University of Maryland University College

Tableau for the Enterprise:

Making the right design decisions

Devdutta Bhosale
University of Maryland University College
2015 HEDW Conference

Agenda

- UMUC and Office of Analytics
- Why Tableau?
- Design, Architecture & Performance
- Demo
- Lessons Learned
- Q&A

Office of Analytics

Mission

The Office of Analytics partners with key university stakeholders to evaluate performance metrics, analyze trends and monitor progress toward strategic and operational goals.

12 Staff

- VP of Analytics (Cabinet Level)
- Analysts

  SQL skills, relationship building, etc.
- ETL Developers

  Advanced SQL, ETL Tool and DBA skillset
- BI Architect

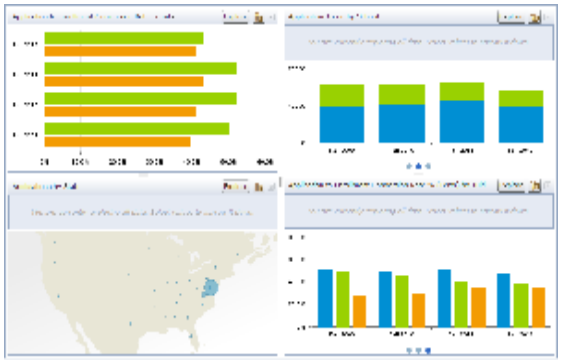
  metadata design, BI infrastructure, admin/security

Subject Areas

- Executive
- Academic Programs
- Faculty
- Marketing
- Enrollment Management
- Retention
- Finance
- Service Center

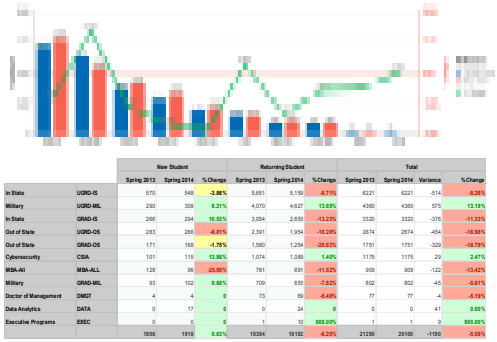
Services

Metrics Dashboards



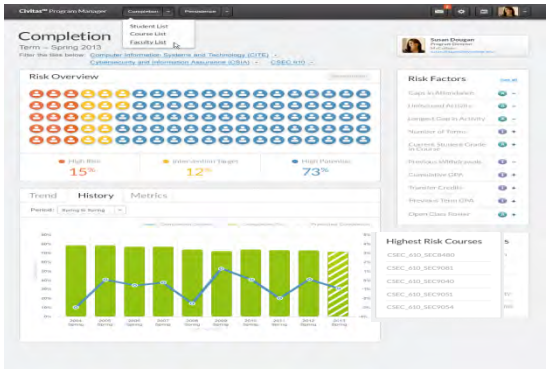
Operational Reporting

Variance Analysis

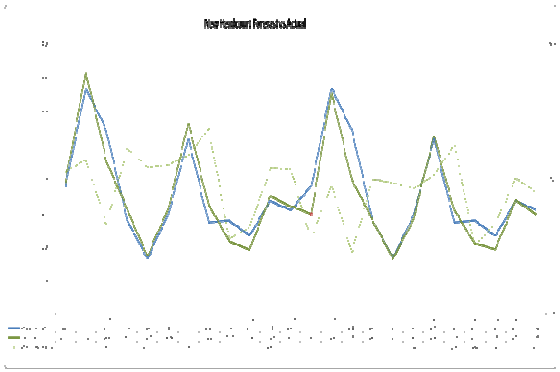


		New Student			Returning Student			Total			
		Spring 2013	Spring 2014	% Change	Spring 2013	Spring 2014	% Change	Spring 2013	Spring 2014	Variance	%Change
In State	UGRD-IS	570	548	-3.86%	5,651	5,159	-8.71%	6221	6221	-514	-8.26%
Military	UGRD-ML	290	308	6.21%	4,070	4,627	13.69%	4360	4360	575	13.19%
In State	GRAD-IS	266	294	10.53%	3,054	2,650	-13.23%	3320	3320	-376	-11.33%
Out of State	UGRD-OS	283	266	-6.01%	2,391	1,954	-18.28%	2674	2674	-454	-16.98%
Out of State	GRAD-OS	171	168	-1.75%	1,580	1,254	-20.63%	1751	1751	-329	-18.79%
Cybersecurity	CSIA	101	115	13.86%	1,074	1,089	1.40%	1175	1175	29	2.47%
MBA-All	MBA-ALL	128	96	-25.00%	781	691	-11.62%	909	909	-122	-13.42%
Military	GRAD-ML	93	102	9.68%	709	655	-7.62%	802	802	-45	-5.61%
Doctor of Management	DMGT	4	4	0	73	69	-5.48%	77	77	-4	-5.19%
Data Analytics	DATA	0	17	0	0	24	0	0	0	41	0.00%
Executive Programs	EXEC	0	0	0	1	10	900.00%	1	1	9	900.00%
		1906	1918	0.63%	19384	18182	-6.20%	21290	20100	-1190	-5.59%

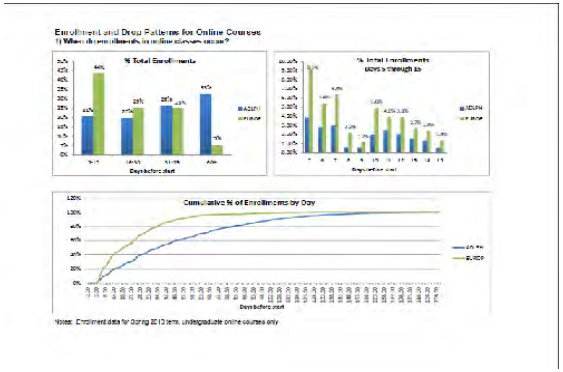
Predictive Applications



Forecast Modeling



Ad Hoc Reporting

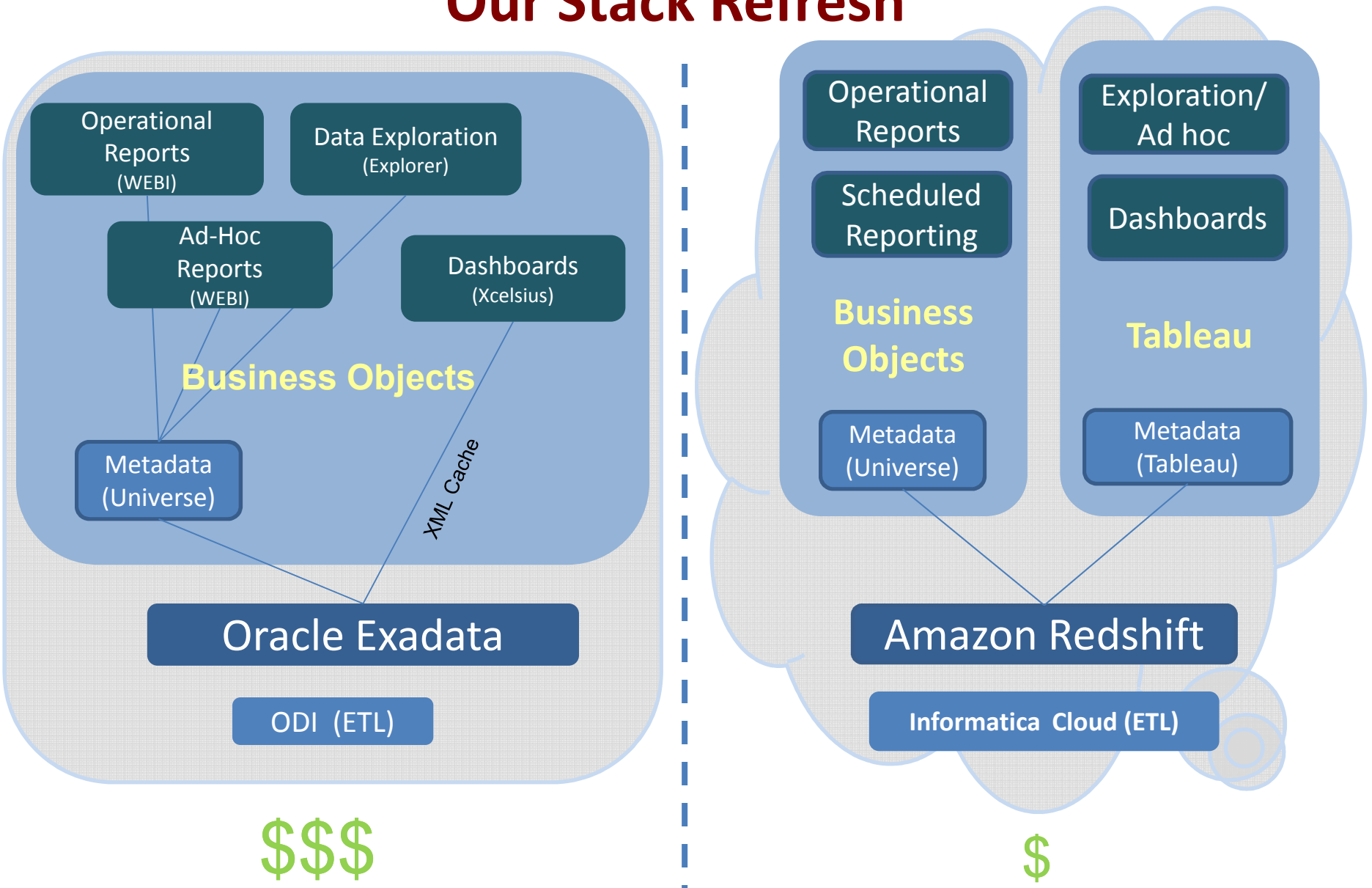


Guiding Principles

- ✓ Build a data infrastructure that facilitates easy access to data
- ✓ Combine disparate data sources to provide an end-to-end view of the student
- ✓ Create dashboards that aggregate, trend and show variances
- ✓ Always build in a 'drill to detail'
- ✓ Provide visually engaging tool sets that foster data exploration
- ✓ Retire legacy reporting over time and not with a big bang
- ✓ Build the brand!

UMUC Trends
Analytics in Action

Our Stack Refresh



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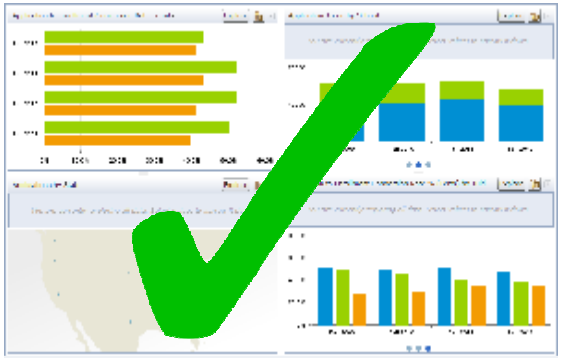
Why Tableau?

Source: Gartner (February 2015)

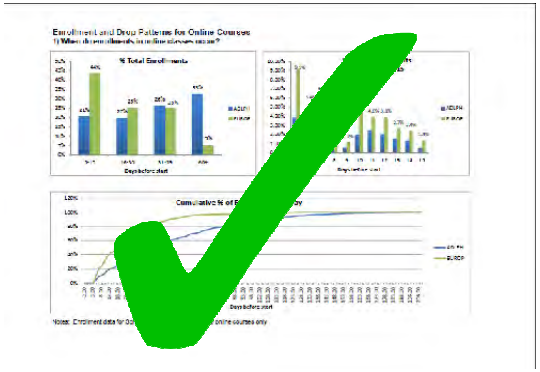
Reporting and Analysis Needs

Dashboards

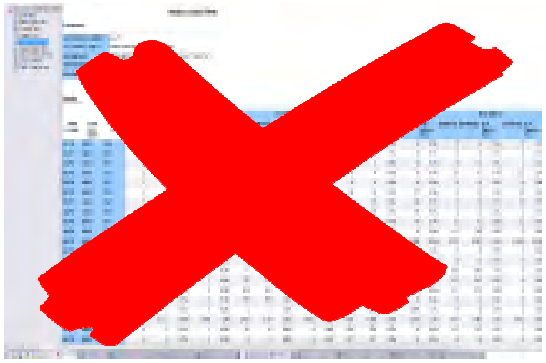


Data Discovery

Ad Hoc Reporting



Operational Reporting



Design, Architecture, and Performance

Architecture Design Goals

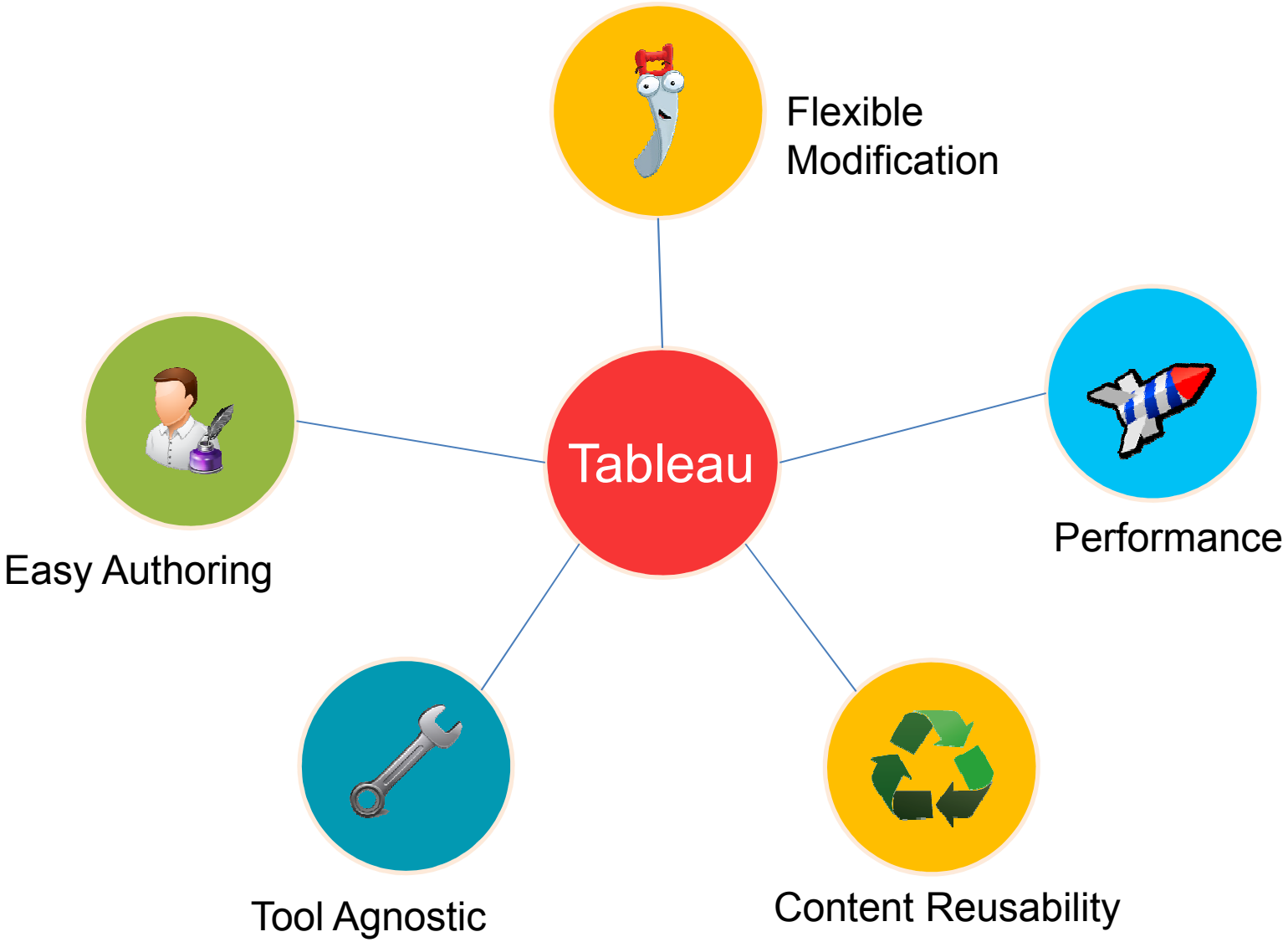
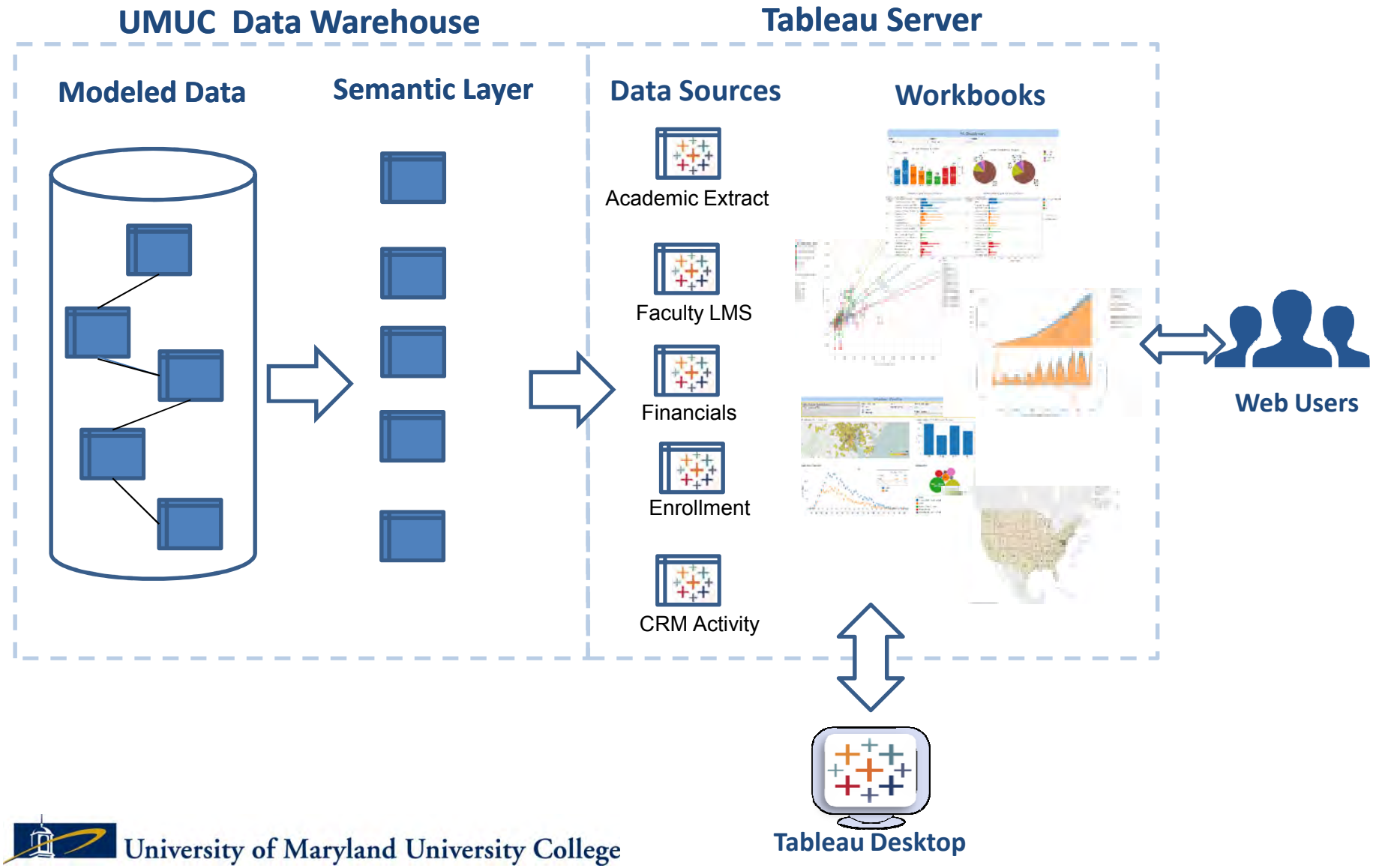
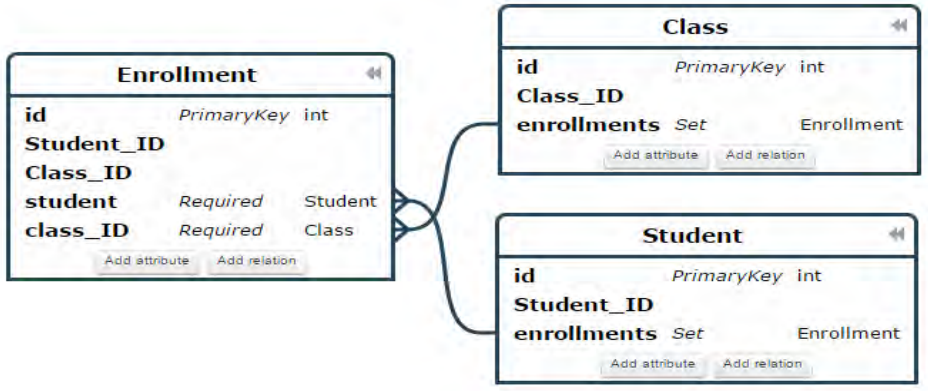


Tableau Architecture

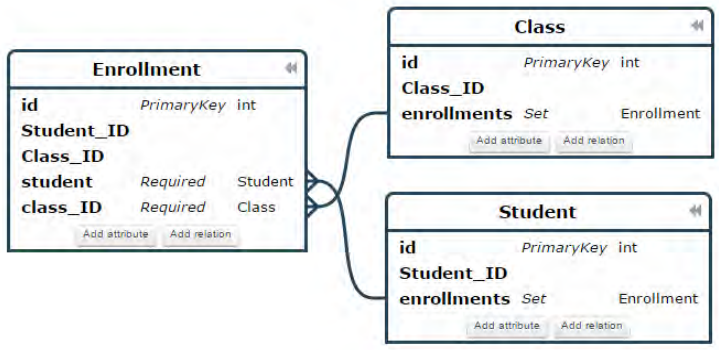


Metadata Management in Tableau - **Constraints**

	Business Objects Universe	Tableau
Derived Tables	✓	✗
Dynamic SQL generation	✓	✗
Data Federation	✓	✗
Data Source Replacement	✓	✗
Performance	A minute or more	Less than 5 seconds
Interesting Visualizations with fast time to market	✗	✓

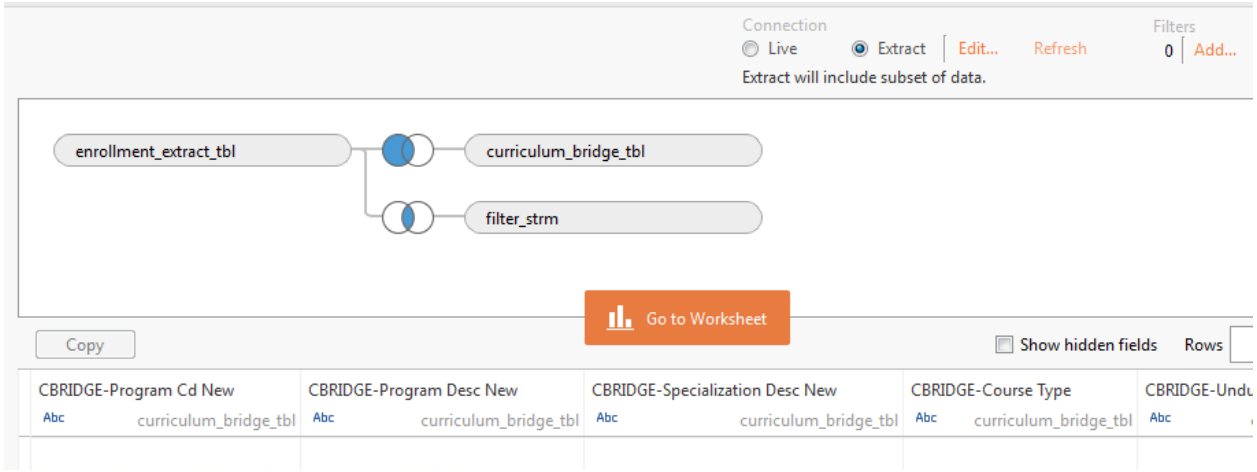


Metadata Management in Tableau - **Design**



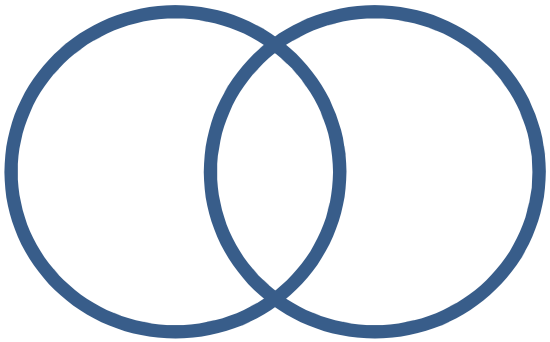
DB Procedures, Views, ETL

ENRL_HEADCOUNT	ENRL_ADD_DATE	ENRL_STATUS	ENRL_CREDIT_HRS	STUDENT_NAME	STUDENT_GENDER	STUDENT_ID	CLASS_SECTION	CLASS_NUMBER	CLASS_START_DATE
1	1/1/2014	E	3	JOE SMITH	M	1234	100	5656	1/20/2014

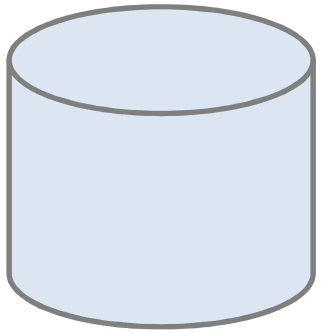


Combining Data Sources

Blending
(in Tableau)

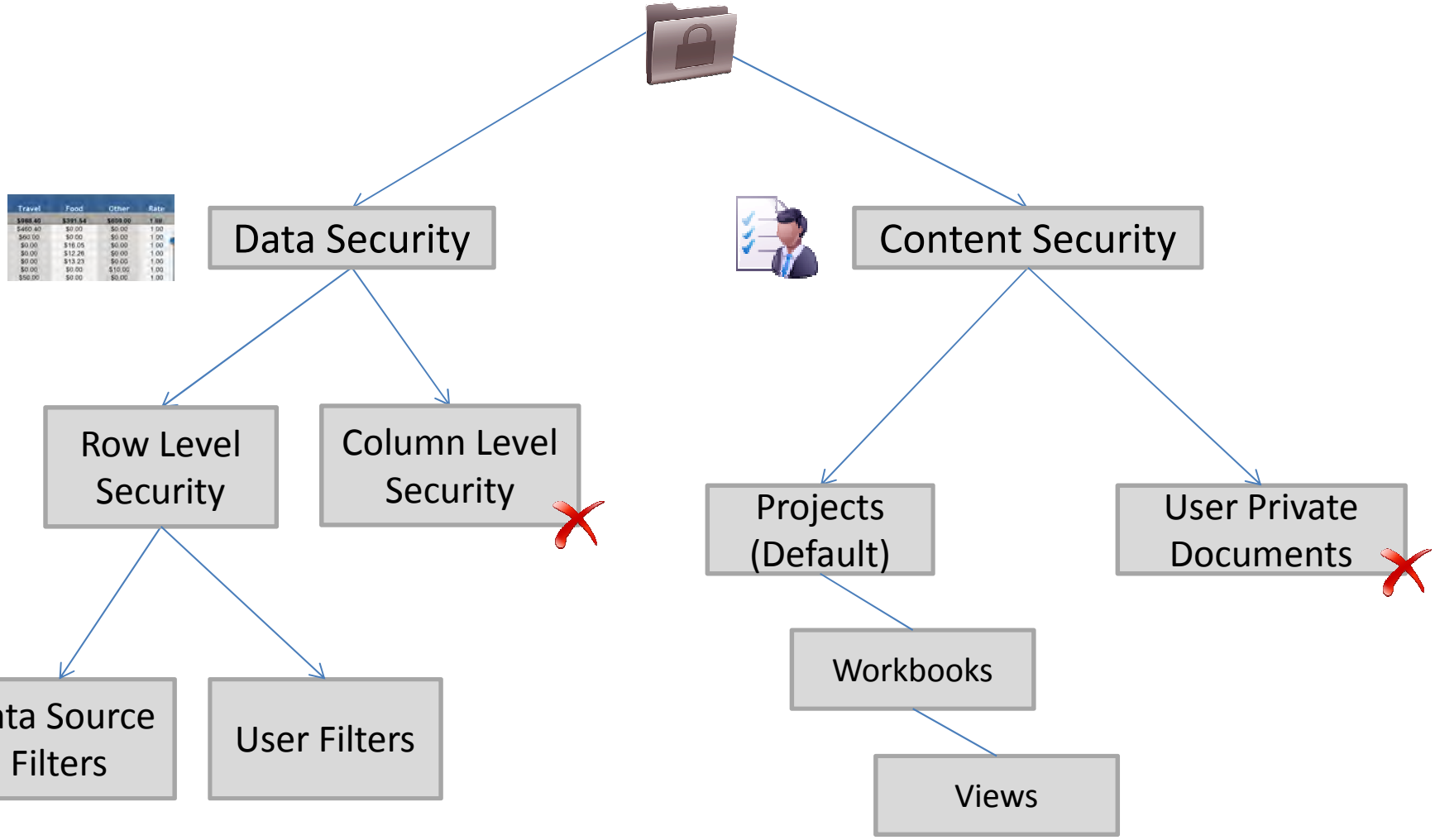


Data Connection
Joining
(in Tableau)



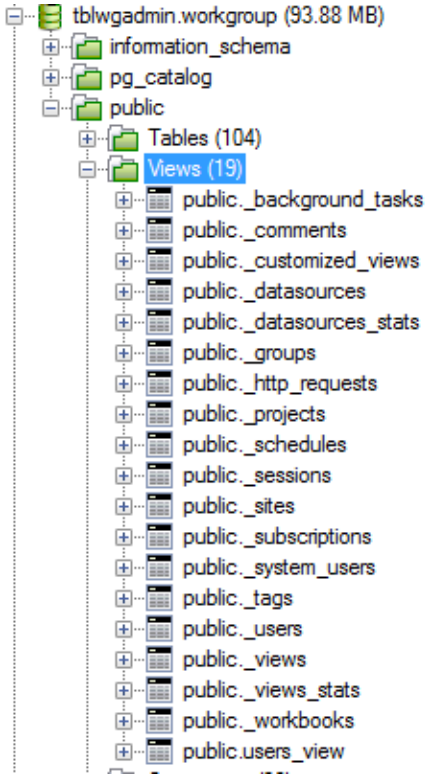
Semantic Layer
(in database)

Security in Tableau Server



UI and UX Customizations

Custom landing dashboard and Tableau's internal database



Source: http://ugamarkj.blogspot.com/2013/11/customizing-tableau-server-experience.html

Dashboard Performance

- A typical dashboard fires 10s of queries against a data source
- How you design your dashboard can have greatest impact on performance

Extract vs. Live Query

- Extracts are a great tool to solve performance problems with medium sized data sets
- Whenever possible, always use live connections
- For multi table joins, creating summary tables or materialized views is beneficial with live connections
- For live connections, a High Performance Computing cluster is recommended

- How did we learn about performance improvements?
  - Our friend Google
  - Tableau Performance Tool
  - Tableau Support
  - Consultant

Key Takeaways

- *Tableau is a great tool that can produce quick results, but careful planning is required for a truly scalable and flexible solution*
- *Tableau can augment your BI stack, not replace all features*
- *Focusing on metadata layer upfront can lead to significant benefits down the road*
- *Some enterprise features are truly lacking*

Thank you!

Tableau for the Enterprise:

Making the right design decisions