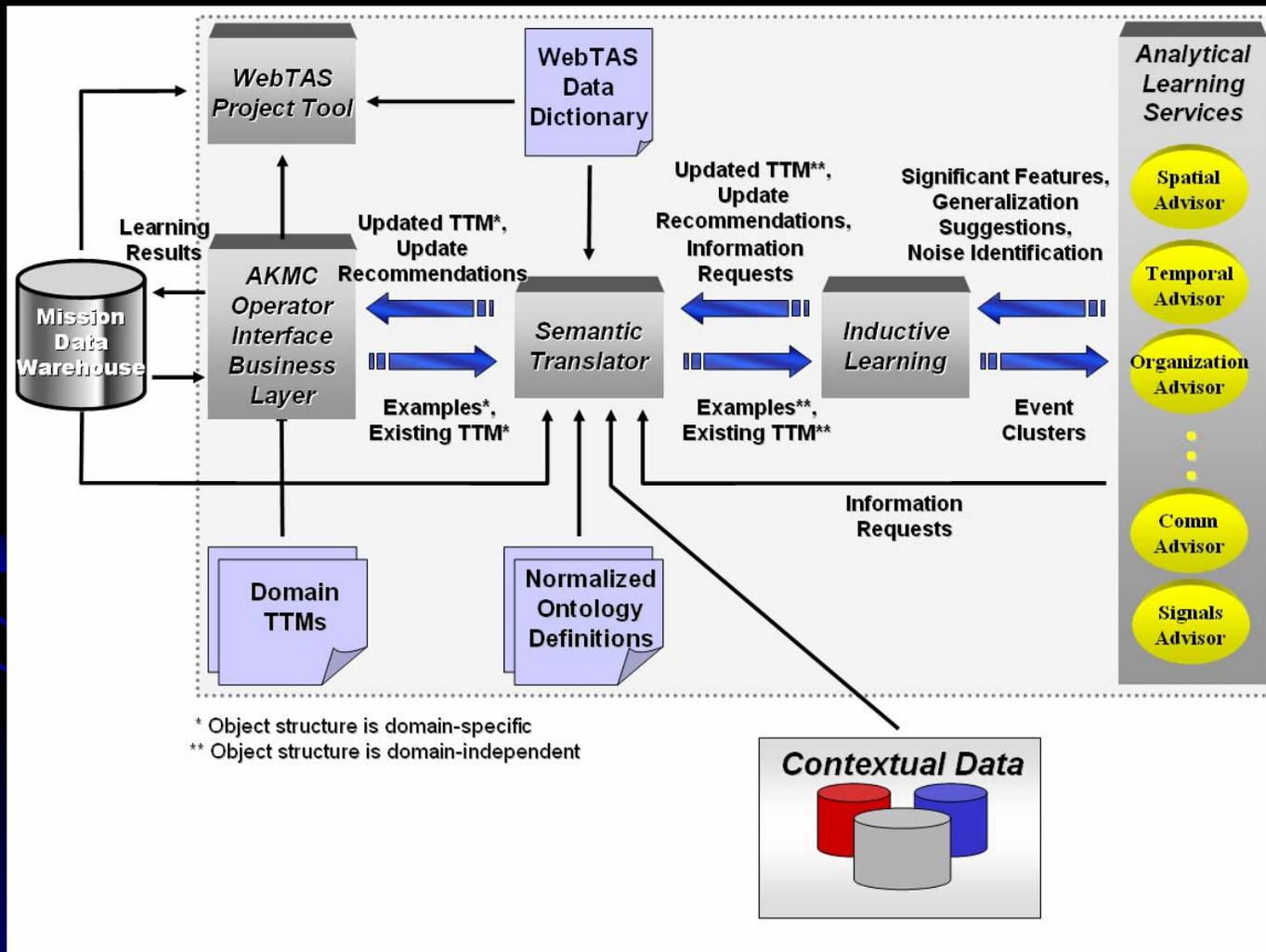
- Focus is on developing **behavioral models** using multiple intelligence sources.
- Behavioral models describe observable sequences of events that indicate a situation of interest.
- Attempt to detect the situation early in the sequence so predictions occur in time for effective course of action planning.



Importance of Automated Model Adaptation

- Behavioral models are in constant flux
 - Adversaries continuously change their modus operandi.
 - Changing collection systems and emphasis impact what we can detect.
 - Limited initial understanding.
- K-PASA/RT or other fusion engines can provide an automated mechanism for model adaptation.
 - Prune alternatives
 - Add additional pattern components
 - Adjust confidence
 - Newer examples have more weight than older examples.

AKMC Functional Architecture



Key Technical Challenges

- Feature selection
 - n-dimensional feature space (temporal, spatial, inter-entity relationships, etc..)
 - Key features are often not explicit in the event data
- Sparse and incomplete historical and contextual data.
- Determining what patterns are meaningful.
- Common confidence scheme.
- Lack of data semantics in WebTAS.