



Third Party Environmental Data Management (EDM)

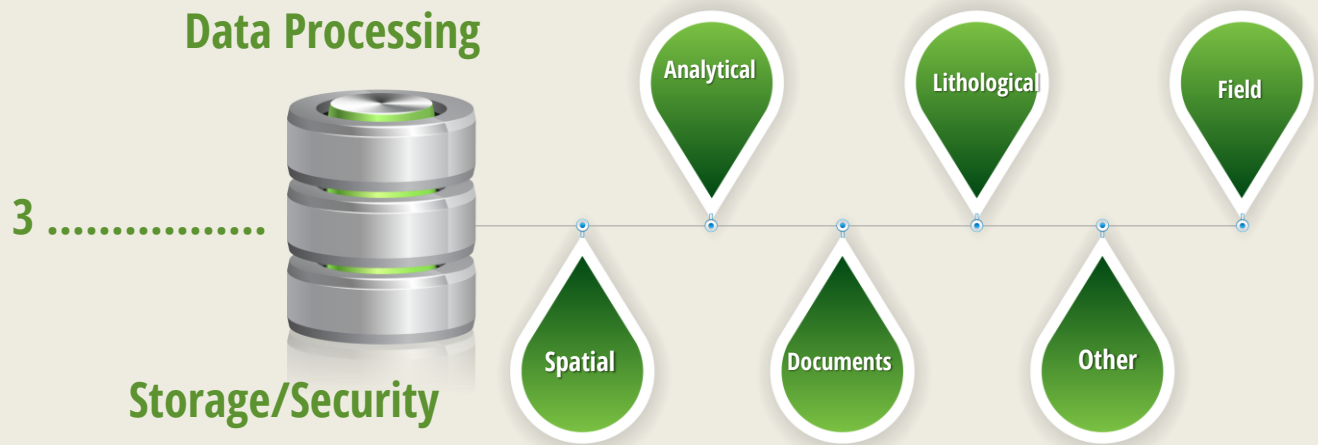
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Common EDM Activities

1 Project Planning
Database Design/Setup

2 Data Collection and Input

Each step can be outsourced



4 Data Output

Why Small & Medium AEC's Would Use 3rd Party EDM Suppliers

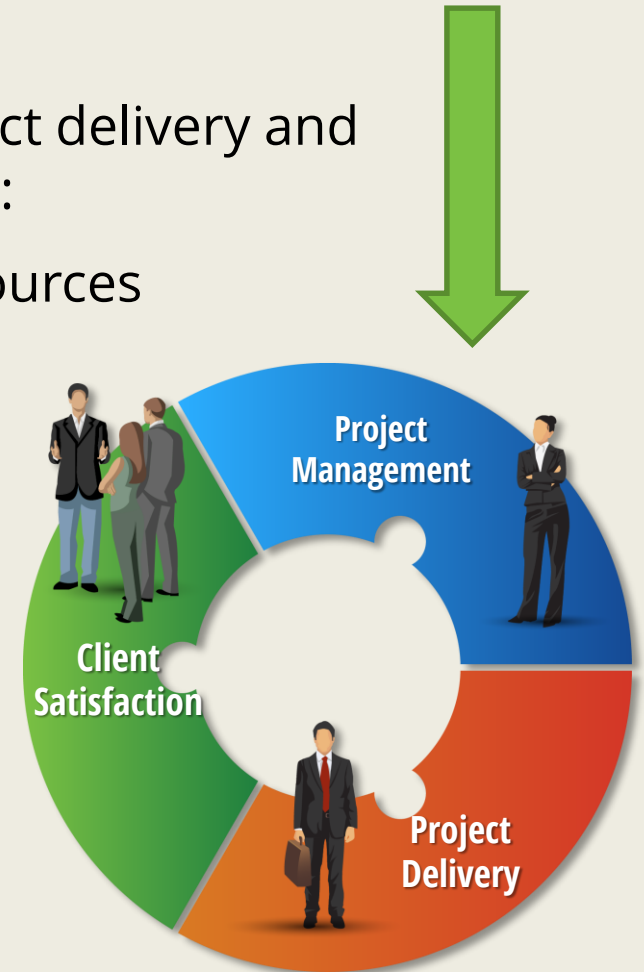
**Specific topics
to be covered**

- Focus on primary corporate mission instead of technology
- Access to state of the art software
- Hardware power and redundancy
- Proven best practices
- Established workflow patterns
- Subject matter experts with EDM experience
- Lower investment costs
- Ability to generate sophisticated deliverables cost effectively
- Creative subcontracting can give funding and timing flexibility
- Staff augmentation can expand/contract workforce when needed

Focus On Corporate Mission

- ✓ Focus should be on enhancing core capabilities to enhance competitive edge
- ✓ State of the Art EDM will enhance project delivery and competition with the big guys, however:
 - EDM is not simple and requires resources
 - Large capital and staff investments are required
 - Staff distractions
 - Staff need time to develop and for ongoing training

Dilemma: How do you have it and not focus on it?



State of the Art Software

- ✓ SAS
 - Lower initial investments
 - Pay for what you need when you need it.
 - Little setup and maintenance
 - Use vetted software and add-ons
 - Can move to self-performance when/if ready and cost effective
 - Share workflow

or

- ✓ Purchase your own software
 - 3rd party setup and maintenance
 - Share workflow

Can outsource this in at least two flexible ways



State of the Art Hardware

- ✓ State of the art server farms are essential for data safety
 - Backup and redundancy are expensive
- ✓ Performance requires the right hardware
- ✓ Web-facing servers can be a security issue if not experienced
- ✓ Multiple users: 24/7 Help Desk is valuable to AEC and stakeholders



Capital intensive

Very specialized skill set required



Proven Best Practices

How to do things right

- ✓ Origin of best practices is experience on multiple EDM projects
- ✓ 3rd party EDM track record of success can be vetted
- ✓ Staff training records should be available
- ✓ Completeness – all workflow steps should have best practices
- ✓ Legacy data requires special considerations
 - Difficult
 - Expensive
 - Multiple steps
 - Extensive best practices required

This goes wrong big and fast

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Established Workflow

✓ Industry knowledge and EDM experience drive this

1.0 Project Planning & Setup	2.0 Sample Collection & Management	3.0 Lab Analysis	4.0 Data Validation	5.0 Data Management	6.0 Data Evaluation & Reporting
1.1 Project Setup	2.1 Sample Management	3.1 Sample Analysis	4.1 Internal Chemical Data Validation	5.1 Project Data	6.1 Data Prep & Processing for Reporting
1.2 QAPP, SAP, DMP, DQOs Integration	2.2 Sample Collection	3.2 EDD Management	4.2 External Chemical Data Validation	5.2 Other Contractor & Legacy Data	6.2 Tabular Data Queries & Reports
1.3 Laboratory Setup	2.3 Sample Data Management	3.3 Hard Copy Management	4.3 Senior Review of Validated Data	5.3 Database Maintenance & Administration	6.3 Field Logs and Graphs
1.4 Database Setup					6.4 GIS Queries and Maps

Good project planning



Successful project delivery

- ✓ Flexibility and scalability are essential to accommodate multiple project and client types
- ✓ Workflow can be shared; BPs still have to be followed
- ✓ Importance of lessons learned on workflow design and execution

Subject Matter Expertise



- ✓ EDM technicians with subject matter experience are invaluable
- ✓ There is more to EDM than gathering, storing, and disseminating data. **Knowing the subject matter is critical.**
- ✓ Ability to speak the language with clients and stakeholders
 - Avoid hitting common stakeholder hot buttons
- ✓ Critical eye on site representativeness
 - Catch issues that pure EDM might not
- ✓ Agency deliverables can be expensive to generate unless there is subject matter expertise (see next slide)



Sophisticated Deliverables

Difficult to do effectively and correctly without EDM and subject matter expertise.

Automation a plus

Takes years to perfect the workflow



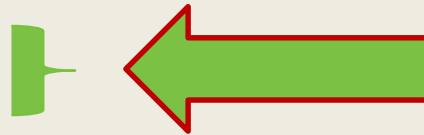
Programming, QC, Testing

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- ERPIMS
- GEOTRACKER
- NIRIS
- Exceedance Reports
- Spatial Layers
- MVS
- EVS **Speak two languages**
- GINT

Efficient Contract Models

- ✓ Ideal contracting
 - Pay as you go
 - Make incremental financial commitments
- ✓ Available vehicles
 - MSAs (**ground rules**)
 - TOs (**specific project needs**)
 - Well defined scope and needs
- ✓ Teaming agreements
Partnership agreements
 - Multiple MSAs
- ✓ Staff Augmentation
 - Expand/contract workforce w/out HR
 - Resume enhancement



**Longer term commitments,
mutual benefits**



Summary: Five Major Advantages of 3rd Party EDM



Q&A Discussion



Some Additional Slides for **Discussion**

These are details of the Critigen
software/hardware approach.



DMS

General Design

Cloud Data Management Environment

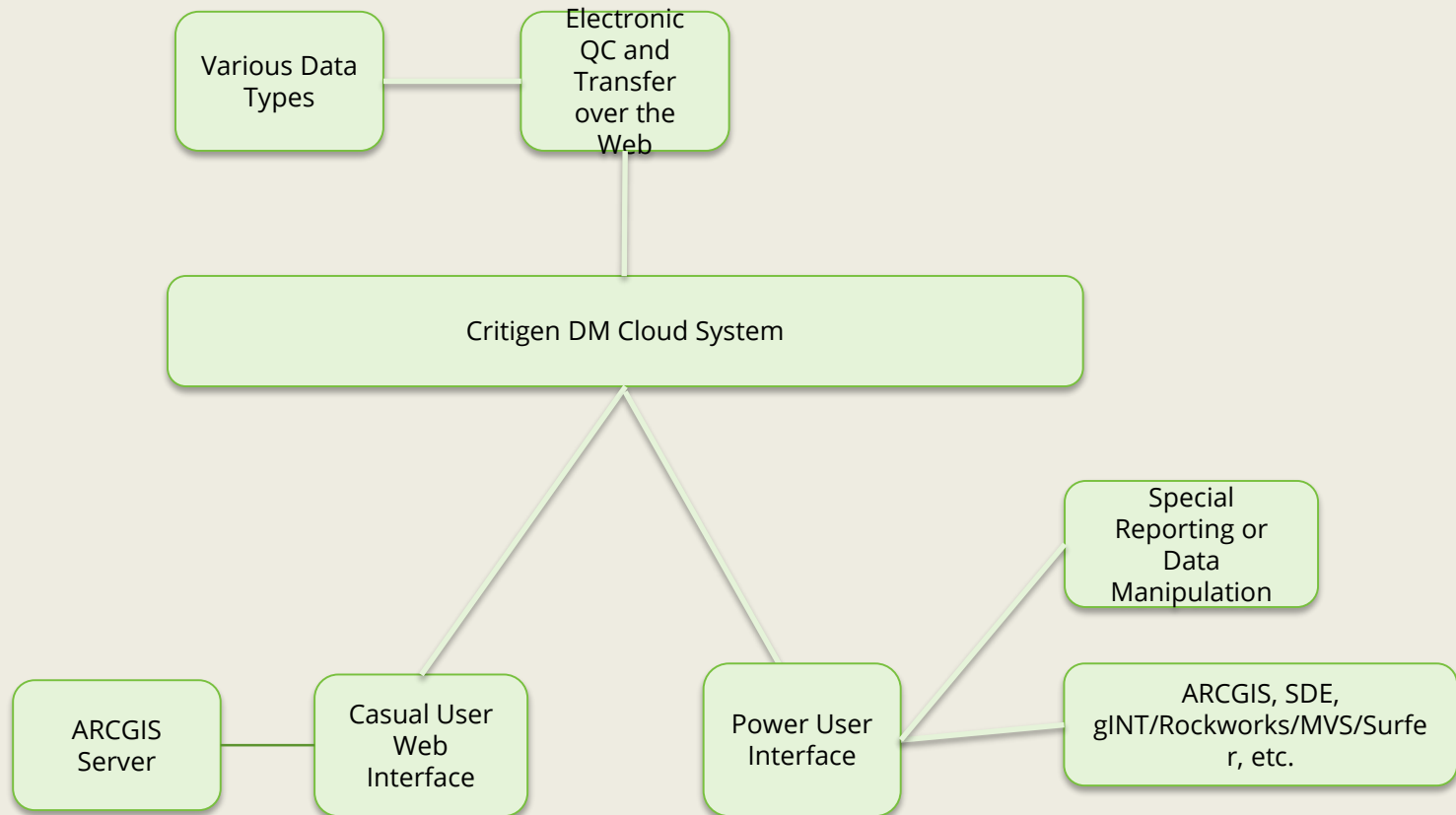
- State-of-the art environmental data management tools
- Best-in-class IT infrastructure and support
- Designed for multi-party collaboration
- Centered on Earthsoft's EQUS 5 line of tools
- Enhanced with proprietary tools and services



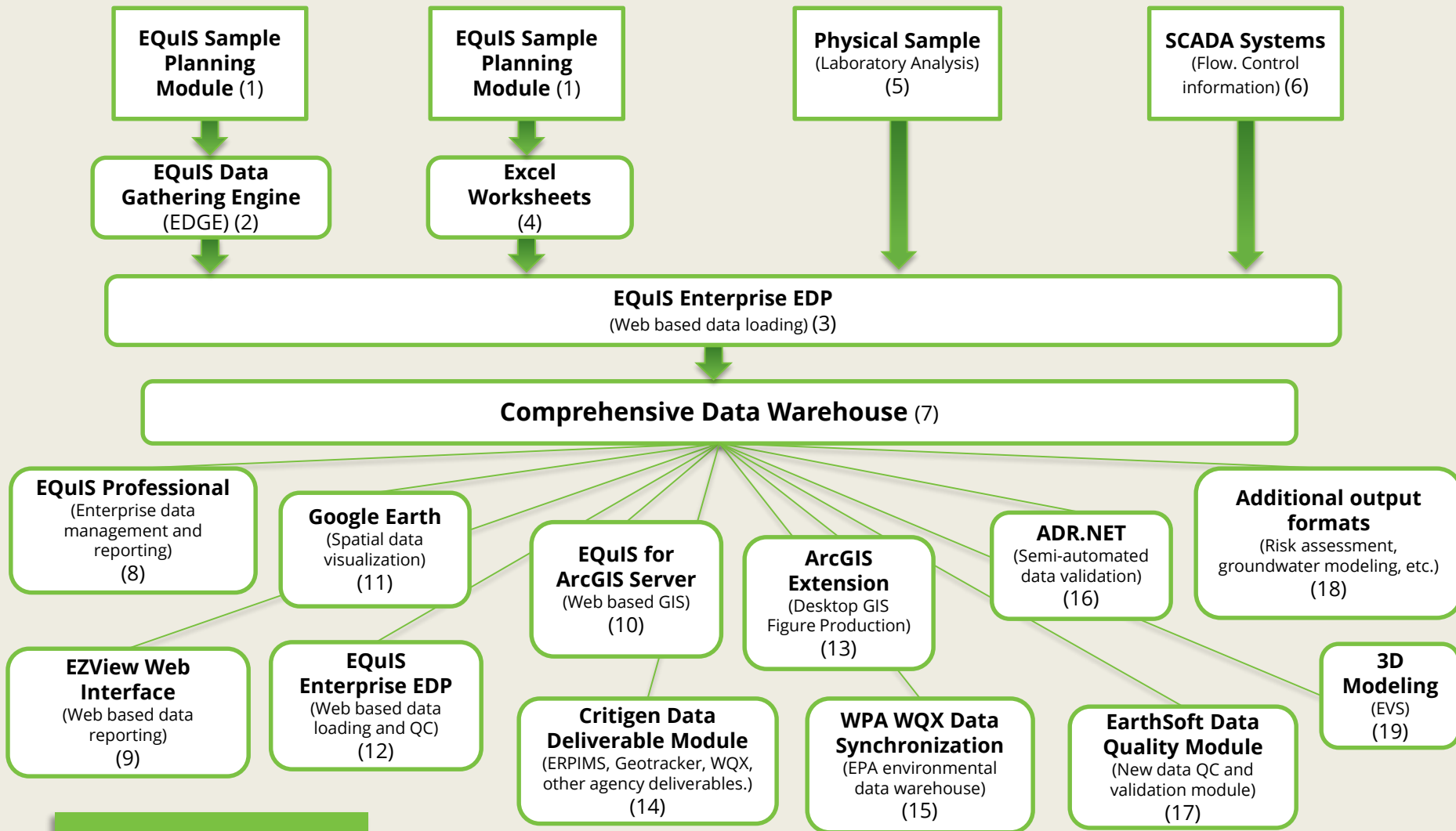
MODULAR CLOUD DMS

Commercial Modules and Proprietary Apps

SQL Server with Web Server

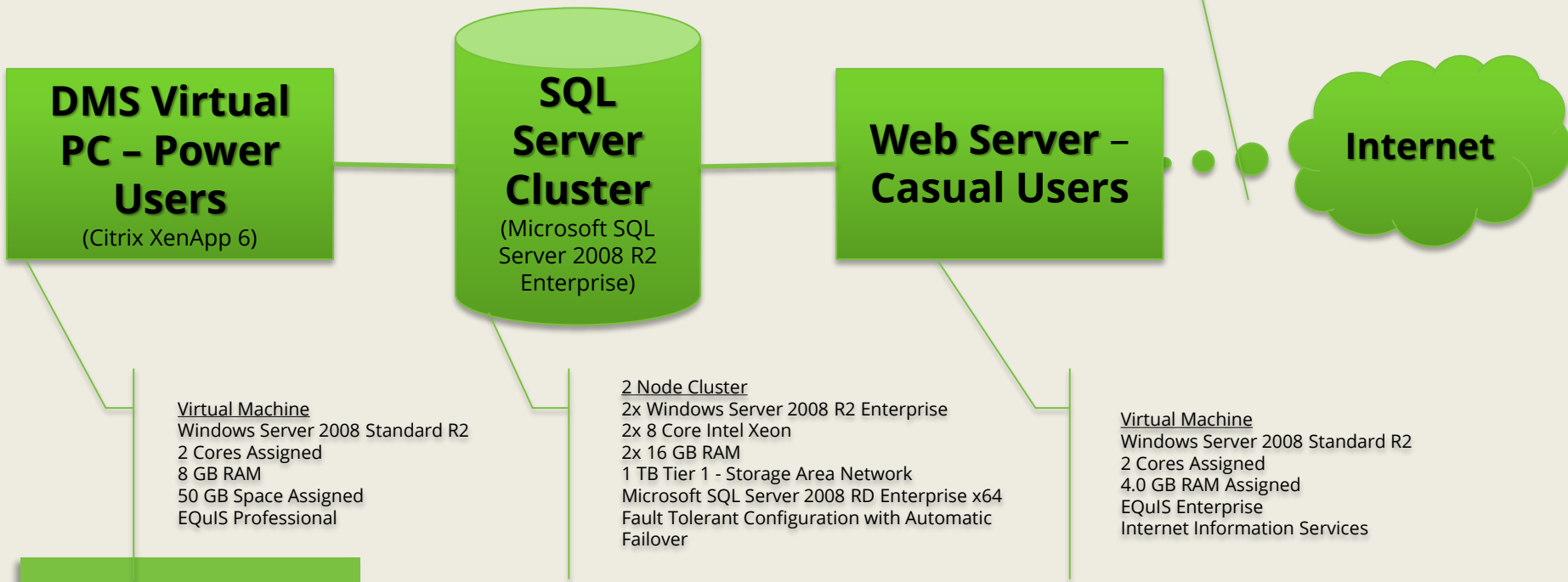


Detailed Critigen Environmental Data Flow



Critigen DMS Server Infrastructure

- Enterprise Earthsoft, ArcGIS Server and Professional accessible via the Internet
- Proprietary Apps Linkage
- 24x7 Help Desk Support
- Detailed Backup and Restore plan



DMS Virtual PC - Power Users

(Citrix XenApp 6)

Virtual Machine
 Windows Server 2008 Standard R2
 2 Cores Assigned
 8 GB RAM
 50 GB Space Assigned
 EQuIS Professional

SQL Server Cluster

(Microsoft SQL Server 2008 R2 Enterprise)

2 Node Cluster
 2x Windows Server 2008 R2 Enterprise
 2x 8 Core Intel Xeon
 2x 16 GB RAM
 1 TB Tier 1 - Storage Area Network
 Microsoft SQL Server 2008 RD Enterprise x64
 Fault Tolerant Configuration with Automatic Failover

Web Server - Casual Users

Virtual Machine
 Windows Server 2008 Standard R2
 2 Cores Assigned
 4.0 GB RAM Assigned
 EQuIS Enterprise
 Internet Information Services

Internet