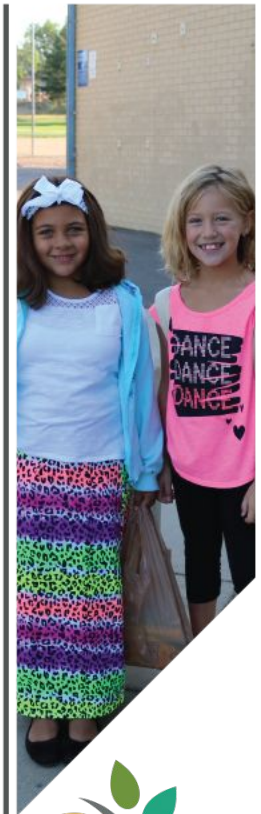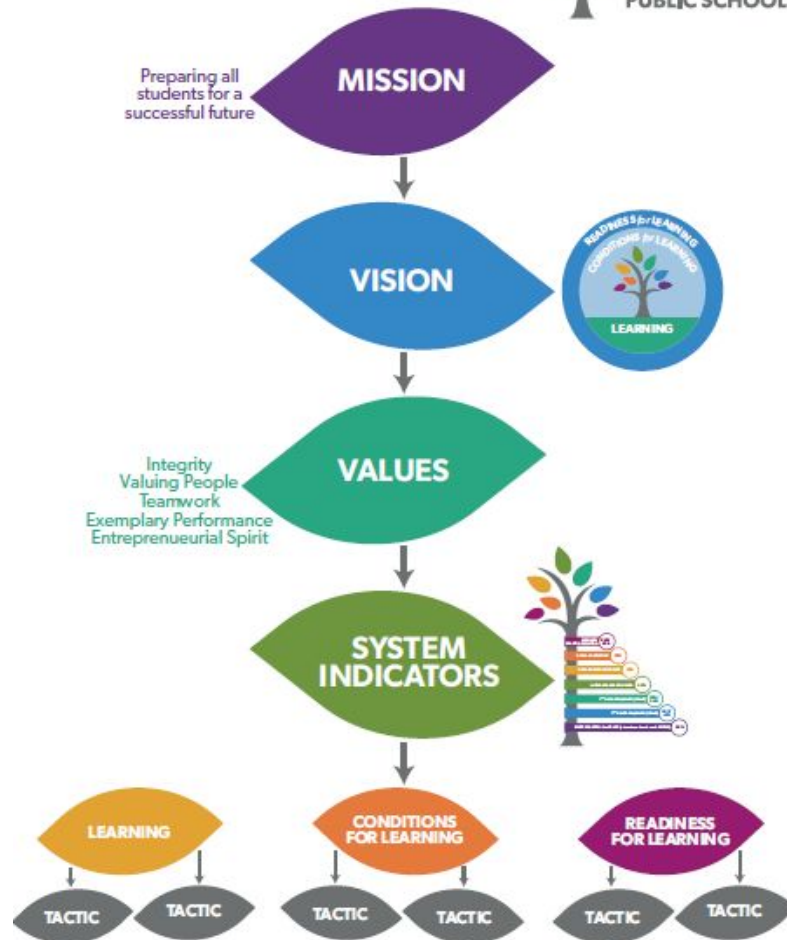JEFFCO PUBLIC SCHOOLS

Technology Tactic Team

Working Group

Tactic Team

- Hope Corrales (Tactic Lead) - Director, Enterprise Application Architecture

- Chris Paschke - Executive Director, Information Security & Data Quality

- Jeremy Felker - Executive Director, Student Data Privacy

- Vera Kennedy - Manager, Purchasing

- Carmody Powell – Director, Assessment & Research, ERD

- Diane Puntenney - IT Liaison, Curriculum and Instruction, ERD

- Tiffinie Willis – Manager, Business Engagement

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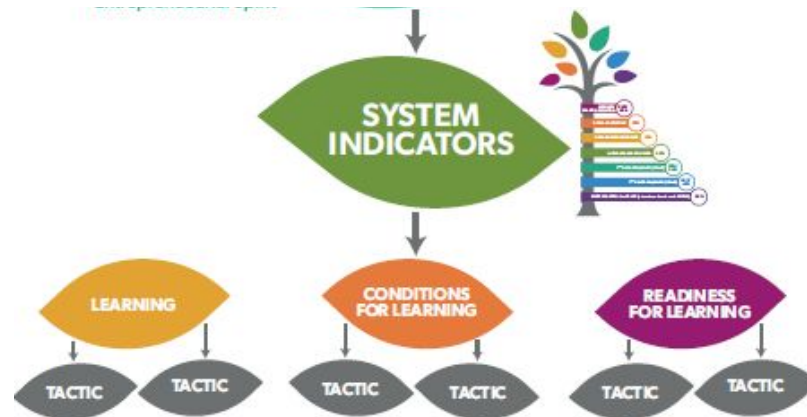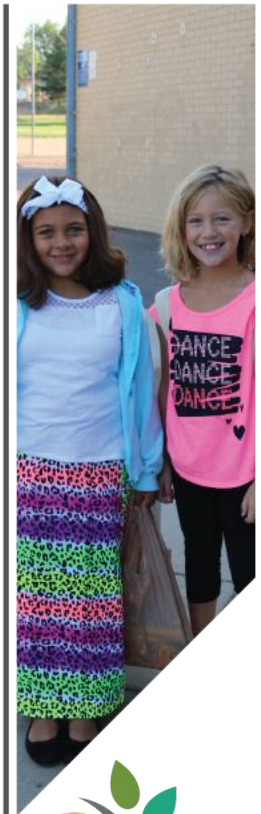# Strategic Plan Structure

Technology Tactics

1:1 Devices

Infrastructure to Support Dynamic Learning

Data Management, Integration and Exchange

Our technology strategy is to integrate technology tools and develop reliable systems and processes to build a secure technology infrastructure that supports dynamic student and organizational learning.

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Understanding the Need

Data Management, Integration and Exchange *underpins other technology tactics to support:*

- *Dynamic student learning through technology*
- *Responsive teaching*
- *Organizational learning*

through integrated tools and reliable data systems and processes

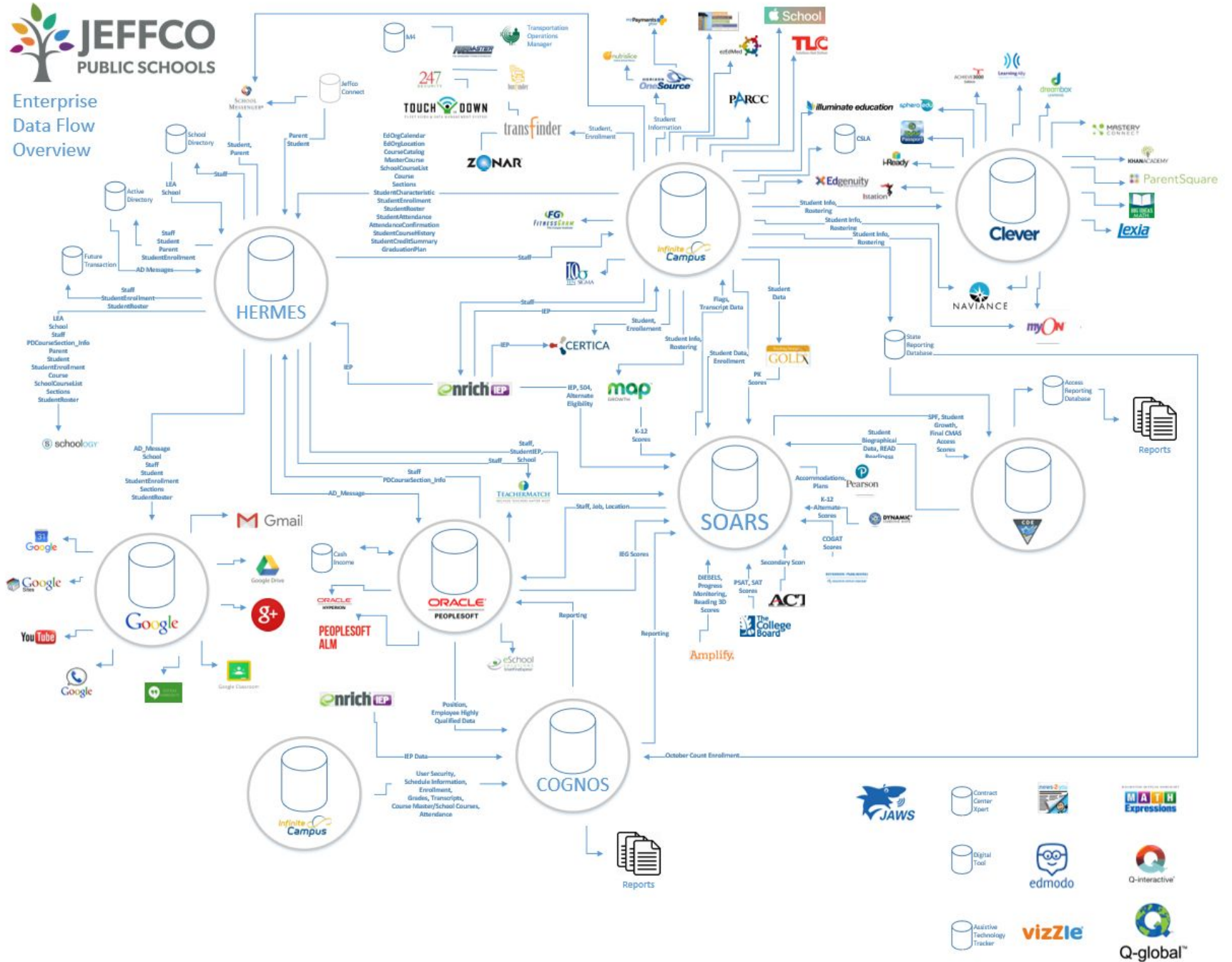What's holding us back?

What barriers exist?

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Current State

- <u>Systems & Data Architecture Assessment</u>
  - November 2017 - February 2018
  - Interviewed several departments/individuals
  - Application & Data Flow analysis
  - Educational Trends (K-12, Jeffco)
  - Observations & Findings

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Enterprise Data Flow Overview

B *Educational Trend: School Autonomy*

School Autonomy is a trend across many US public school districts. The "*one size fits all*" philosophy is rapidly changing to "*do what is best to meet the needs of the students for that school*". This is evident in the spectrum of options that are available to parents and students, including: Charter Schools, Magnet Schools, Inter/Intra District Public Choice Schools, Online Learning, and Customized Learning. Schools within a district continue to evolve following separate paths, driven by the by teacher and principal vision as well as parent demands.

Trend Data

- Because of the drive towards innovation, schools are allowed flexibility in pursuing its own IT tools for its teachers, classrooms, students, etc. This flexibility also provides schools and districts a recruiting tool to attract faculty and staff

- Both private and public school options are increasing, enabling and empowering schools to develop their own identity to compete for students

- 70% of Americans support school choice[1]

- School choice is creating a healthy sense of competition to attract and support the needs of their community

1 US News, October 19, 2017

NUMBER OF CURRENTLY ENACTED PRIVATE SCHOOL CHOICE PROGRAMS BY YEAR LAUNCHED
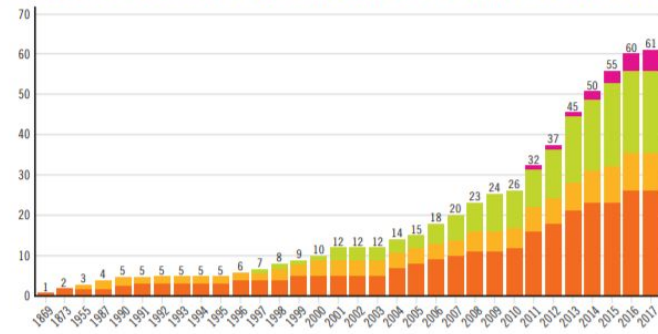
Source: The ABC's of School Choice, edchoice.org, 2017 Edition

While this chart shows the number of private school choice programs offered in the US by year, it is reflective of the overall trend toward providing options across public and private school options.

Educational Trend: Drive for Innovation

The drive for innovation is an education trend in districts across the US and is a common discussion topic at the national level. The push for innovation is being expressed by all stakeholder groups; students, parents, teachers, superintendents, and administrators. The desire and support for innovation fosters an atmosphere where individual stakeholders are encouraged to try new curriculums, teaching techniques, technology applications, and learning tools. As a consequence, IT teams are asked to support a wider landscape of applications and technologies.

Trend Data

- The Bill and Melinda Gates Foundation recently announced an investment of $1.7 billion over the next five years with a focus on US public schools

  "According to Gates, about 60 percent of the new $1.7 billion investment will support the development of new curricula and the foundation's new venture centered around building networks of existing schools, and about 15 percent will support the foundation's charter school work. The other 25 percent will focus on 'big bets,' which Gates characterizes as having 'the potential to change the trajectory of public education over the next 10 to 15 years.'" [1]

- DPS has introduced and is expanding the concept of Innovation Zones to give non-charter schools near-charter-like levels of autonomy

1 US News, October 19, 2017

Charter Schools
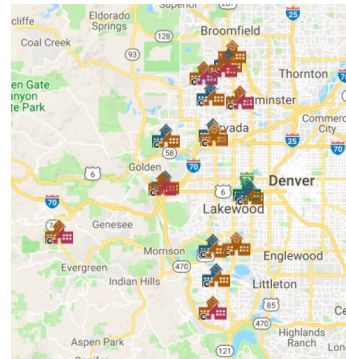
Jeffco Specialized Schools

Option Schools
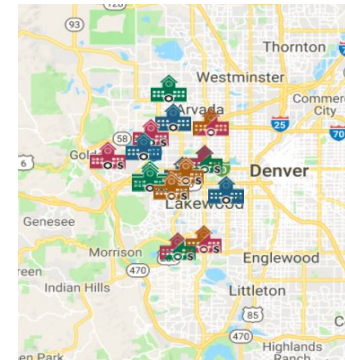
Special Schools
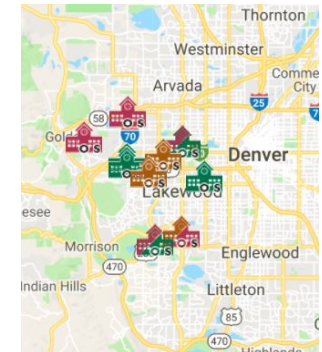
C *Observation: Application Proliferation*

With thousands of education specific applications available today, school districts and IT teams are dealing with issues and threats associated with the ever growing catalog of education technology. The risks that come with new and untested solutions represent potential threats to data, privacy, compliance, and other hazards. One way that schools are addressing the threats is by implementing IT policies and standards through established governance or steering committees. Not only are the committees formulating guidelines to protect districts and students, they also serve as a counterbalance to innovation, ensuring the district remains focused on students.

Observation

- Over 360 documented tools available on Jeffco site today
- Hazards to consider
  - Identity sprawl
    - Multiple user names along with passwords and protocols
    - Increased risk of breach
  - Data dissipation
    - Data format and data entry
    - Data no longer centralized
    - Risk of data exposure rises
  - Security vulnerability
    - Variability in web frameworks leads to complexities
    - Various authentication frameworks
    - Cloud solutions remove control from districts
    - Faculty, staff, students, parents, vendors, all have access via web applications, mobile applications, and other portals
  - Complicates Disaster Recovery Planning
- Addressing threats
  - Explore single-sign on and multi layered authentication
  - Establishing IT standards and encryption

1 US News, October 19, 2017

W *Edu Trend: Shift from Composite Scorecards to Performance Measurements*

In general, the educational industry is seeing a trend away from complex, composite scorecards to a focus on student-level performance measurement. Measuring schools and teachers with advanced scorecards has led to conflicting sub-measures, confusion, and frustration for many student leaders, teachers, parents, and students. The core of advanced scorecards is standardized tests; this is necessary to provide a fair baseline across groups that are being measured. There is a growing change in sentiment to focus on 1) providing fair and equitable access to a quality education and 2) measuring the results of students in terms of individual achievement.

Observation / Trend Data:
- The Gates Foundation is making a deliberate shift from traditional advanced scorecards to focusing on innovation that improves student performance
- Standardized testing has been a long standing debated item among teachers and is frequently a sticking point in union negotiations
- Parent push back against standardized testing has been increasing and students who opt out of tests affect the validity of the scorecard
- Composite scorecards create competition between schools and districts, drawing focus away from the ultimate goal of student success

Public school parents who say there is too much emphasis on testing → **67%**

Parents who say testing is very important in measuring school effectiveness → **14%**

Parents who oppose using test scores to evaluate teacher performance → **66%**

Source: 47th Annual PDK/Gallup Poll of the Public's Attitudes Toward the Public Schools, Sept. 2015

1 US News, October 19, 2017
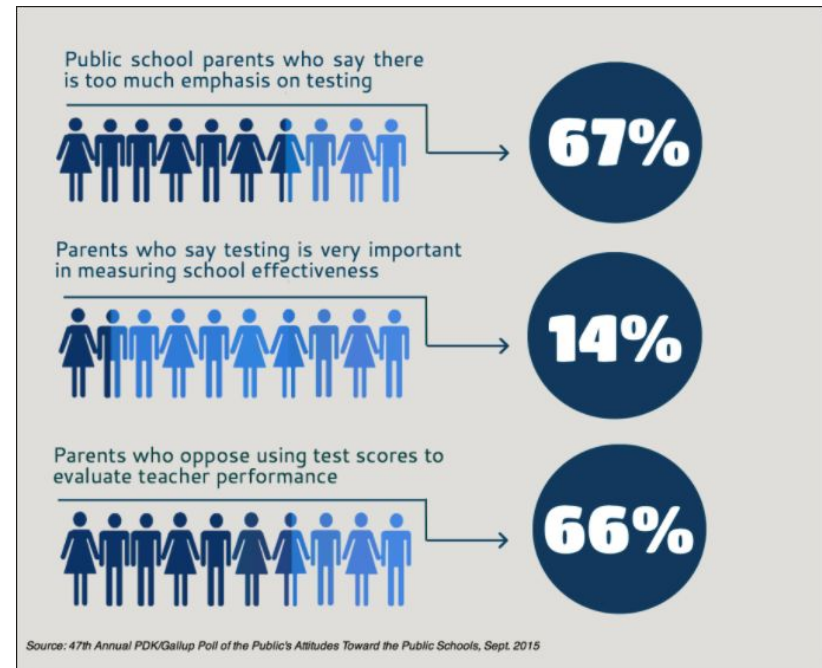
D *Observation: Unrealized Data Strategy*

School applications contain the data to drive insights and action across the district. A lack of a centralized strategy has led to disjointed efforts that produce different outcomes and create siloed BI solutions that don't focus on a unified mission or process. Data definition efforts are duplicated because they are not shared outside of the immediate focus area. A combination of different reporting, ETL tools, and data storage systems increase the costs associated with licenses, administration and maintenance. A reliance on differing data management strategies has also lead to difficulty determining the "source of truth," increasing the costs of maintaining those efforts.

Observation / Trend Data:

- Reliable but disparate data warehouses
- Separate BI solutions and functions
- Data redundancy collections in data warehouses
- Less-defined purpose of shared data collection
- Data definition and intent organized by each data reporting system
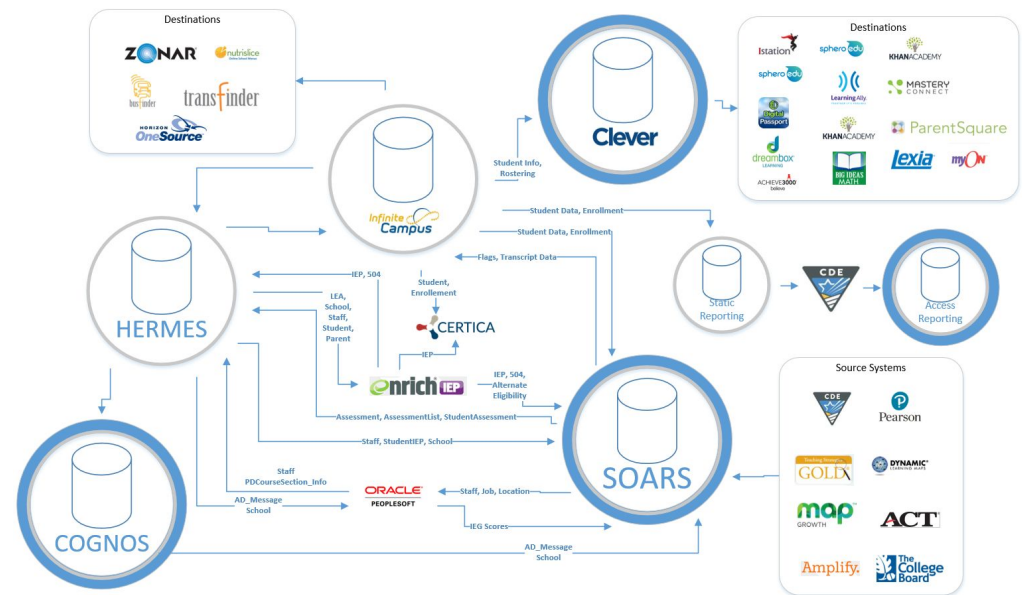
Jeffco Data & Systems Current Architecture

- Complex - Current state of patchwork data systems leads to added complexities and challenges for our user community

- Incomplete - multiple systems of data; cannot see the complete data picture (organization or student)

- Expensive - Cost to maintain such a complex environment continues to increase as new systems are added;

- Inefficient – Environment lacks agility for innovation and autonomy

- Unsupportable - Pace of growth makes current level of support unsustainable in the future with limited resources

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Data Maturity Model

Leadership

Training & Support

Governance/Quality/Privacy

Accountability/Metrics

Integration

Architecture

LEVEL 1 — Initial

- Ad hoc.
- No systematic training and support.
- Recognized need/concern. Quality is unknown.
- State/federal accountability metrics only.
- Most tools stand alone and unconnected.
- Ad hoc. No enterprise architecture.

LEVEL 2 — Emerging

- Department silos.
- Training is scarce & inconsistent.
- Ad-hoc governance & privacy in department silos. Quality is inconsistent.
- Additional organizational KPIs tracked annually.
- Some connections between applications and data sources.
- Point-to-point batch interfaces between tools.

LEVEL 3 — Integrated

- Cross-department cooperation.
- Targeted training & support for functional use of tools based on user role.
- Cross-department governance & privacy policy & procedures.
- Additional departmental/school-level KPIs developed & tracked periodically.
- Most applications and data sources integrated.
- Consolidated tools around an integration architecture. Dashboards introduced.

LEVEL 4 — Optimizing

- Enterprise collaboration.
- Training & support is personalized to advance data literacy & use.
- Enterprise governance & privacy policy & procedures. Quality & privacy checks built into systems.
- All KPIs tracked in real-time to inform & drive continuous improvement.
- Real-time, enterprise integration.
- Central data warehouse feeds data marts and analytics.

LEVEL 5 — Responsive

- Cross-enterprise collaboration.
- Training & support is on-demand, situational, & cross-enterprise.
- Cross-enterprise governance, quality & privacy standards, policy & procedures.
- Cross-enterprise KPIs tracked in real-time to optimize supports for and impact on student outcomes.
- Real-time, cross-enterprise integration.
- Data warehouse supports real-time predictive and prescriptive analytics.

What's the problem?

- Current organizational data maturity is <u>Level 2 Emerging</u>
  - Difficult to support the Jeffco Strategic Plan and learning-focused tactics nor the measurement of Strategic Indicators

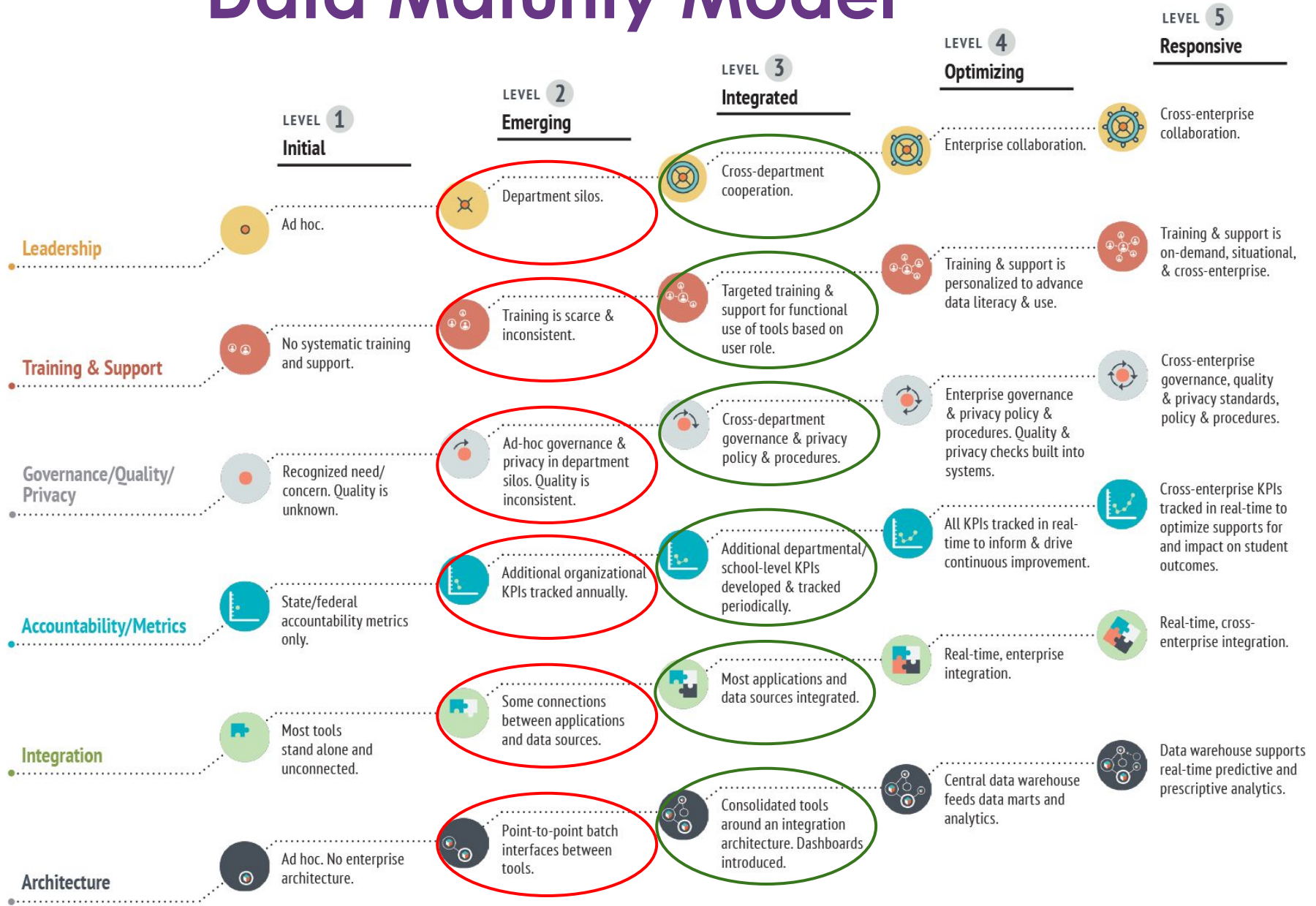- We need to improve our data maturity to <u>Level 3 - Integrated</u>

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Data Maturity Model

LEVEL **1**
Initial

LEVEL **2**
Emerging

LEVEL **3**
Integrated

LEVEL **4**
Optimizing

LEVEL **5**
Responsive

Leadership
- Ad hoc.
- Department silos.
- Cross-department cooperation.
- Enterprise collaboration.
- Cross-enterprise collaboration.

Training & Support
- No systematic training and support.
- Training is scarce & inconsistent.
- Targeted training & support for functional use of tools based on user role.
- Training & support is personalized to advance data literacy & use.
- Training & support is on-demand, situational, & cross-enterprise.

Governance/Quality/Privacy
- Recognized need/concern. Quality is unknown.
- Ad-hoc governance & privacy in department silos. Quality is inconsistent.
- Cross-department governance & privacy policy & procedures.
- Enterprise governance & privacy policy & procedures. Quality & privacy checks built into systems.
- Cross-enterprise governance, quality & privacy standards, policy & procedures.

Accountability/Metrics
- State/federal accountability metrics only.
- Additional organizational KPIs tracked annually.
- Additional departmental/school-level KPIs developed & tracked periodically.
- All KPIs tracked in real-time to inform & drive continuous improvement.
- Cross-enterprise KPIs tracked in real-time to optimize supports for and impact on student outcomes.

Integration
- Most tools stand alone and unconnected.
- Some connections between applications and data sources.
- Most applications and data sources integrated.
- Real-time, enterprise integration.
- Real-time, cross-enterprise integration.

Architecture
- Ad hoc. No enterprise architecture.
- Point-to-point batch interfaces between tools.
- Consolidated tools around an integration architecture. Dashboards introduced.
- Central data warehouse feeds data marts and analytics.
- Data warehouse supports real-time predictive and prescriptive analytics.

Integrated Data Maturity

Leadership – cross department collaboration

Training & Support – data training by role

Governance, Quality, Privacy – managed across departments

Accountability, Metrics – KPIs drive management

Integration – comprehensive integration

Architecture – enterprise integration architecture

Jeffco Data & Systems Future State

- Enterprise data integration strategy that focuses on eliminating redundant processes while supporting the collection of data for dynamic student learning, responsive teaching, organizational learning

- Consolidated yet comprehensive integration architecture that minimizes complexity and costs (around maintaining expertise and connectivity among multiple applications) all the while improving our ability to respond to change

- Cross-department data governance, privacy policies and procedures

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Agree on How to Change

- Consolidate application integration architecture for **data exchange**
  - Adopt Ed-Fi Data Standard
  - Limit mechanisms to which the District will integrate with vendor systems (Ed-Fi API compliant, vendor-specific APIs, Data Sets)
    - Weigh Ed-Fi compliant vendors heavily
- Build an enterprise **data integration** strategy
  - Build an Operational Data Store using Ed-Fi ODS/APIs
- Expand **data management** and governance through Collibra
  - Catalog, Data Dictionary, Business Glossary
  - Data Stewardship and Quality
  - Embed in Project Management processes
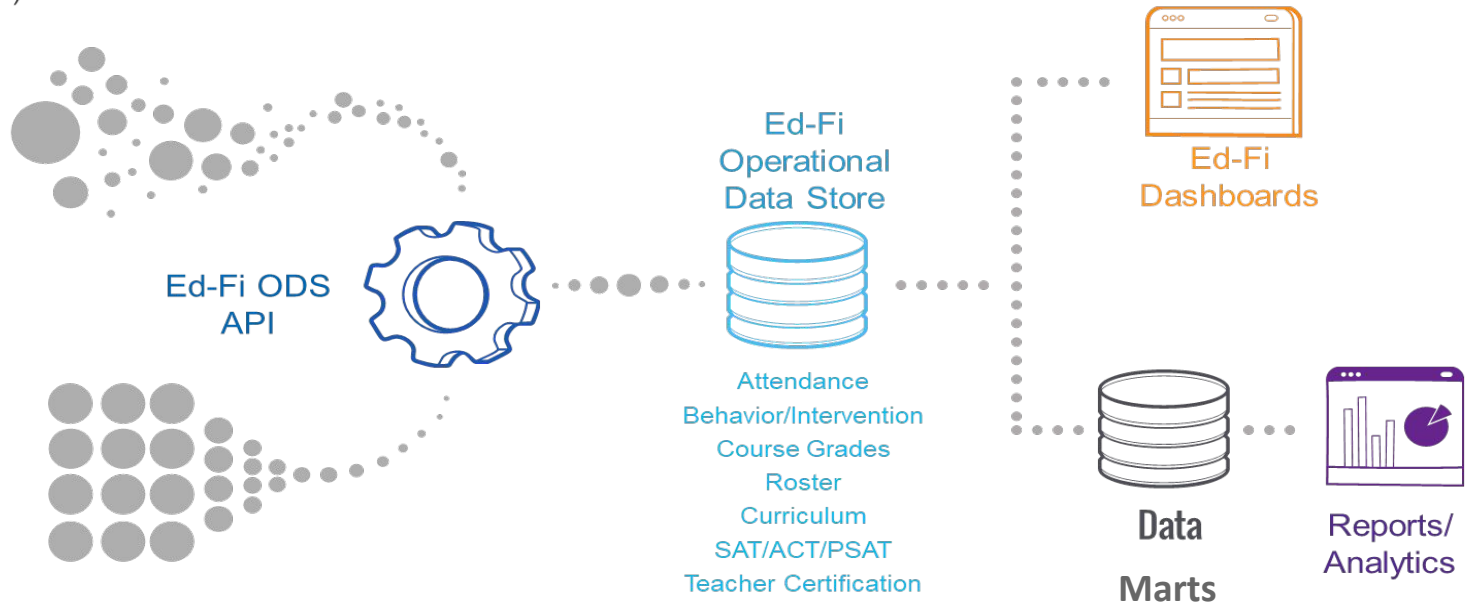
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Implement an Operational Data Store

Transactional Data (JSON)
- SIS/LMS
- Content Management
- Instructional Apps
- Financial/HR
- Operations (food, transport, library)

Bulk Data (XML)
- State Assessments
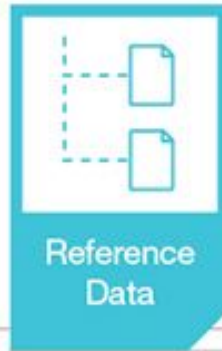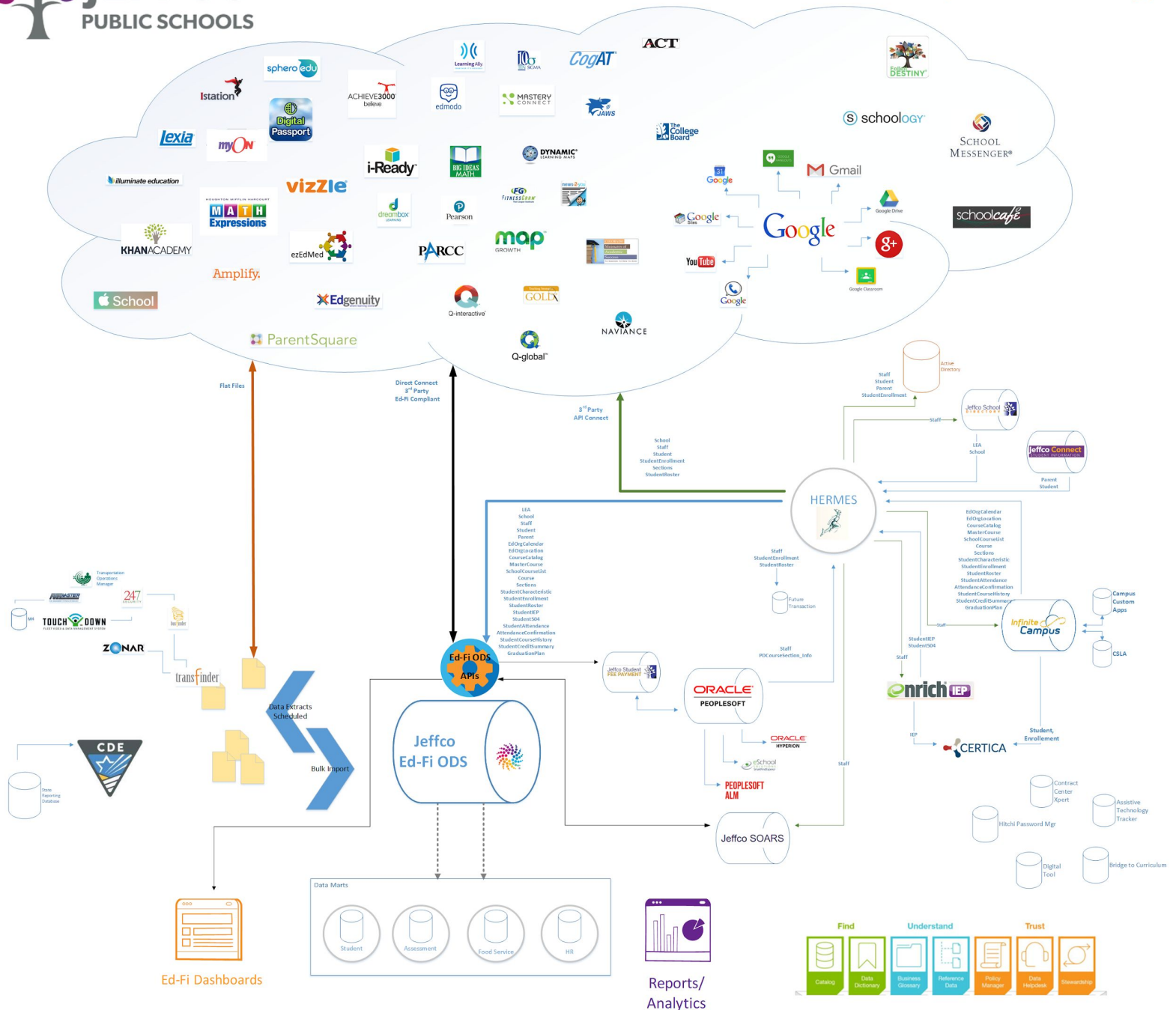- National Assessments
- Other?

Ed-Fi ODS API

Ed-Fi Operational Data Store

Attendance
Behavior/Intervention
Course Grades
Roster
Curriculum
SAT/ACT/PSAT
Teacher Certification

Ed-Fi Dashboards

Data Marts

Reports/ Analytics

Expand Collibra Capabilities

Find | **Understand** | **Trust**

Catalog | Data Dictionary | Business Glossary | Reference Data | Policy Manager | Data Helpdesk | Stewardship

⚙ Process | </> Metadata | Organization

All activities and information surrounding the data, it's meaning and it's use.

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Enterprise Data Strategy

Theory of Action

IF we structure Jeffco's data to be understood by users, vendors, and other educational entities *THEN* data-based decision making for student learning will be supported across the organization and schools

SMART Goal

By July 2022, 100% of Jeffco's district-supported instructional/learning applications will be integrated into a single source to enhance reporting and operational decision making.

Action Plan

- Continue developing shared Data Strategy
- Embed Data Management requirements into existing processes (Project/Enhancements)
- Enable collection of Data Management requirements using Collibra:
  - Business Glossary
  - Data Dictionary
  - Data Lineage
- Adopt Ed-Fi Data Standard and begin mapping data assets

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Action Plan

- Build an Operational Data Store (ODS) using Ed-Fi ODS/APIs v.2.3+
  - Integrate data from source applications to Jeffco ODS
  - Source existing data integrations from Jeffco ODS
- Vendor/Contract Management
  - Work with key vendors to build Ed-fi compliance into application roadmaps
  - Require vendors to be Ed-Fi compliant as part of contractual agreement with District
  - Weigh Ed-Fi compliant vendors favorably
- Implement Data Dashboards

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Upcoming Milestones

- **January 2019**: IT rollout of Collibra to document data assets
- **March 2019**: School and Staff data populated into Jeffco ODS; 1st Extract sourced from Jeffco ODS (POC)
- **April 2019**: Data integration roadmap built
- **May 2019**: Data extract roadmap built

Leading Indicators

- # of Jeffco data assets/approved business terms defined in Collibra
- # of Jeffco data assets mapped to ed-fi data elements
- # of Jeffco data assets integrated into operational data store
- # of district-supported learning/instructional applications using Ed-Fi ODS to integrate data
- # of district-supported 3rd-party learning/instructional applications using Ed-Fi API to integrate data

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