Preview: IT4220 : Database Administration

Syllabus

Course Overview

IT4220 puts the focus on the roles and responsibilities of database administrators and explores how they contribute to the work of data management. Factors include determining how database design, administration, regulations, and standards can impact effective data management processes. You will also explore the tools and strategies that allow a database administrator to support the work of data management.

Course Competencies

(Read Only)

To successfully complete this course, you will be expected to:

1. Analyze the roles and responsibilities of the database administrator in meeting data management objectives.
2. Evaluate how specific database design and administration activities, rules and standards impact effective data management activities.
3. Apply data security and privacy strategies and tools that will support both data management and the rights of the subjects of that data.
4. Apply the tools and strategies that allow database administrators to support the work of data management.
5. Communicate effectively.

Course Prerequisites

IT2230.

The materials listed below are required to complete the learning activities in this course.

Library

The following required readings are provided in the Capella University Library or linked directly in this course. To find specific readings by journal or book title, use Journal and Book Locator. Refer to the Journal and Book Locator library guide to learn how to use this tool.

- Asif Naeem, M., Dobbie, G., & Weber, G. (2013). Big data management in the context of real-time data warehousing. In W-C. Hu & N. Kaabouch (Eds.), *Advances in data mining and database management: Big data management, technologies, and applications* (pp. 150–152). Hershey, PA: Information Science Reference.
- Branescu, I., Purcarea, V., & Dobrescu, R. (2014). Solutions for medical databases optimal exploitation. *Journal of Medicine and Life, 7*(1), 109–118.
- Dowell, M. A. (2012). HIPAA privacy and security HITECH Act enforcement actions begin. *Employee Benefit Plan Review, 66*(12), 9–11.
- Greene, A. (2012). HIPAA compliance for clinician texting. *Journal of AHIMA, 83*(4), 34–36.
- Kim, J. (2014). Big data sharing among academics. In W-C. Hu & N. Kaabouch (Eds.), *Advances in data mining and database management: Big data management, technologies, and applications* (pp. 177–194). Hershey, PA: Information Science Reference.
- Krutz, R., Vines, R., & Brunette, G. (2010). *Cloud security: A comprehensive guide to secure cloud computing.* Hoboken, NJ: Wiley
- Linoff, G. S. & Berry, M. J. (2011). *Data mining techniques: for marketing, sales, and customer relationship management* (3rd ed.). Indianapolis, IN: Wiley.
- Minow, M. (2002). The USA Patriot Act. *Library Journal, 127*(16), 52–55.
- Mullins, C. S. (2013). Database administration and storage management. *Database Trends and Applications*, *27*(2), 53.
- Murthy, C. S. (2008). *Database management design.* Mumbai, India: Himalaya Publishing House.
- Ofner, M., Otto, B., & Osterle, H. (2012). Integrating a data quality perspective into business process management. *Business Process Management Journal, 18*(6), 1036–1067.
- Pallaw, V. K. (2010). *Database management systems* (2nd ed.). New Delhi, India: Asian Books Pvt Ltd.
- Pavolotsky, J. (2013). Privacy in the age of big data. *The Business Lawyer, 69*(1), 217–225.
- Pike, G. H. (2007). The PATRIOT Act illuminated. *Information Today*, *24*(5), 17–18.
- Pike, G. H. (2010). The PATRIOT Act is back. *Information Today*, *27*(1), 15–17.
- Poolet, M. A. (2011). Database design essentials. *SQL Server Magazine*, *13*(4), 14–18.
- Rode, D. (2010). Keeping HITECH in context. *Journal of AHIMA, 81*(10), 18–20.
- Sims, A. (2010). *Oracle Database 11g: Underground advice for database administrators.* Birmingham, UK: Packt Publishing.
- Stephens, R. (2009). *Beginning database design solutions.* Indianapolis, IN: Wiley.
- Taitsman, J. K., Grimm, C. M., & Agrawal, S. (2013). Protecting patient privacy and data security. *The New England Journal of Medicine*, *368*(11), 977–979.
- Tomes, J. (2012). Keeping it private. *Journal of AHIMA*, *83*(3), 32–35.
- Wiggy, Z. (2010). Database security. *SQL Server Magazine*, *12*(4), 41–43.

- Witt C. (2011). HIPAA versus the Cloud. *Managed Care Outlook*, *24*(16), 10–11.

External Resource

Please note that URLs change frequently. While the URLs were current when this course was designed, some may no longer be valid. If you cannot access a specific link, contact your instructor for an alternative URL. Permissions for the following links have been either granted or deemed appropriate for educational use at the time of course publication.

- Funza Academy. (2013). How to become a database administrator or DBA [Video]. Retrieved from http://youtu.be/r1kKrt6lkaM
- U.S. Department of Labor: Bureau of Labor Statistics. (2014). Occupational outlook handbook: Database administrators. Retrieved from http://www.bls.gov/ooh/computer-and-information-technology/database-administrators.htm

Suggested

The following materials are recommended to provide you with a better understanding of the topics in this course. These materials are not required to complete the course, but they are aligned to course activities and assessments and are highly recommended for your use.

Optional

The following optional materials are offered to provide you with a better understanding of the topics in this course. These materials are not required to complete the course.

Library

The following optional readings may be available in the Capella University Library. To find specific readings by journal or book title, use Journal and Book Locator. Refer to the Journal and Book Locator library guide to learn how to use this tool. If the full text is not available, you may be able to request a copy through the Interlibrary Loan service.

- Biegelman, M. T. (2009). *Identity theft handbook: Detection, prevention, and security.* Hoboken, NJ: John Wiley and Sons.
- Sales, N. A. (2010). Mending walls: Information sharing after the USA PATRIOT Act. *Texas Law Review*, *88*(7), 1795–1854.

External Resource

Please note that URLs change frequently. While the URLs were current when this course was designed, some may no longer be valid. If you cannot access a specific link, contact your instructor for an alternative URL. Permissions for the following links have been either granted or deemed appropriate for educational use at the time of course publication.

- Computeach. (2010). Database administration as a career [Video]. Retrieved from http://youtu.be/Y7ilZYkwR9I
- ISeek. (2012). Database administrator interview [Video]. Retrieved from http://youtu.be/Jos6dRLzi80
- U.S. Department of Health and Human Services. (n.d.) Summary of the HIPAA privacy rule. Retrieved from http://www.hhs.gov/ocr/privacy/hipaa/understanding/summary/index.html
- U.S. Department of Justice. (n.d.). Highlights of the USA PATRIOT Act. Retrieved from http://www.justice.gov/archive/ll/highlights.htm

Unit 1 >> Roles and Responsibilities of the Database Administrator

Introduction

Data collection, storage, analysis, and use are a major part of the business world of the twenty-first century. As more and more of citizens' personal and private information, both from a societal and constitutional perspective, becomes electronic and travels great distances in very short times, both benefits and risks inure to that format and to those individuals. Data are truly the grist for the information mill required to power businesses.

In order to effectively manage a business in today's environment, it is essential to effectively manage its information flow and to effectively manage its collection, maintenance, use, and quality. The developing, analyzing, and processing of data is accomplished in the context of a database. The database is not simply a passive storage receptacle; it defines the relationships within the data, making searching, filtering, and other data functions rapid, smooth, and accurate. Keeping the databases finely tuned and functioning well requires a database administrator who not only performs these critical tasks and supervises those who perform the daily data duties, but also fits into the overall business administration. In this way, the strategic use of information is a permanent part of the business.

In Unit 1, we will analyze the roles and responsibilities of the database administrator. We will not only identify those roles and responsibilities, but also draw sharp descriptions of them. The goal is not simply to consider those roles and responsibilities in isolation, but also in the context of meeting the management objectives of the entire business.

Learning Activities

u01s1 - Studies

Readings

Use the Capella Library to complete the following:

- In Pallaw's 2005 e-book, *Database Management Systems*, read pages 2–5 and 22–24.
- Read pages 150–152 of Asif Naeem, Dobbie, and Webber's chapter "Big Data Management in the Context of Real-Time Data Warehousing," in Hu and Kaabouch's e-book, *Advances in Data Mining and Database Management: Big Data management, Technologies, and Applications.*
- In Murthy's 2008 e-book, *Database Management Design*, read pages 221–246.
- Read Ofner, Otto, and Osterle's 2012 article, Integrating a Data Quality Perspective into Business Process Management," in *Business Process Management Journal*, volume 18, issue 6, pages 1036–1067.

Use the Internet to complete the following:

- Review the U.S. Department of Labor's Occupational Outlook Handbook for Database Administrators.

Optional Multimedia

The People of the Database System Environment

Transcript

Click **The People of the Database System Environment** to launch the presentation.

- Computeach. (2010). Database administration as a career [Video]. Retrieved from http://youtu.be/Y7iIZYkwR9I
- Funza Academy. (2013). How to become a database administrator or DBA [Video]. Retrieved from http://youtu.be/r1kKrt6IkaM
- ISeek. (2012). Database administrator interview [Video]. Retrieved from http://youtu.be/Jos6dRLzi80

Course Resources

The People of the Database System Environment

u01s2 - Library and Internet Research

Use the following keywords to engage in research on database administrator roles and responsibilities that will support the completion of the unit assignment and discussion:

- Database administrator tasks.
- Database administrator role.
- Database administrator responsibilities.
- Database administrator activities.
- Role of database administrators.
- Responsibilities of database administrators.

u01a1 - Business Objectives in Database Administration

Two small businesses, Apex Computer Parts and City Computer Supply Co., have merged into a single entity, keeping the name of City Computer Supply Co. The new company will begin with combined sales exceeding that of all other companies competing in the region, making it a medium-sized business. Each parent company had small IT departments without clear employee structure, even though much of their business management was heavily dependent on relational database management systems. Apex's system was developed and maintained in Microsoft Access over the past six years, whereas the system in the premerger City Computer Supply Co. was 10 years old and was developed and maintained using Microsoft SQL Server.

The Board of Directors and the CEO of the new company set out some of the business objectives that directly relate to a new Information Systems Division and have appointed a new chief information officer. Since it is clear that the combined City Computer Supply Co. will need a solid IS/IT base with a more clearly defined structure, the CIO has contracted you to assist her in the planning and implementation of the new department, and specifically to consult on hiring a new database administrator and other staff as needed to meet the business objectives and to manage the transition to a fully operational department.

The Board and CIO set out the following business objectives for the new department:

- Combine all data into a single centralized system.
- Streamline all software applications to properly support all business functions of the merged company.
- Protect all business information as the valuable assets they represent.
- Vigilantly monitor and maintain all informational assets.
- Minimize any threats to the business' informational assets from loss by any means and from breaches of confidentiality.
- Ensure the integrity of all information owned by the business.
- Constantly optimize the information system software.
- Develop and implement all information policies, procedures, and standards.
- Plan for future implementation of data warehousing and data mining operations.

Research and write a 2–3 page paper that covers the following:

- Analyze the roles and responsibilities of the database administrator in the context of stated business objectives.
- Describe the education and experience requirements you would require of applicants to the database administrator position.
- Describe how the existing skills of database administrator applicants will be vetted to ensure the best candidate is chosen.

Assignment Requirements

- **Written communication:** Written communication is free of errors that detract from the overall message.
- **APA formatting:** Resources and citations are formatted according to current APA style and formatting.
- **Length of paper:** 2–3 pages, excluding the references page.
- **Font and font size:** Times New Roman, 12 point.

Course Resources

APA Style and Format

u01d1 - Role of the DBA in Various Business Types.

The study materials cover how the roles and responsibilities of the database administrator may be both similar and different due to the context of various business settings, such as retail, healthcare, financial, and educational businesses. The underlying core business processes that make up the mission of the organization can influence what the role of database administrator involves. The same is true of the size of an organization. In smaller settings, database administration is just one part of a general IT role that covers a broad span of responsibilities; in a large multinational conglomerate, the role might involve very specific tasks and activities.

In this discussion, please state and explain your findings on this issue in clear academic prose, and document your facts with references from your research. The goal is to point out how the role of the DBA is impacted by the environment in which they do their work.

Response Guidelines

Read the posts of your peers and respond to two (minimum) and expand on the concepts covered in their initial post. Quantity and quality of your posts will determine the value of the group's learning experience. Provide a substantive and appropriate response.

Course Resources

Undergraduate Discussion Participation Scoring Guide

Unit 2 >> Factors That Influence Database Design

Introduction

In Unit 2, the learner will evaluate how specific database design and administration activities, rules, and standards impact effective data management activities. In doing so, the learner will specifically identify, describe, and articulate the database design and administration activities, rules, and standards that may impact data management activities. Data design can be described in ten "golden rules," as follows:

1. Articulate the purpose of the database.
2. Find the correct tool.
3. List the requirements of the database.
4. Perform accurate data modeling.
5. Link data relationships.
6. Determine proper data types.
7. Index data models.
8. Use a functional naming scheme.
9. Use SQL or other code accurately.
10. Record the results.

In carefully following such rules, and consulting standards for data within a particular industry, the database administrator builds a strong base on which to later maintain the database and perform all management activities. Upon completion of this unit, the learner will have a clearer understanding of how databases and the position of the database administrator flow together.

Learning Activities

u02s1 - Studies

Readings

Use the Capella Library to read the following:

- Read Branescu, Purcarea, and Dobrescu's 2014 article, "Solutions for Medical Databases Optimal Exploitation," in *Journal of Medicine and Life,* volume 7, issue 1, pages 109–118.

- Read Mullins' 2013 article, "Database Administration and Storage Management," in *Database Trends and Applications*, volume 27, issue 2, page 53.
- Read Poolet's 2011 article, "Database Design Essentials," in *SQL Server Magazine*, volume 13, issue 4, pages 14–18.
- From Sims's 2010 e-book, *Oracle Database 11g – Underground Advice for Database Administrators*, read pages 24–67.
- From Stephens' 2009 e-book, *Beginning Database Design Solutions*, read:
  - Chapter 1, "Database Design," pages 3–22.
  - Chapter 19, "Database Maintenance," pages 379–387.
- Read Wiggy's 2010 article, "Database Security," in *SQL Server Magazine*, volume 12, issue 4, pages 41–43.

Optional Multimedia

Relational Databases

Transcript

Planning a Database: Introduction to Database Systems

Transcript

Programming and Database System Resources

Transcript

- Click **Relational Databases** to view the presentation.
- Click **Planning a Database: Introduction to Database Systems** to view the presentation.
- Click **Programming and Database System Resources** to view the presentation.

Course Resources

Relational Databases
Planning a Database: Introduction to Database Systems
Programming and Database System Resources

u02s2 - Library and Internet Research

Library and Internet Research

Use the following keywords to research factors that impact database design which will support completion of the unit assignment and discussion:

- Database design factors.
- Database design impacts.
- Database design standards.
- Database design regulatory and legal.
- Database design security.
- Database design privacy.
- Database design data quality.
- Database design collection methods.

u02a1 - Factors That Impact Database Design

Some database administrators assume their role managing existing databases have already been fully designed and implemented. Throughout the career of a database administrator it is likely, however, that there will be need to design a new database for the organization. There are an array of factors that influence the approach a database administrator will take when designing a new database, including the objectives of the database, the data in which it will be stored, the location and activities of the database users, and the degree to which the data collected and stored in the database will be integrated with other organizational data. There are also external factors that might influence database design, including data security and privacy regulatory requirements, standard practices, and benchmarking objectives.

Use the organization described in the Unit 1 assignment as the model for your analysis and write a 2–3 page paper that covers the following:

- Evaluate the internal factors that influence the design choices for a new database that will be used to collect and store a comprehensive inventory of existing IT equipment.
- Evaluate the external standards, practices, or regulatory requirements that will influence the design choices for a new database that will collect and store a comprehensive inventory of existing IT equipment.
- Describe the steps involved in designing a new database that will be used to collect and store a comprehensive inventory of existing IT equipment.

Assignment Requirements

- **Written communication:** Written communication is free of errors that detract from the overall message.
- **APA formatting:** Resources and citations are formatted according to current APA style and formatting.
- **Length of paper:** 2–3 pages, excluding the references page.
- **Font and font size:** Times New Roman, 12 point.

Course Resources

APA Style and Format

u02d1 - Data Management Activities at the Pampered Pet

As the new database administrator at The Pampered Pet, a new business catering to canines, you will be involved initially in database design activities. The specifics for the business and a rough guide to your specific activities may be found in Chapter 11 (pages 227–244) of the Stephens e-book, *Beginning Database Design Solutions* (see link in the Resources). Please use this scenario and research other information on the Internet or via the Capella Library to discuss the following:

- As you review the various activities you will be performing in database design and administration, how will those activities, and the associated rules and standards, impact effective data management in the future for The Pampered Pet?

Response Guidelines

Read the posts of your peers and respond to two (minimum) and expand on the concepts covered in their initial post. Quantity and quality of your posts will determine the value of the group's learning experience. Provide a substantive and appropriate response.

Course Resources

Undergraduate Discussion Participation Scoring Guide

Beginning Database Design Solutions

Unit 3 >> Data Security and Privacy Strategies and Tools

Introduction

Since the earliest of times, business security and privacy have been issues of some concern. A strong lock on the door was basic, but proper screening and training of those the business entrusted with the keys were vital. Security for the business' information, whether written or in methodology, have been critical issues, along with protection of business assets. Security is key for competitive reasons and to protect the privacy of the business' owners, employees, and customers. As businesses grew into larger enterprises, security and privacy needs multiplied, and electrical alarms and security teams became part of the business landscape.

In the last half of the twentieth century, as the greater value of assets transitioned from plant, machinery, and inventory to information systems, new concepts of security and privacy evolved. And as information systems steadily became more electronic, the security systems and concerns for privacy had to evolve as well. Wire-tapping turned into hacking. Attacks on business assets became cyberattacks. Business espionage went from human "plants" on site, morphing into Chinese government employees sitting in secret offices in Shanghai. Cybersecurity and confidentiality, while met with security personnel common to the entire computer system, are concerns of the entire enterprise.

In the twenty-first century, data began to accumulate in databases and even in data warehouses. Access to that increasing amount of data grew from applications within databases to entire data mining operations, spanning multiple databases and multiple locations. As informational value began to center on databases, the security and privacy came more under the purview of the database administrator. Standards and rules for data security and for maintaining privacy of all data developed and has become a critical function of data management.

While such security and privacy issues apply to businesses of all types, some businesses have special concerns, such as financial institutions and online retailers. Large retail chains with both online and in-store centers of profit are in the news lately with security breaches that impact large segments of the retail population, making people vulnerable to identity theft. As government incentives have augmented the already rapid computerization of the healthcare industry, security and privacy of health data have become major concerns. Omnibus laws have been passed, such as HIPAA and HITECH, that have provided entire sets of rules and standards to protect the personal health data of patients, especially the more vulnerable ones.

The purpose of Unit 3 is to study how database administrators develop and use security and privacy tools and strategies, based on the underlying rules and standards, to support data management and to protect the interests of businesses and customers.

Learning Activities

u03s1 - Studies

Readings

- Read Dowell's 2012 article, "HIPAA Privacy and Security HITECH Act Enforcement Actions Begin," in *Employee Benefit Plan Review*, volume 66, issue 12, pages 9–11.
- Read Greene's 2012 article, "HIPAA Compliance for Clinician Texting," in *Journal of AHIMA*, volume 83, issue 4, pages 34–36.
- Use Krutz, Vines, and Brunette's 2010 e-book, *Cloud Security: A Comprehensive Guide to Secure Cloud Computing* to read Chapter 5, pages 153–176.
- Read Minow's 2002 article, "The USA PATRIOT Act," in *Library Journal*, volume 127, issue 16, pages 52–55.
- Read Pavolotsky's 2013 article, "Privacy in the Age of Big Data," in *The Business Lawyer*, volume 69, issue 1, pages 217–225.
- Read Pike's 2007 article, "The PATRIOT Act Illuminated," in *Information Today*, volume 24, issue 5, pages 17–18.
- Read Pike's 2010 article, "The PATRIOT Act Is Back, in *Information Today*, volume 27, issue 1, pages 15–17.
- Read Rode's 2010 article, "Keeping HITECH in Context," in *Journal of AHIMA*, volume 81, issue 10, pages 18–20.
- Read Taitsman, Grimm, and Agrawal's 2013 article, "Protecting Patient Privacy and Data Security," in *The NewEngland Journal of Medicine*, volume 368, issue 11, pages 977–979.
- Read Tomes' 2012 article, "Keeping It Private," in *Journal of AHIMA*, volume 83, issue 3, pages 32–35.
- Read Witt's 2011 article, "HIPAA Versus the Cloud," in *Managed Care Outlook*, volume 24, issue 16, pages 10–11.

Optional Readings

- Biegelman, M. T. (2009). *Identity theft handbook: Detection, prevention, and security*. Hoboken, NJ: John Wiley and Sons.
- Sales, N. A. (2010). Mending walls: Information sharing after the USA PATRIOT Act. *Texas LawReview, 88*(7), 1795–1854.
- U.S. Department of Health and Human Services. (n.d.). Summary of the HIPAA privacy rule. Retrieved from http://www.hhs.gov/ocr/privacy/hipaa/understanding/summary/index.html
- U.S. Department of Justice. (n.d.). Highlights of the USA PATRIOT Act. Retrieved from http://www.justice.gov/archive/ll/highlights.htm

Library and Internet Research

Use the following keywords to engage in research on the subject of security and privacy rules that impact the work of database administrators:

- FERPA.
- HIPAA.
- SOX.
- Patriot Act.
- HiTech Act.
- Data security regulations.
- Information security regulations.
- Data privacy regulations.
- Information privacy regulations.
- Data privacy rights.
- Information privacy rights.
- Data Subject privacy rights.

u03a1 - Potential Data Security and Privacy Breach

Upon opening your browser early one morning, you see a Yahoo! News story about an arrest that was made the previous day involving a major cybercrime ring. As you read more of the story, it seems that authorities are going through computers and servers seized from the criminals' offices and have identified more than 20 companies that may have had their customer and retail transactions compromised. One of the companies listed, it turns out, was SuperMart, Inc., the company for which you have been employed as a database administrator for the past nine years. You leave a message on the office phone of your superior, John Dalton, the CIO of SuperMart.

SuperMart is a medium-sized retail company that evolved from a grocery chain in the 1980s. While the corporation has 200 stores, primarily in your region of the country, it carries a full line of grocery and household items in large outlets that are linked by a very up-to-date computer network with real-time integration of data into a series of databases. Your department has been working on a project that will be transferring all data into a data warehouse and streamlining data mining operations. Security for the system is handled by a security department for physical security, an IT security division of the network administration department, and by the team of data security and privacy specialists within your own data management department.

Even in these early moments of this possible breach of security, after your shock wears off, you understand that the CIO's response will be to meet immediately with all security personnel, with the database administrator, the

network manager, the corporate legal team, and possibly the CEO and CFO. You have assigned your assistant to get as much information as possible from authorities, and you are making initial notes on a plan to proceed with SuperMart's response to such a potentially toxic data breach.

Research and write a 2–3 page paper that covers the following:

- Explain the tools available to database administrators that would prevent security breaches such as the one that may have occurred at SuperMart.
- Describe the strategies that are available to database administrators that would prevent security breaches such as the one that may have occurred at SuperMart.
- Identify the laws, rules, and standards that may be applicable to SuperMart and this possible security breach.

Assignment Requirements

- **Written communication:** Written communication is free of errors that detract from the overall message.
- **APA formatting:** Resources and citations are formatted according to current APA style and formatting.
- **Length of paper:** 2–3 pages, excluding the references page.
- **Font and font size:** Times New Roman, 12 point.

Course Resources

APA Style and Format

u03d1 - Federal Rules of Data Security and Privacy

Many rules and standards used by data administrators are derived from federal statutes. Recent laws have made a considerable impact on their respective fields; these laws are best known by their acronyms or nicknames—HIPAA, FERPA, SOX, and the Patriot Act.

Use the study and research materials and discuss these regulations and provide examples of how they might influence or otherwise impact the work of database administrators who are directly and/or indirectly impacted by these regulations.

Response Guidelines

Read the posts of your peers and respond to two (minimum) and expand on the concepts covered in their initial post. Quantity and quality of your posts will determine the value of the group's learning experience. Provide a substantive and appropriate response.

Course Resources

Undergraduate Discussion Participation Scoring Guide

Unit 4 >> Tools and Strategies That Support the Work of Data Management

Introduction

In Unit 4, learners will identify and describe the tools and strategies that database administrators need to support data management. Additionally, leaners will have the opportunity to study the use of those tools and strategies to support data management activities. Data management tasks are continual through the entire database lifecycle. In fact, it is helpful to organize the workload of the database administration along the continuum of the database lifecycle. In the planning and development phases, strategies are available for determining the database structure and network architecture. There are large numbers of tools to use for the modeling, coding, and structure of the data and the database. Tools such as entity-relationship diagrams, database management software such as SQL Server, MS Access, and Oracle, query languages such as SQL Visual Basis, JAVA, and software tools that code specific database structures and tasks are plentiful and available.

As earlier units have delineated the role of the database administrator, the duties require data management tools to enter, search, and report on data. As the amount of data increases, tools may be needed to store data in data warehouses, and to development mining processes. Repairs on data and databases may be needed and tools such as normalization and other data integrity tools may be needed. The initial architectures of client-server or web-based require strategies and tools to control access and to avoid collisions. Upgrading databases also requires strategies and tools to manage.

In addition to learning about the large assortment of such tools and procedures, the learner will study the actual use of such tools and strategies in the management of various data management scenarios.

Learning Activities

u04s1 - Studies

Readings

Use the Capella Library to complete:

- Use the Linoff and Berry 2011 e-book, *Data Mining Techniques: For Marketing, Sales, and Customer Relationship Management* to read pages 1–50.
- Review Mullins' 2013 article, "Database Administration and Storage Management," in *Database Trends and Applications*, volume 27, issue 2, page 53.
- Review pages 221–246 in Murthy's 2008 e-book, "Database Management Design."
- Read Kim's Chapter 8, "Big Data Sharing Among Academics," in Hu and Kaabouch's 2014 e-book, *Advances in Data Mining and Database Management: Big Data Management, Technologies, and Applications*.
- Use the Pallaw 2010 e-book, *Database Management Systems* to read pages 132–143.

u04s2 - Library and Internet Research

Library and Internet Research

Use the following keywords to engage in library and Internet research related to database management tools and strategies, which will support completion of the unit assignment and discussion:

- Data cleansing tools.
- Data discovery tools.
- Data management tools.
- Database management tools.
- Data normalization tools.
- Data normalization concepts.
- Data transformation tools.
- Data integration tools.
- Data collection tools.
- Data archiving tools.
- Data destruction tools.
- Data storage tools.

u04a1 - Practical Application of Data Management Tools

There is an array of tools that are needed in the work of data management. These include tools to assist in data discovery, data integration, data transformation, and data cleansing, just to name a few. Because of the

complexity of the types and variety of tools involved in the work of data management, one approach to a fuller understanding of the topic is to begin by considering the steps involved in managing data.

Use the study and research materials to write a 2–3 page paper that addresses the following:

- Identify the steps involved in data management, from initial planning for data collection to retiring, archiving, or destroying data no longer in use.
- Describe the tools that are required to accomplish each step in the data management process.
- Explain the approach needed to identify from among those tools which are best-of-breed or most commonly used.

Assignment Requirements

- **Written communication:** Written communication is free of errors that detract from the overall message.
- **APA formatting:** Resources and citations are formatted according to current APA style and formatting.
- **Length of paper:** 2–3 pages, excluding the references page.
- **Font and font size:** Times New Roman, 12 point.

Course Resources
Database Management Design
APA Style and Format

u04d1 - Database Normalization as a Strategic Tool

Database normalization is an important aspect of database management and is sometimes a complicated concept to fully grasp. In concept, database normalization involves the ordering of the database in such a way as to reduce the amount of redundancy. A primary reason to avoid redundancy is that it is inefficient, it costs more money to support and maintain, and possibly most importantly, it creates the need to engage in synchronization of data so that the data does not become unaligned. One example might be a customer address field. If the customer zip code exists in more than one location within a particular database it is possible that any changes to it will be changed in only one location, creating an unalignment of that field. (For example, if the sales department updates a customer's address, but that update does not carry over to the customer service department's data.) By normalizing that database, the zip code would exist in only one location even if it might be used within more than one context by the system.

Use the study and research materials to discuss the following:

- What are the steps involved in database normalization?

- What are the tools and resources available to support database normalization activities?
- In what context is it or is it not appropriate to engage in database normalization?

Response Guidelines

Read the posts of your peers and respond to two (minimum) and expand on the concepts covered in their initial post. Quantity and quality of your posts will determine the value of the group's learning experience. Provide a substantive and appropriate response.

Course Resources
Undergraduate Discussion Participation Scoring Guide

Unit 5 >> Application of Data Management and Database Administration Concepts

Introduction

Unit 5 is the final unit of this course and is designed to integrate all earlier learning competencies and objectives in IT4220, stressing the additional competency of communicating the business and IT concepts and processes effectively in written form, and to demonstrate critical thinking about each issue discussed. Effective communication includes not only the organization of one's information and logical conclusions, but doing so with high-level writing skills and following current APA format, so that all such papers are ready to submit for publication.

Learning Activities

u05s1 - Studies

Optional Readings

Review your readings throughout the course to clarify any topics as needed.

Optional Media

Watch the presentation, Design and Operation of a Data Warehouse.

u05s2 - Internet and Library Research

Internet and Library Research

Use the following keywords to engage in research on ERP systems and IT project management which will support completion of the unit assignment and discussion

- Enterprise Resource Planning.
- ERP systems.
- IT project management.
- ERP data management.
- ERP system data discovery.
- ERP system data cleansing.
- ERP system database design.

u05a1 - Application of Database Administration Concepts

A regional health and life insurance company with offices throughout the Midwest has recently purchased a sophisticated enterprise resource planning (ERP) system. This company had been in business for 35 years and had accumulated an array of Excel spreadsheets, MS-Access databases, paper records, and homemade data collection and storage solutions. You have been hired to help the CIO of this company get his arms around this project.

Use the study and research materials that have been covered in the first four units of this course to write a 6–8 page paper that includes the following:

- Create a job description that includes the responsibilities you will assume as part of this project.
- Recommend the appropriate steps for designing the ERP database into which the existing data will ultimately be stored.
- Recommend data management procedures that will support the internal and external factors specific to data collection and storage within the context of the health and insurance industries.
- Identify applicable federal, state, and local data security and privacy regulations that would impact database design and data management within this context.
- Identify industry standards, best practices, and benchmarking resources that are available to help support this project.
- Document the tools that will be needed to accomplish the goals of this project.

Assignment Requirements

- **Written communication:** Written communication is free of errors that detract from the overall message.
- **APA formatting:** Resources and citations are formatted according to current APA style and formatting.
- **Length of paper:** 6–8 pages, excluding the references page.
- **Font and font size:** Times New Roman, 12 point.

Course Resources
Data Mining Techniques: For Marketing, Sales, and Customer Relationship Management
APA Style and Format
Big Data Management in the Context of Real-Time Data Warehousing
Design and Operation of a Data Warehouse | Transcript

u05d1 - IT Project Management Concepts

It is common for IT projects to be focused on hardware and software; however, as was pointed out in an earlier unit, the most valuable information asset is nearly always the data that the technology collects and stores. IT project management is a specialty area within the field of project management. Enterprise resource planning (ERP) systems are complex technologies that typically collect and store data from a variety of streams, which allows for easier integration and analysis of that data than when it is stored in separate silos and a variety of formats.

Use the study and research materials and discuss the following:

- What are some of the resources you found most useful in identifying relevant concepts related to IT project management?
- What are the primary components of an ERP system?
- How would you identify the location and quality of existing data that would be appropriate for inclusion in the new ERP system?

Response Guidelines

Read the posts of your peers and respond to two (minimum) and expand on the concepts covered in their initial post. Quantity and quality of your posts will determine the value of the group's learning experience. Provide a substantive and appropriate response.

Course Resources

Undergraduate Discussion Participation Scoring Guide

u05d2 - Course Reflections

Share with your fellow learners what you have found most informative about the course and how you can apply what you have learned in future endeavors.

Response Guidelines

Share with two of your peers how their participation in this course has helped to enhance your own understanding of the concepts.

Course Resources

Undergraduate Discussion Participation Scoring Guide