Visual Analytics for Heavy Oil Production Optimization

Corvelle Drives Concepts to Completion

Yogi Schulz
Biography

- Partner in Corvelle Consulting
- Information technology related management consulting
- Microsoft Canada columnist & CBC Radio guest
- PPDM Association board member
- Industry presenter:
  - Project World - 6 years
  - PMI – SAC - 3 years
  - CIPS – many years
  - PPDM Association - several years
Visual Analytics for Heavy Oil Production Optimization

Data Volumes Growing every Year

Value of Visual Analytics

“Without data you’re just another person with an opinion.”
– W. Edwards Deming
Having all this production data available is great, but I think I need a degree in data analytics to sort it all out.

Impediments to Achieving Value

- Poor data access
- Inadequate data quality
- Hand-crafted data integration
- Poor data presentation
- No query flexibility
- Poorly organized implementation project
Visual Analytics for Heavy Oil Production Optimization

Visual Analytics Software Packages

- Spotfire
- Tableau
- QlikView
- Verdaazo

Poor Data Access

- Impediments
  - Many unique user interfaces
  - Multiple, distinctive data definitions
  - Multiple proprietary database schemas
- Solutions
  - Provide a single user interface that can query, report, graph and export data
  - Build database access once
**Oil & Gas Data Access**

**Context Diagram**

- Daily Production data
- Monthly Financial data
- Monthly Public well data
- Monthly Proprietary well data
- Monthly Public Frac data
- Monthly CAPEX Forecast data

**Optimizing Frac Design**

**12 Month Cumulative Gas Per Well Grouped by # of Stages**

- More production
Inadequate Data Quality

- Impediments
  - Inadequate training
  - Lack of appreciation for data quality

- Solutions
  - Provide functionality to report data disconnects
  - Report data issues to those entering data

Visualizing Data Quality
Hand-crafted Data Integration

- Impediments:
  - Time-consuming, hand-crafted, complex Microsoft Excel routines
  - Excel routines susceptible to data problems and subtle bugs
  - Excel routines must be run and tweaked regularly

- Solutions:
  - Make disparate database schemas appear uniform and integrated
  - Build data integration once

TIBCO Spotfire Native Connectors

- Amazon Redshift
- Apache Spark SQL
- Cloudera Impala
- HP Vertica
- IBM DB2
- IBM Netezza
- Microsoft SQL Server
- Microsoft OData
- Oracle
- Oracle Essbase
- OData
- PostGreSQL
- Salesforce.com
- SAP HANA
- SAP NetWeaver
- Teradata
- Teradata Aster
Poor Data Presentation

- Impediments
  - Reporting and graphing tools limitations

- Solutions
  - Multiple, color-coded time series of data
  - Robust drill-down capability
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Producing Property Profitability Analysis

Robust Drill-down Capability
When you two have finished arguing your shaky opinions, I have actual data!

No Query Flexibility

- **Impediments**
  - Limited to predefined queries and reports
  - Revised queries or reports require service request
- **Solutions**
  - Rich user interface to construct reports in real-time
  - Ability to save queries and reports for reuse later
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**Visual Analytics Application Context Diagram**

- Datastores
- VA app Update
- VA app Configuration data
- Visual Analytics Application
- VA app Summary data
- Graphs
- Tables
- Reports
- Exports

**Comparison of Actuals Sales to Estimates**

- Estimates far exceed Actual Sales
- Actual Sales far exceed Estimates
Poorly Organized Implementation Project

<table>
<thead>
<tr>
<th>Impediment</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor pre-sales demo risk</td>
<td>Avoid pre-sales demo</td>
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<tr>
<td></td>
<td>Explain differences from reality</td>
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<tr>
<td>Technologists imposing scope</td>
<td>Avoid out-of-scope work</td>
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<tr>
<td></td>
<td>Link work to business goal</td>
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<tr>
<td>Cadillac DBMS</td>
<td>Avoid over-kill product</td>
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<tr>
<td></td>
<td>Link product to business goal</td>
</tr>
<tr>
<td>To move or not to move data</td>
<td>Avoid elegant solution</td>
</tr>
<tr>
<td></td>
<td>Let data sit; costs nothing</td>
</tr>
</tbody>
</table>

What is well downtime costing your company?

![Lost Production (Diagnostic Measure of Downtime)](chart.png)

- Lost Production
- Actual Production
Visual Analytics for Heavy Oil Production Optimization

Visual analytics is about:

A. Displaying lots of data as pretty pictures
B. Using overly complex terms as a way of charging more for software licenses
C. Representing data analysis and insights in ways that resonate
D. Over-analyzing data to avoid reaching any actionable conclusions
Recommendations

- Improve your data management processes
- Identify operational problems
- Select visual analytics software
- Pilot software package to operational problem
- Build on pilot success

Questions & Discussion

Can you help us achieve more production from visual analytics?

Please fill out evaluation form
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Corvelle Bibliography

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