



.conf2015

Predict, Alert, Manage, and Optimize an Ecosystem with Splunk

Tom Twait & Chris Hogan
Cerner
EDI Manager, Sr. EDI Solution Architect



splunk®

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- In addition, any information about our roadmap outlines our general product direction and is subject to change at any time without notice. It is for informational purposes only and shall not, be incorporated into any contract or other commitment. Splunk undertakes no obligation either to develop the features or functionality described or to include any such feature or functionality in a future release.

Speakers

Tom Twait

- Manager, EDI Services
- 13 Years @ Cerner
- University of Iowa



Chris Hogan

- Sr Solution Architect, EDI Services
- 4 Years @ Cerner
- University of Missouri
- Rockhurst University (MBA)



Who is Cerner?



One of the largest healthcare software IT companies in the world

- > \$3B+ Annual Revenue
- Publicly traded (NASDAQ) with 20+ years of 20% compounded annual growth
- 22,000+ Associates in more than 30 countries
- Industry Leader and Innovator in Clinical, Revenue Cycle and Population Health Solutions



CernerMillennium

AcuteCare

PatientAccounting

TransactionServices

PracticeManagement

Registration
Scheduling

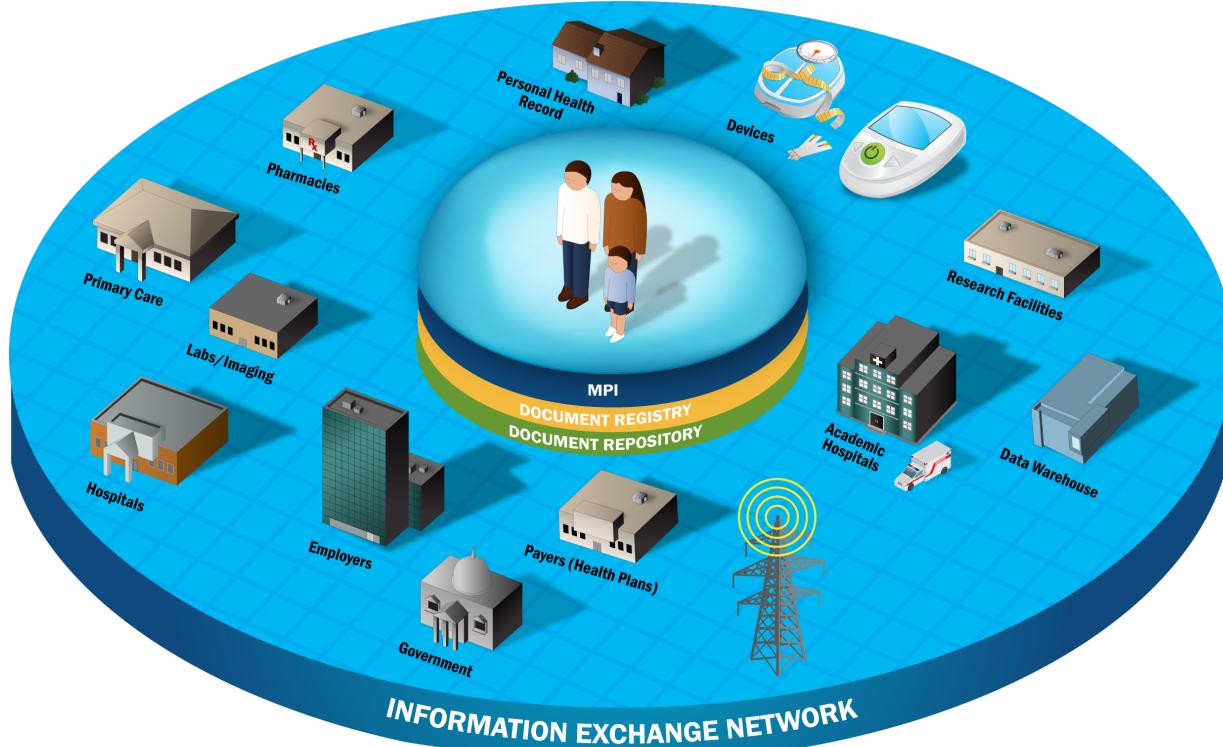
What Do Tom and Chris Do?

Transaction Services (EDI)

- Address Validation
- Address Verification
- Claims Scrubbing
- Contract Management
- Credit Card Processing
- Medical Necessity Checks
- Real-time Eligibility Checks
- Etc...

*Cerner Transaction Services Processes >300M
Transactions Annually*

Complex Connections



Problem Statement

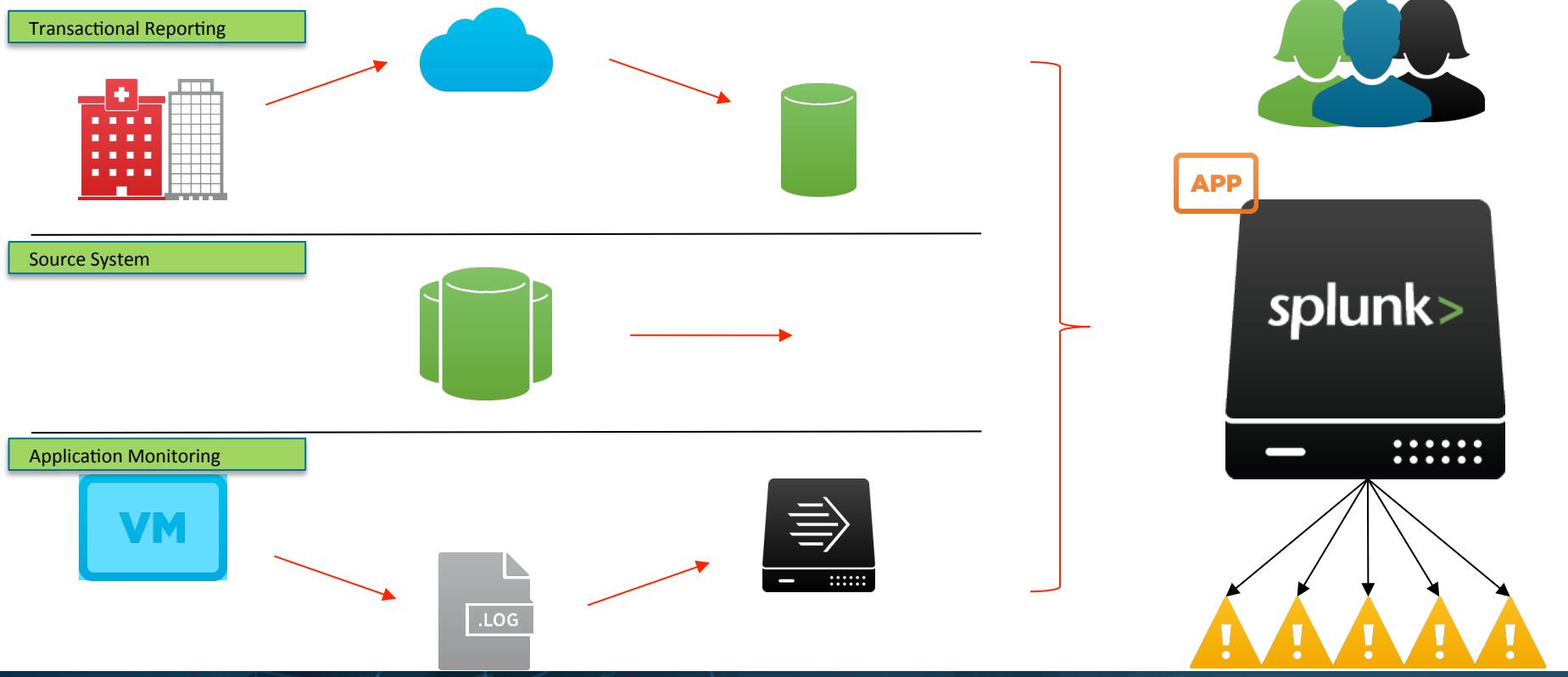
System

- Reduce Downtime
- Developer Access to Logs
- More Reliable/Predictable System
- Often Reactive, Not Proactive
- Data Blind to Real-Time Issues

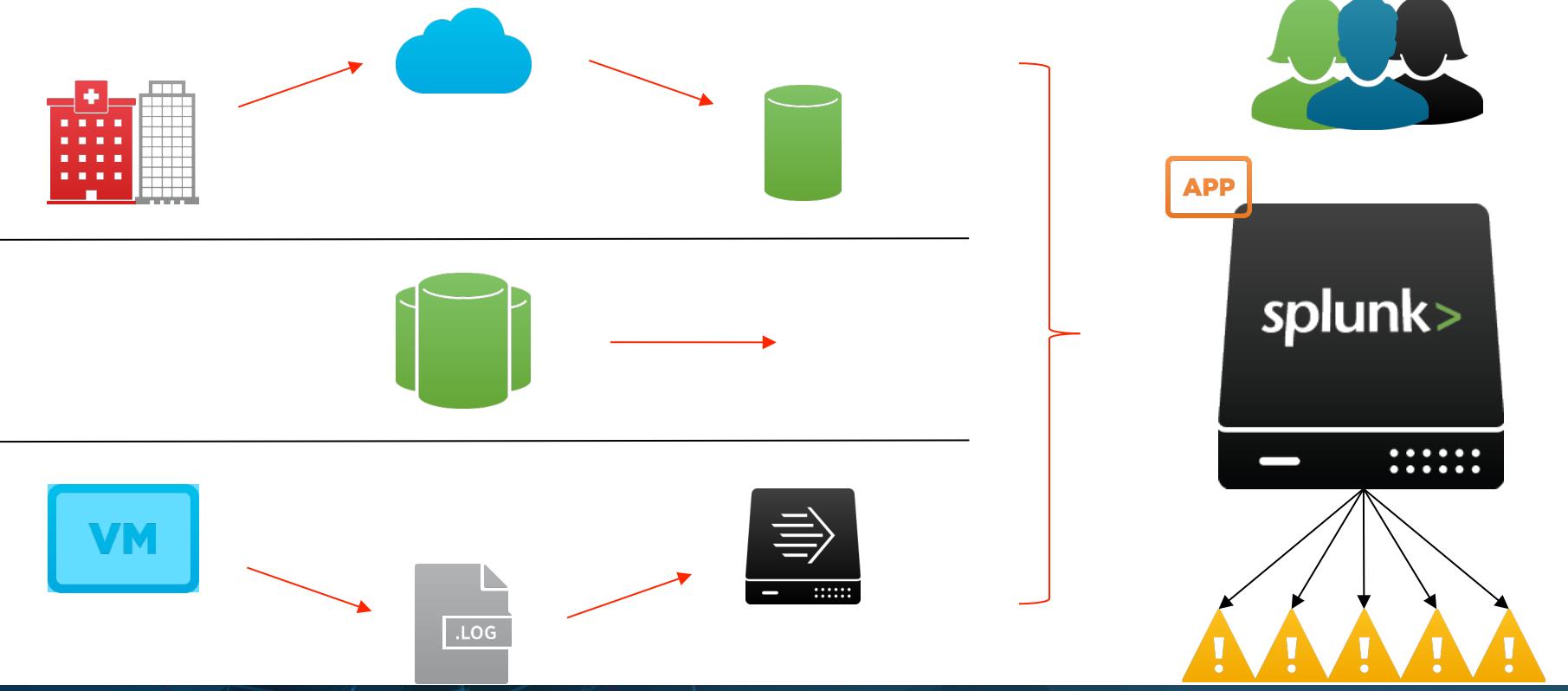
Users

- Access to Data
- Less ad-hoc requests to analysts
- Limited Operational Reporting
- Slowing Moving Process Improvement Initiatives
- Minimal Visibility for Operations Team when System Issues Arose
- Cumbersome process to analyze data

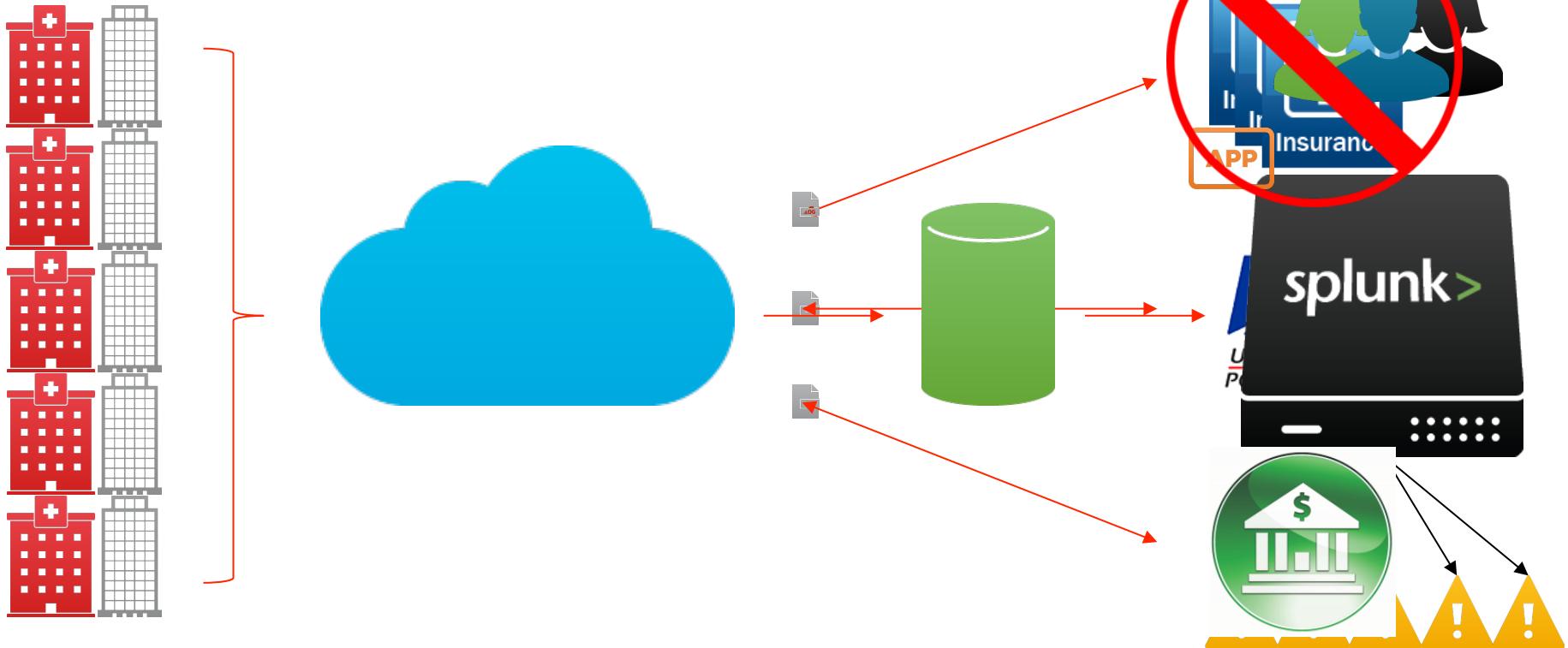
Analytics Ecosystem at Cerner



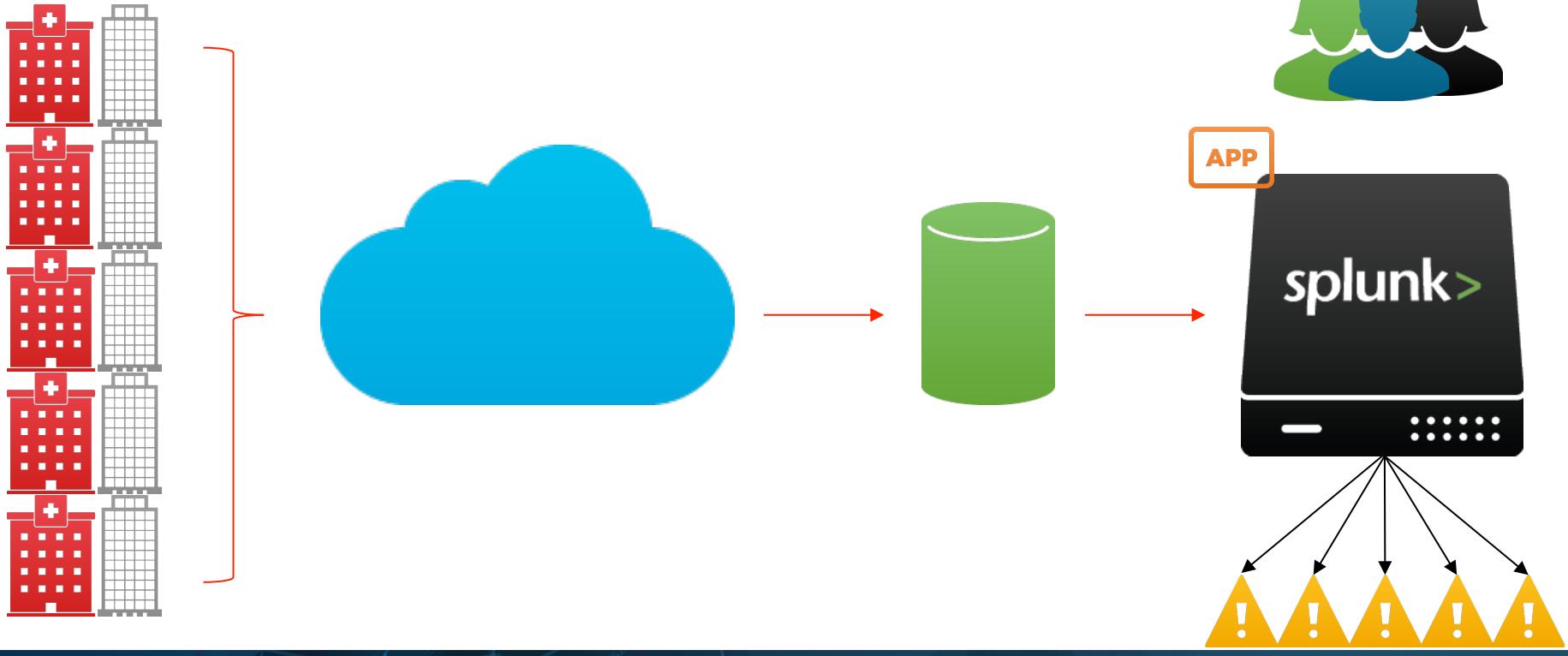
Analytics Ecosystem



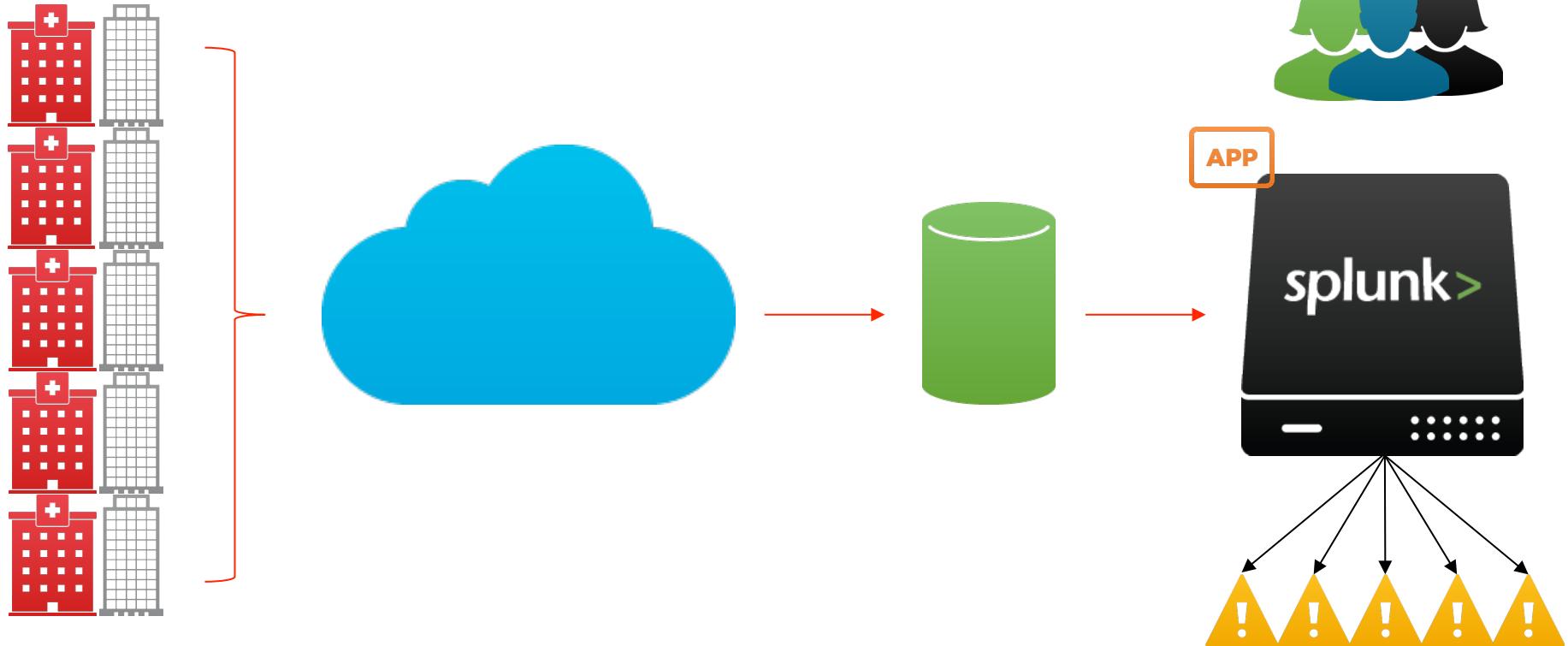
Transactional Reporting



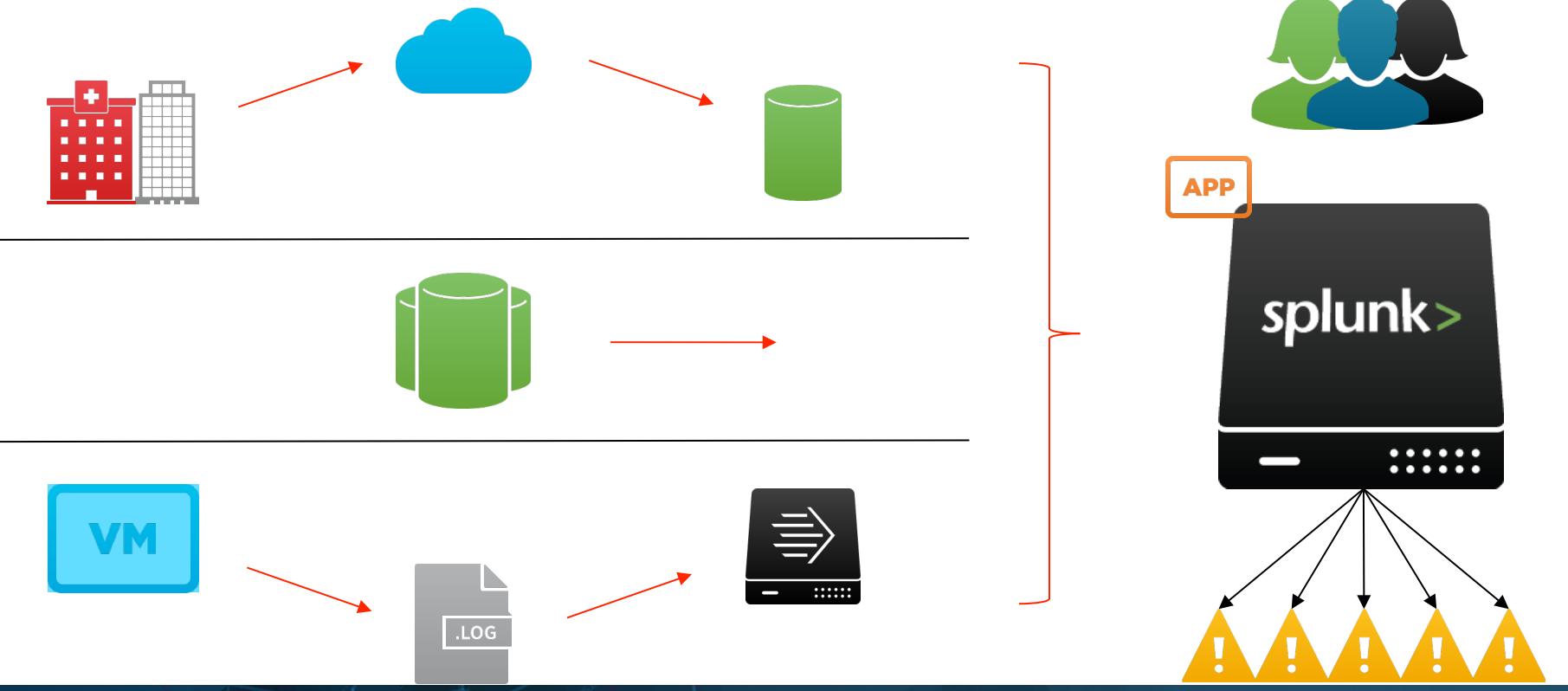
Transactional Reporting



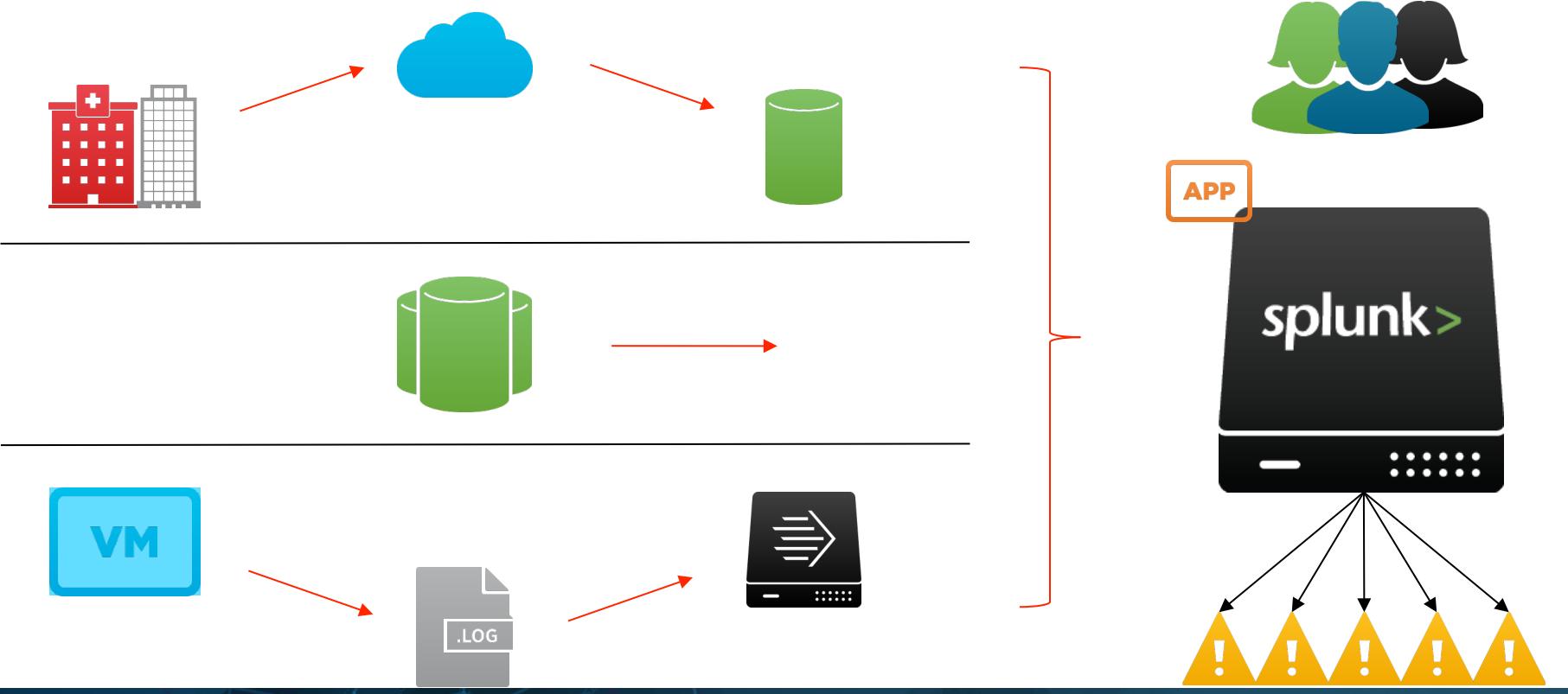
Transactional Reporting



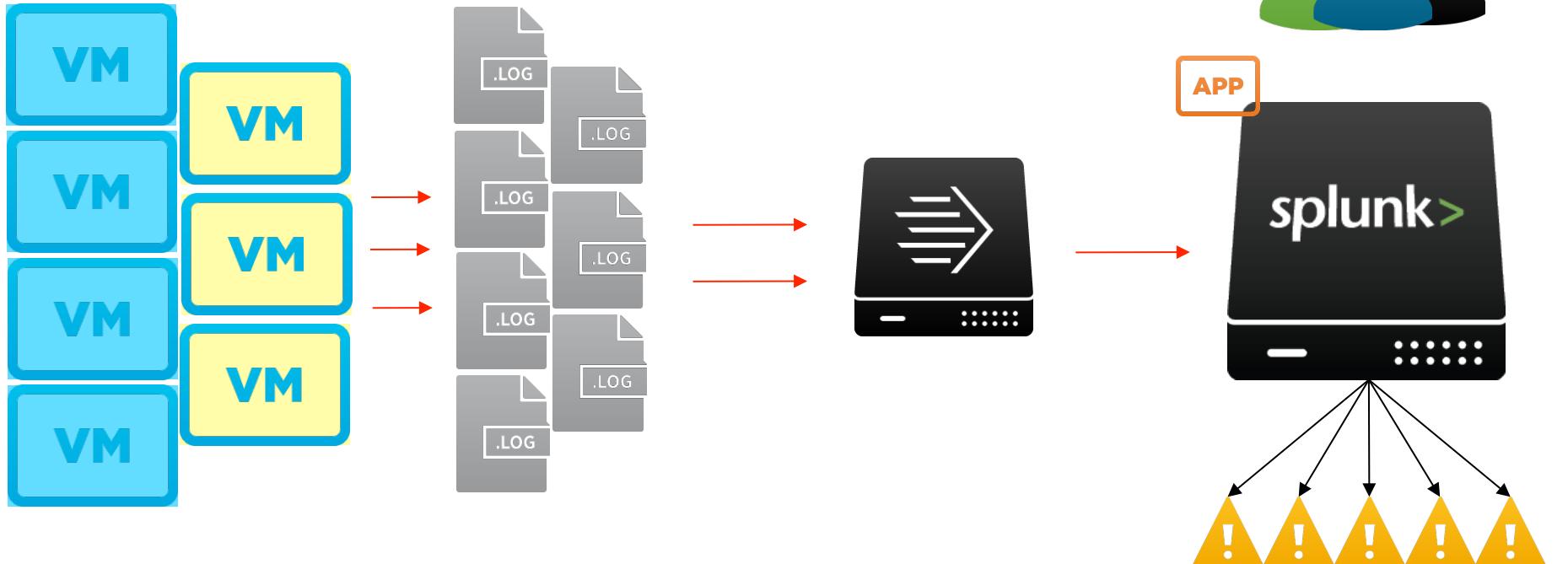
Analytics Ecosystem



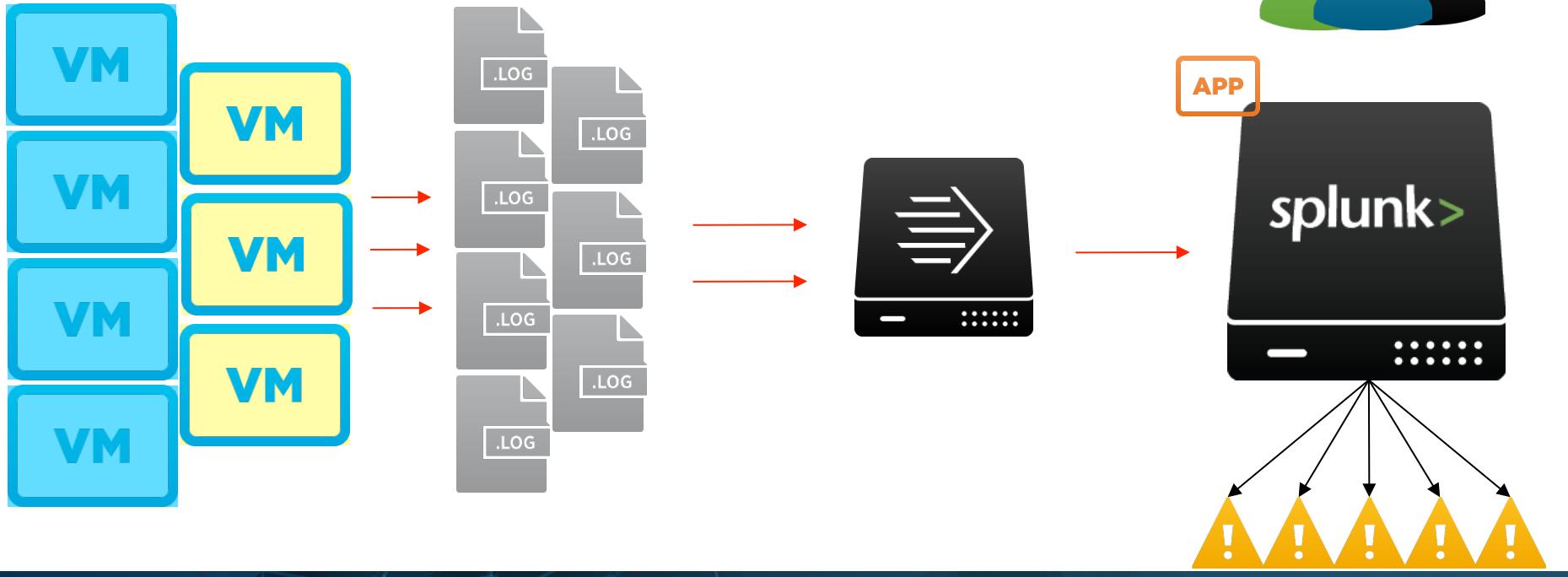
Websphere Application Server



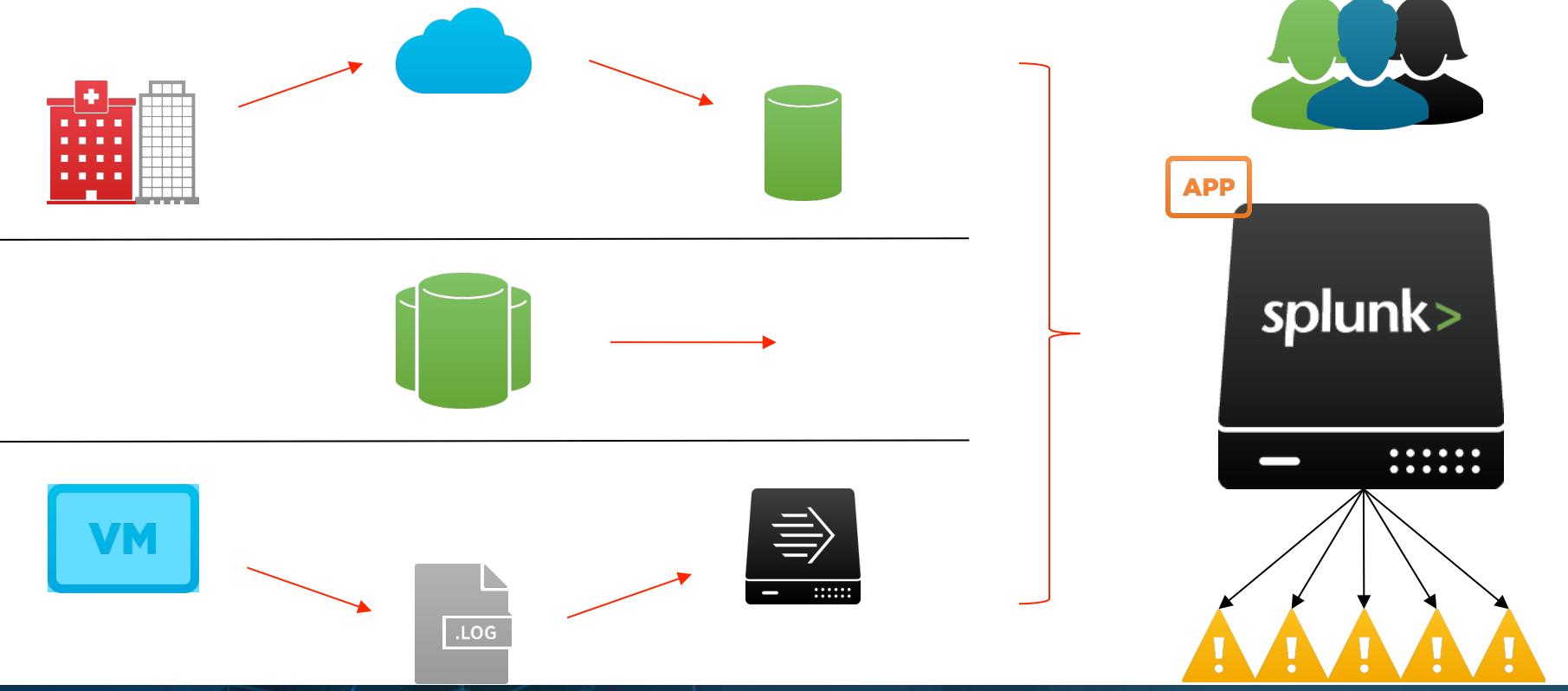
Websphere Application Server



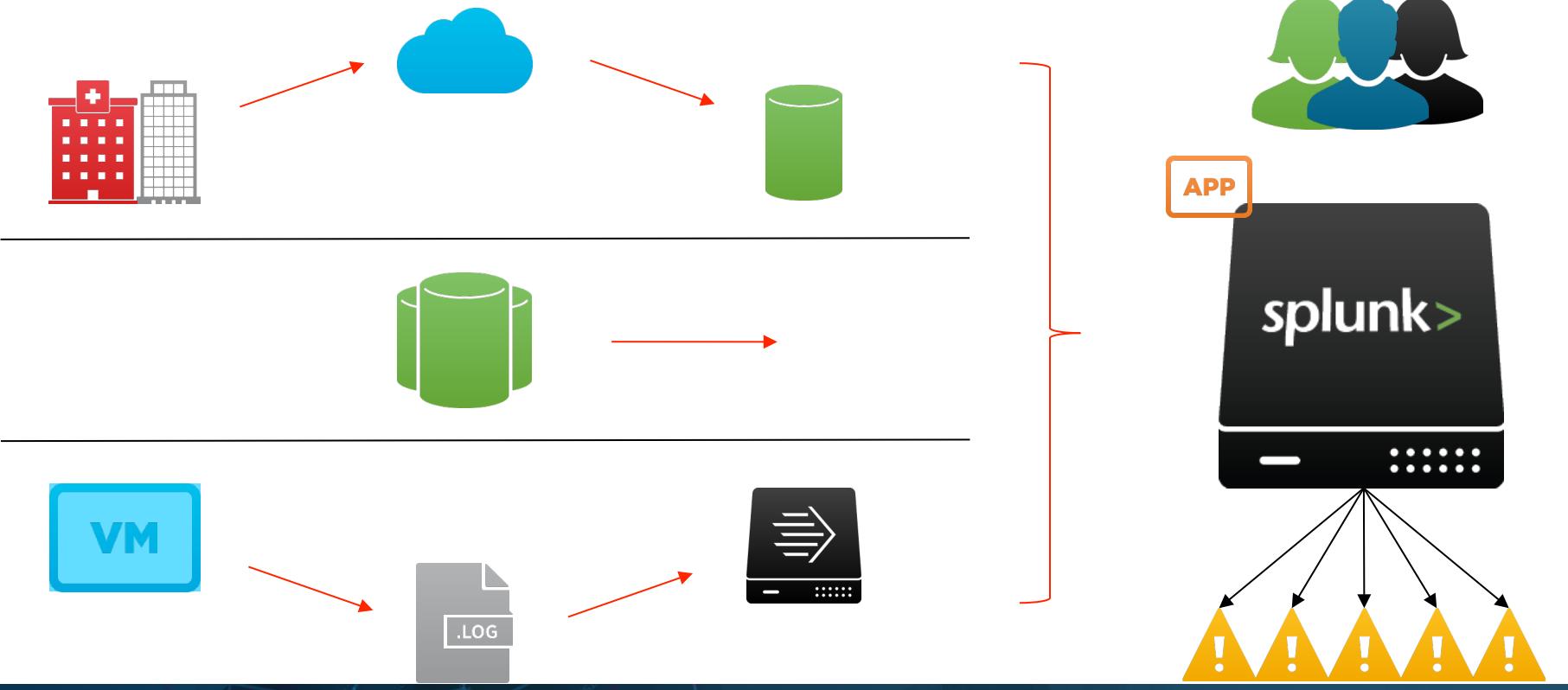
Websphere Application Server



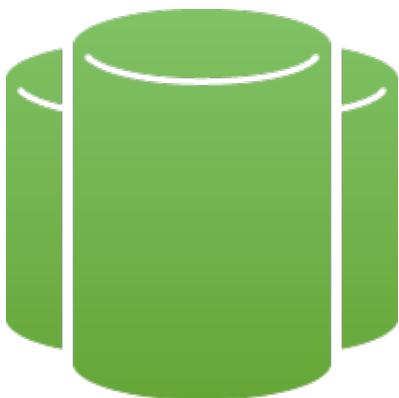
Analytics Ecosystem



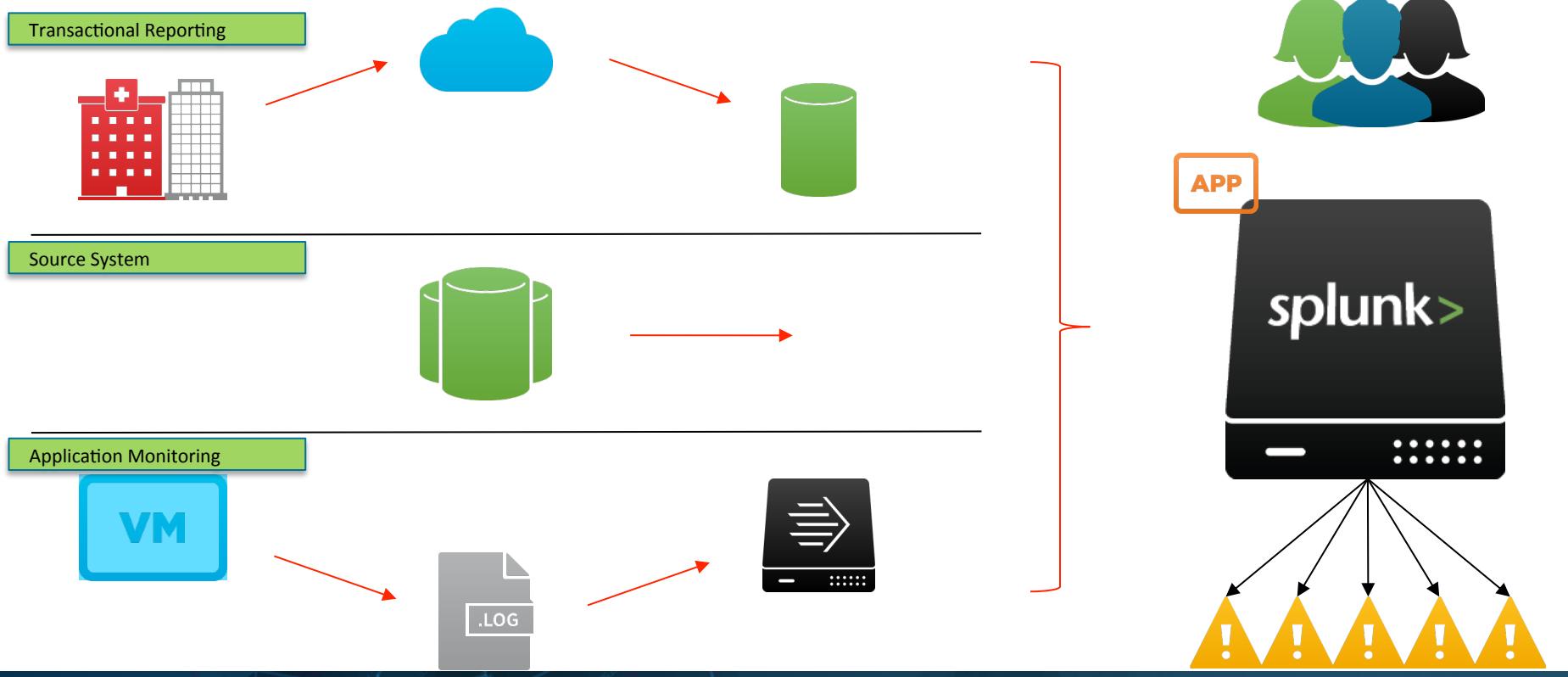
Millennium



Millennium



Analytics Ecosystem at Cerner



Analytics In Action – Examples Using the Ecosystem Information

- Operations
 - Monitor partner connectivity and alert Operations staff in the event monitoring thresholds are breached
- Consulting
 - Pinpoint key issues and trends to optimize and improve system performance
- IP/Engineering
 - Validate WebSphere health and identify potential issues
- Executive Team
 - Produce on-time reports for analysis without engaging Architects and Business analysts

Windows

An error has occurred. To continue:

Press Enter to return to Windows, or

Press CTRL+ALT+DEL to restart your computer. If you do this,
you will lose any unsaved information in all open applications.

Error: 0E : 016F : BFF9B3D4

Press any key to continue _

Analytics In Action – Examples Using the Ecosystem Information

- Alert, Report and Monitor System Issues!!!
- Monitor, Evaluate and Investigate Individual Services and Solutions



Claims Scrubbing

```
index=tx_detail* sourcetype=clmscrub  
| fillnull  
| stats dc(GROUP_ID) as count by SUBMITTER_ID CLAIM_ERROR_IND  
| eval errClaims = if(CLAIM_ERROR_IND==1, count, null)  
| eval cleanClaims = if(CLAIM_ERROR_IND==0, count, null)  
| stats sum(cleanClaims) as cleanClaims  
    sum(errClaims) as errClaims  
    sum(count) as allClaims by SUBMITTER_ID  
| fillnull  
| eval "cleanRate%="round(cleanClaims/(cleanClaims+errClaims) * 100, 2)  
| table SUBMITTER_ID allClaims cleanClaims errClaims "cleanRate%"  
| sort -"cleanRate%"  
| where isnotnull(SUBMITTER_ID)  
| table SUBMITTER_ID allClaims cleanClaims errClaims "cleanRate%"  
| addcoltotals allClaims  
    cleanClaims  
    errClaims  
    labelfield=SUBMITTER_ID  
    label="--TOTALS--"  
| eval cleanClaims = tostring(cleanClaims, "commas")  
| eval errClaims = tostring(errClaims, "commas")  
| eval allClaims = tostring(allClaims, "commas")
```

splunk> App: Prod > Administrator

Dashboards

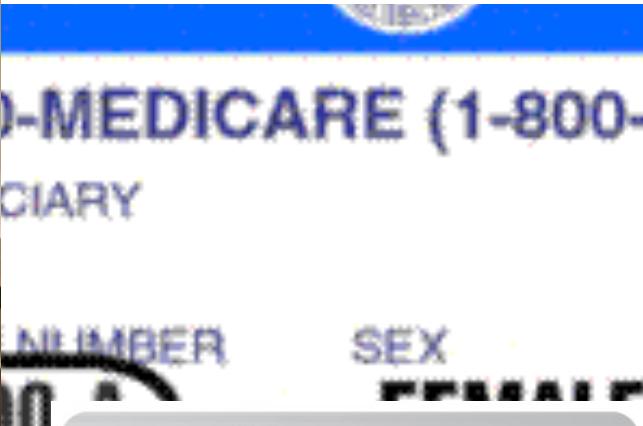
Claim Scrubbing

Select Date Range Select Output Type Enter

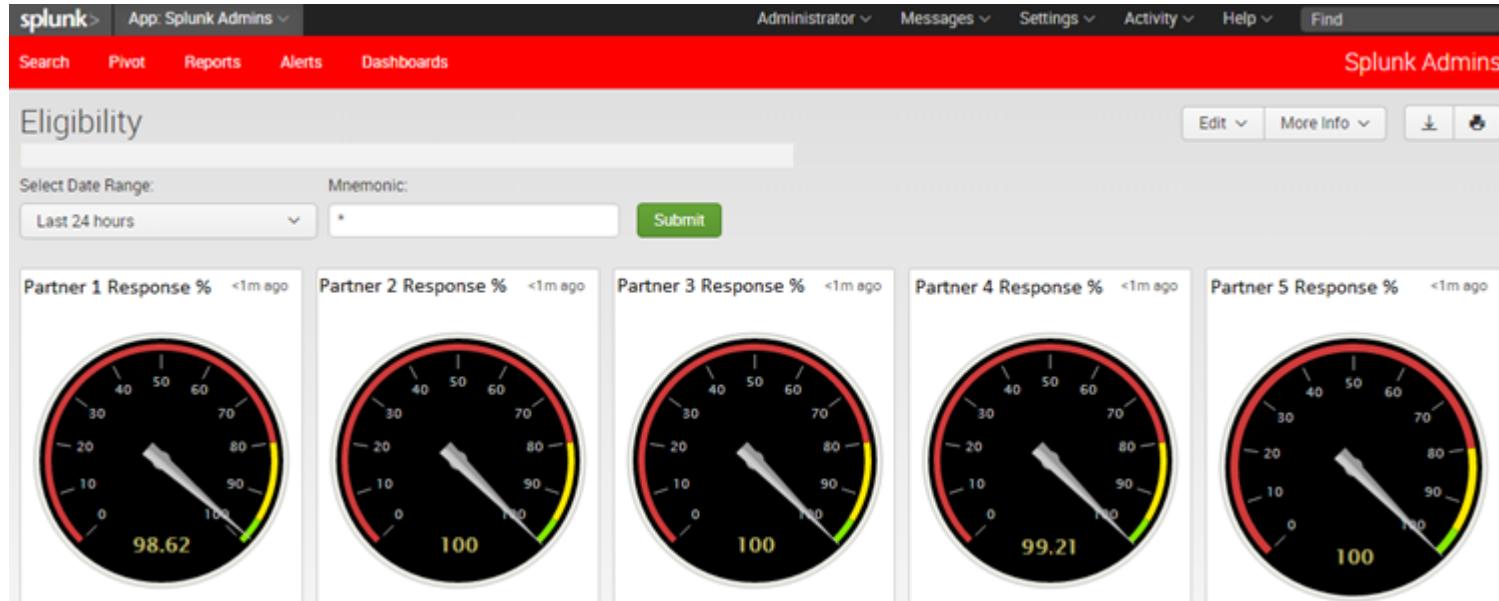
Submitter ID

SUBMITTER_ID	allClaims	cleanClaims	errClaims	cleanRate%
Bob's Hospital	3,060	2,842	218	92.88
C. Razy Institute	11,013	10,038	975	91.15
On Call Clinic	1,414	1,182	232	83.59
Knife to Meet You Surgical Center	4,211	3,367	844	79.96
Tooth Hurty Dental Care	5	2	3	40.00
-TOTALS-	19,703	17,431	2,272	

Real-Time Eligibility Processing



Real-Time Eligibility Processing



searchTemplate:

```
index=tx_detail* sourcetype=elig  
| stats dc(PARTNER_REQUEST_ID) as PARTNER_REQUESTS dc(PARTNER_RESPONSE) as PARTNER_RESPONSES by PARTNER  
| eval PartnerResponsePercent = round(PARTNER_RESPONSES / PARTNER_REQUESTS * 100, 2)
```

searchPostProcess

```
| where PARTNER = "Partner N" | table PartnerResponsePercent
```

Real-Time Eligibility Alerting

i This message was sent with High importance.

If there are problems with how this message is displayed, click here to view it in a web browser.

The alert condition for 'CRITICAL - Eligibility Partner Response Rate' was triggered.

Alert: CRITICAL - Eligibility Partner Response Rate

[View results in Splunk](#)

PARTNER_NAME	PARTNERREQUESTS	PARTNERRESPONSES	PARTNER_PERCENT
Partner1	2430	1501	61.77

If you believe you've received this email in error, please see your Splunk administrator.

splunk > the engine for machine data

Credit Card Processing

splunk > App: Prod >

Administrator > Messages > Settings > Activity > Help > Find

Dashboards Prod

Admin - Credit Card Processing

Select Date Range: Enter a Mnemonic:

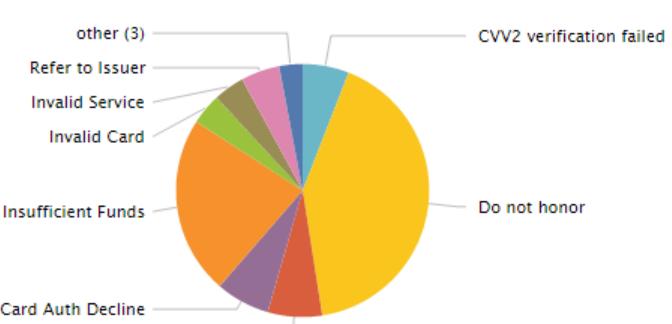
\$ 574,789.50
DOLLARS SUBMITTED

\$ 491,567.58
DOLLARS APPROVED

\$ 53,785.03
REFUNDS SUBMITTED

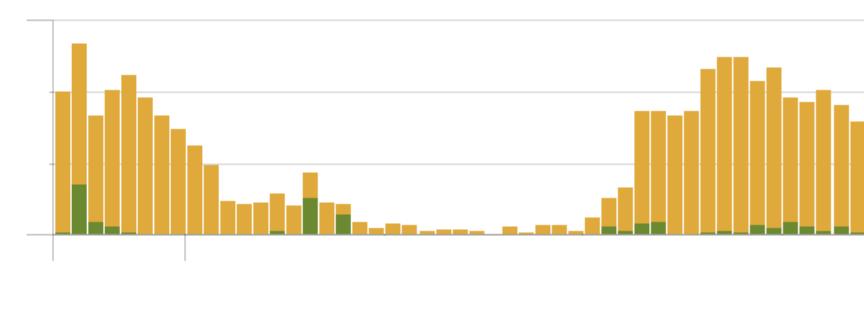
\$ 28,882.20
REFUNDS APPROVED

Top Non-APPROVED Messages



Reason	Count
Do not honor	~50%
CVV2 verification failed	~15%
Insufficient Funds	~10%
General Card Auth Decline	~5%
Expired Card	~5%
Invalid Card	~3%
Invalid Service	~2%
Refer to Issuer	~2%
other (3)	~2%

Transaction Volume



Time Period	Charges (approx.)	Refunds (approx.)
Initial Period	100	10
Peak Period	250	10
Mid Period	150	10
Final Period	200	10

Legend: █ Charges █ Refunds

Websphere

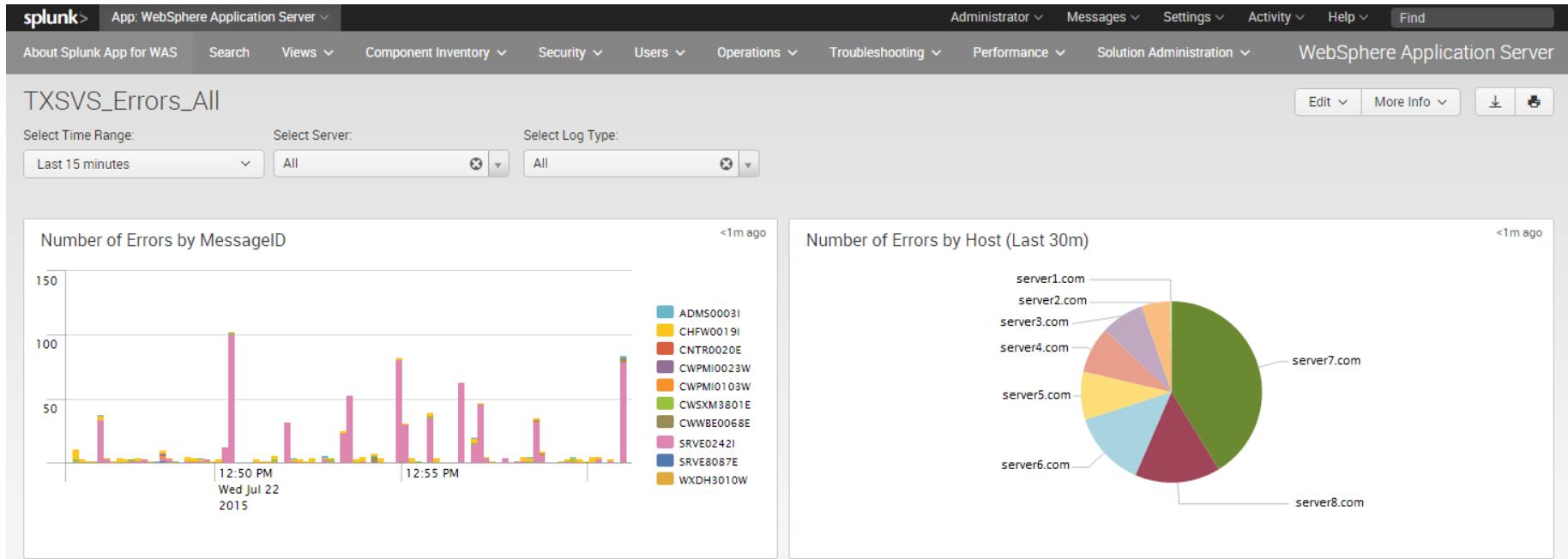
System

- We've shown CTS dashboards, what does websphere look like and how do we use it to obtain a positive outcome?

Users

- Easy Access to Data
- Fewer ad-hoc Requests for Analysts
- Easier Implementation of Process Improvement Initiatives
- Visibility for Operations, Consulting, IP, Executives

Websphere Monitoring



Outcomes

System

- Downtime Reduction
- Developer Access to Logs
- More Reliable/Predictable System
- Proactive Monitoring/Alerting and Support
- Visibility to Real-Time Events

Users

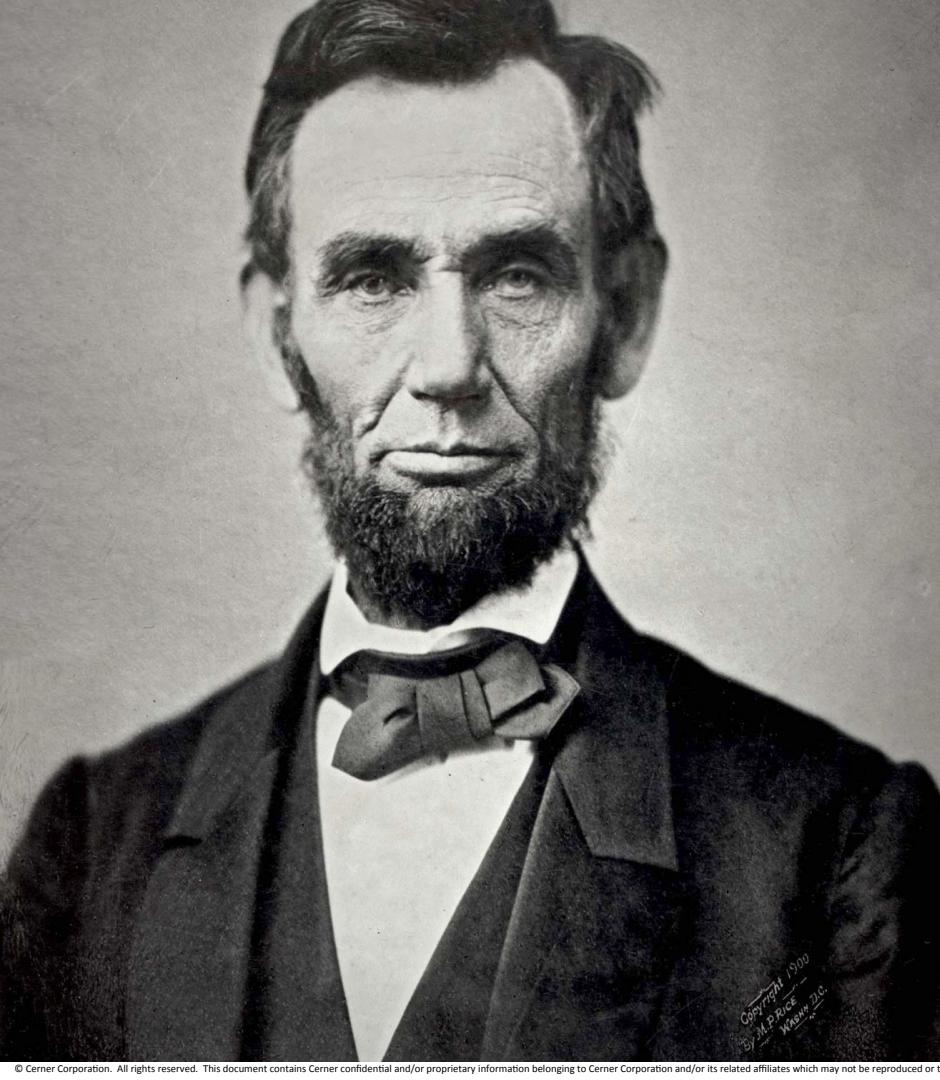
- Easy Access to Data
- Less ad-hoc requests for analysts
- Easier Implementation of Process Improvement Initiatives
- Visibility for Operations / Consulting / IP / Executives

Positive Impacts for End-Users

- Business Analysts – Analyze data faster with improved business insights
- Operations – Proactively monitor system performance and prevent unwanted system events
- IP/Engineering – Analyze/identify/resolve system issues faster than ever
- Consultants – Optimize system configurations for improved client outcomes
- Executive Team – Able to create customized, data-driven, on-demand reports

Next Steps

- Build external views for dashboards, reports and alerting
- Add additional transactions
- Focus on external data sets, not native to our core Financial Hub



“Don’t believe everything you read on the Internet just because there’s a picture with a quote next to it”

-Abraham Lincoln

QUESTIONS?

