# Appendix A: Terms and Definitions

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**First Level Terms:**

Big data - Advanced techniques that harness independent resources for building scalable data systems when the characteristics of the datasets require new architectures for efficient storage, manipulation, and analysis.

Data Provider – Organization or entity that introduces information feeds into the big data system for discovery, access, and transformation by the big data system.

Transformation Provider – Organization or entity that executes a generic “vertical system” data life cycle, including: (a) data collection from various sources, (b) multiple data transformations being implemented using both traditional and new technologies, (c) diverse data usage, and (d) data archiving.

Vertical Orchestrator – Organization or entity that defines and integrates the required data transformations components into an operational vertical system.

Capabilities Provider – Organization or entity that provides a computing fabric (such as system hardware, network, storage, virtualization, and computing platform) to execute certain transformation applications, while maintaining security and privacy requirements.

Data Consumer - End users or other systems that use the results of data transformations.

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**Second Level Terms:**

Data Service Abstraction – The interface for both registering data sources and querying the registry so that transformation functions can locate a data provider, identify what comparable data it contains, understand what types of access is allowed, understand what types of analysis are supported, where the data source is located, how to access the data, security requirements for the data, privacy requirements for the data, etc.

Usage Service Abstraction –

System Service Abstraction –

Capabilities Service Abstraction –

Interoperability - The capability to communicate, to execute programs, or to transfer data among various functional units under specified conditions.

Portability – The ability to transfer data from one system to another without being required to recreate or reenter data descriptions or to modify significantly the application being transported.

Reusability –

Extendability -

Security –Protecting data, information, and systems from unauthorized access, use, disclosure, disruption, modification, or destruction in order to provide:

(a) integrity: guarding against improper data modification or destruction, and includes ensuring data nonrepudiation and authenticity;

(b) confidentiality: preserving authorized restrictions on access and disclosure, including means for protecting personal privacy and proprietary data;

(c) availability: ensuring timely and reliable access to and use of data.

Privacy - The assured, proper, and consistent collection, processing, communication, use and disposition of data associated with personal information (PI) and personally-identifiable information (PII) throughout its life cycle.

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**Third Level Terms:**

Software as a Service (SaaS) - The capability provided to the consumer to use applications running on a cloud infrastructure. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings. (Source: NIST CC Definition)

Platform as a Service (PaaS) - The capability provided to the consumer to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly application hosting environment configurations. (Source: NIST CC Definition)

Infrastructure as a Service (IaaS) - The capability provided to the consumer to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, deployed applications, and possibly limited control of select networking components (e.g., host firewalls). (Source: NIST CC Definition)

# Appendix B: Acronyms

# Appendix C: References

The lists below provide examples of resources that may be helpful.

[1] White House Press Release, “Obama Administration Unveils “Big Data” Initiative”, 29 March 2012, <http://www.whitehouse.gov/sites/default/files/microsites/ostp/big_data_press_release_final_2.pdf>

[2] White House, “Big Data Across The Federal Government”, 29 March 2012, <http://www.whitehouse.gov/sites/default/files/microsites/ostp/big_data_fact_sheet_final_1.pdf>

[3] NIST, Big Data Workshop, 13 June 2012, <http://www.nist.gov/itl/ssd/is/big-data.cfm>

[4] NIST, Big Data Public Working Group, 26 June 2013, <http://bigdatawg.nist.gov/home.php>

[5] National Science Foundation, “Big Data R&D Initiative”, June 2012, <http://www.nist.gov/itl/ssd/is/upload/NIST-BD-Platforms-05-Big-Data-Wactlar-slides.pdf>

[6] Gartner, “3D Data Management: Controlling Data Volume, Velocity, and Variety”, <http://blogs.gartner.com/doug-laney/files/2012/01/ad949-3D-Data-Management-Controlling-Data-Volume-Velocity-and-Variety.pdf>

[7] Gartner, “The Importance of 'Big Data': A Definition”, <http://www.gartner.com/DisplayDocument?id=2057415&ref=clientFriendlyUrl>

[8] Hilbert, Martin and Lopez, Priscilla, “The World’s Technological Capacity to Store, Communicate, and Compute Information”, Science, 01 April 2011

[9] Department of Defense, “Reference Architecture Description”, June 2010, <http://dodcio.defense.gov/Portals/0/Documents/DIEA/Ref_Archi_Description_Final_v1_18Jun10.pdf>

[10] Rechtin, Eberhardt, “The Art of Systems Architecting”, CRC Press; 3rd edition, 06 January 2009

[11] ISO/IEC/IEEE 42010 Systems and software engineering — Architecture description, 24 November 2011, <http://www.iso.org/iso/catalogue_detail.htm?csnumber=50508>