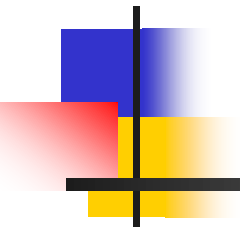
Decision Support and Business Intelligence Systems
(9th Ed., Prentice Hall)



Chapter 3:

Decision Support Systems Concepts, Methodologies, and Technologies: An Overview

Learning Objectives

- Understand possible decision support system (DSS) configurations
- Understand the key differences and similarities between DSS and BI systems
- Describe DSS characteristics and capabilities
- Understand the essential definition of DSS
- Understand important DSS classifications
- Understand DSS components and how they integrate

Learning Objectives

- Describe the components and structure of each DSS component
- Explain Internet impacts on DSS (and vice versa)
- Explain the unique role of the user in DSS versus management information systems
- Describe DSS hardware and software platforms
- Become familiar with a DSS development language
- Understand current DSS issues

Opening Vignette:

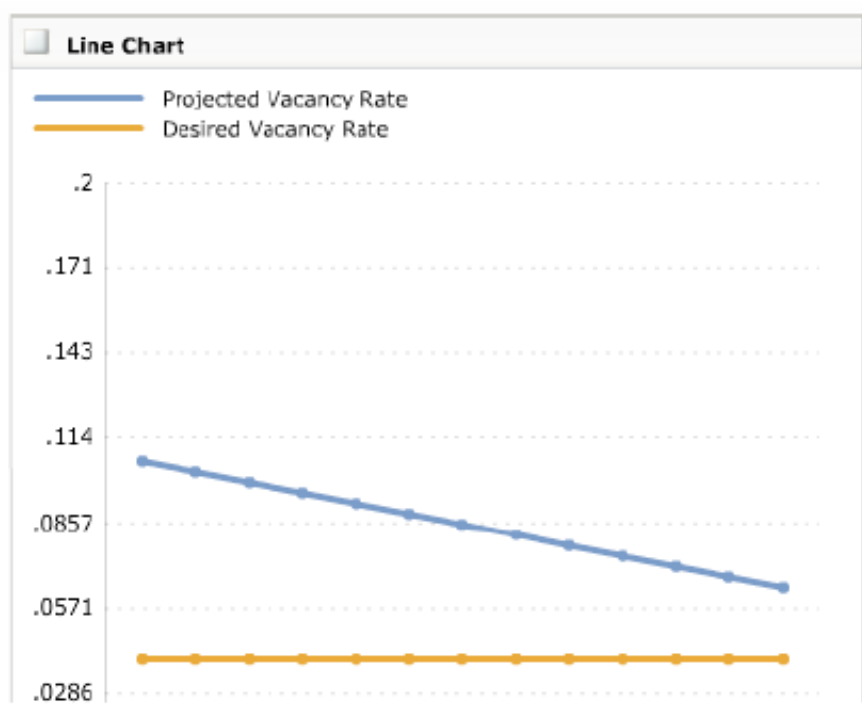
"Decision Support System Cures for Health Care"

- Company background
- Problem
- Proposed solution
- Results
- Answer and discuss the case questions

Opening Vignette:

"Decision Support System Cures for Health Care"

- Projected Vacancy Rate versus Desired Vacancy Rate

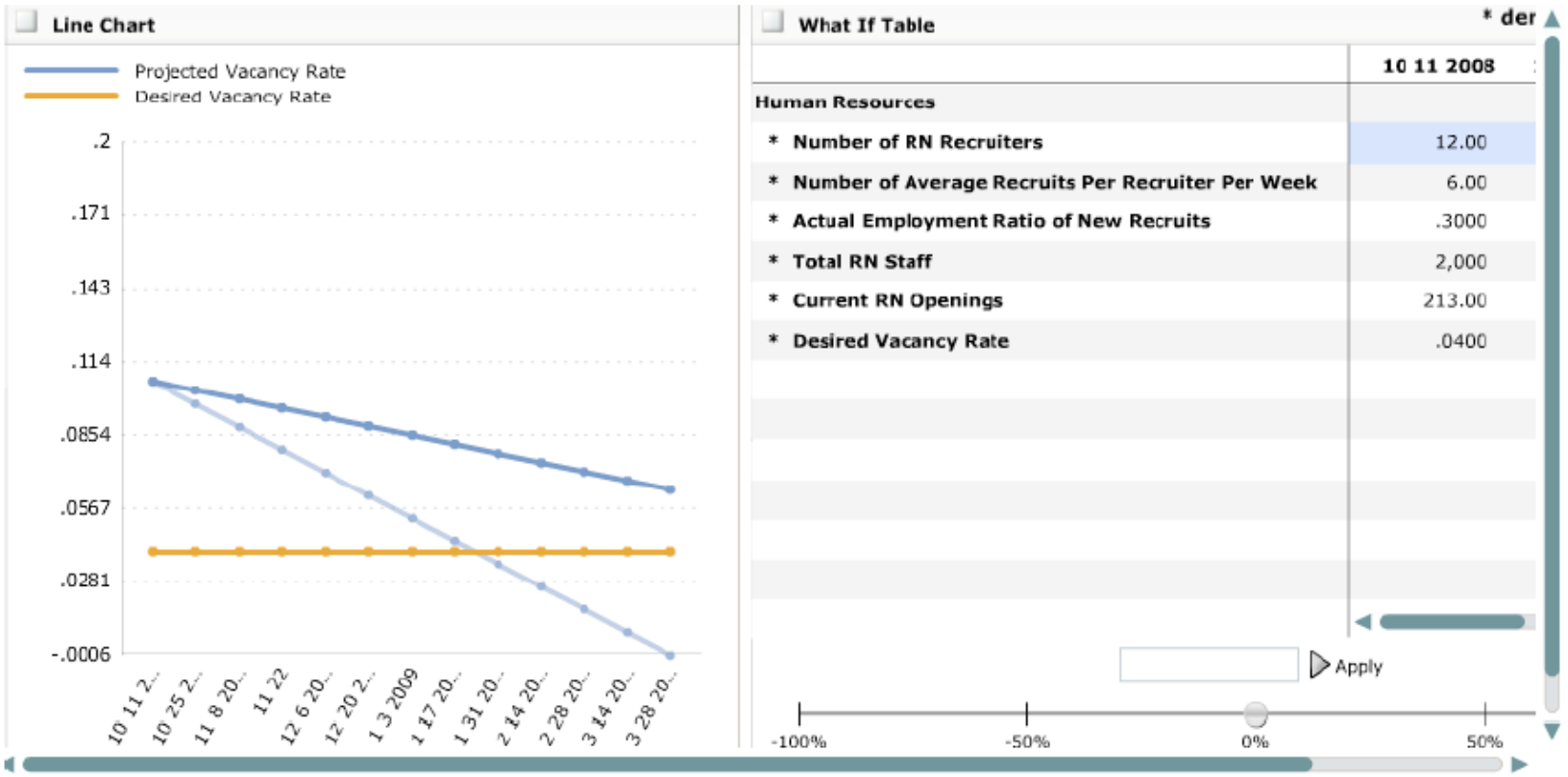


What If Table

	10 11 2008
Human Resources	
* Number of RN Recruiters	6.00
* Number of Average Recruits Per Recruiter Per Week	6.00
* Actual Employment Ratio of New Recruits	.3000
* Total RN Staff	2,000
* Current RN Openings	213.00
* Desired Vacancy Rate	.0400

Opening Vignette:

- Projected Vacancy Rate vs. Desired Vacancy Rate "What-if" scenario with 6 additional RN recruiters



Opening Vignette:

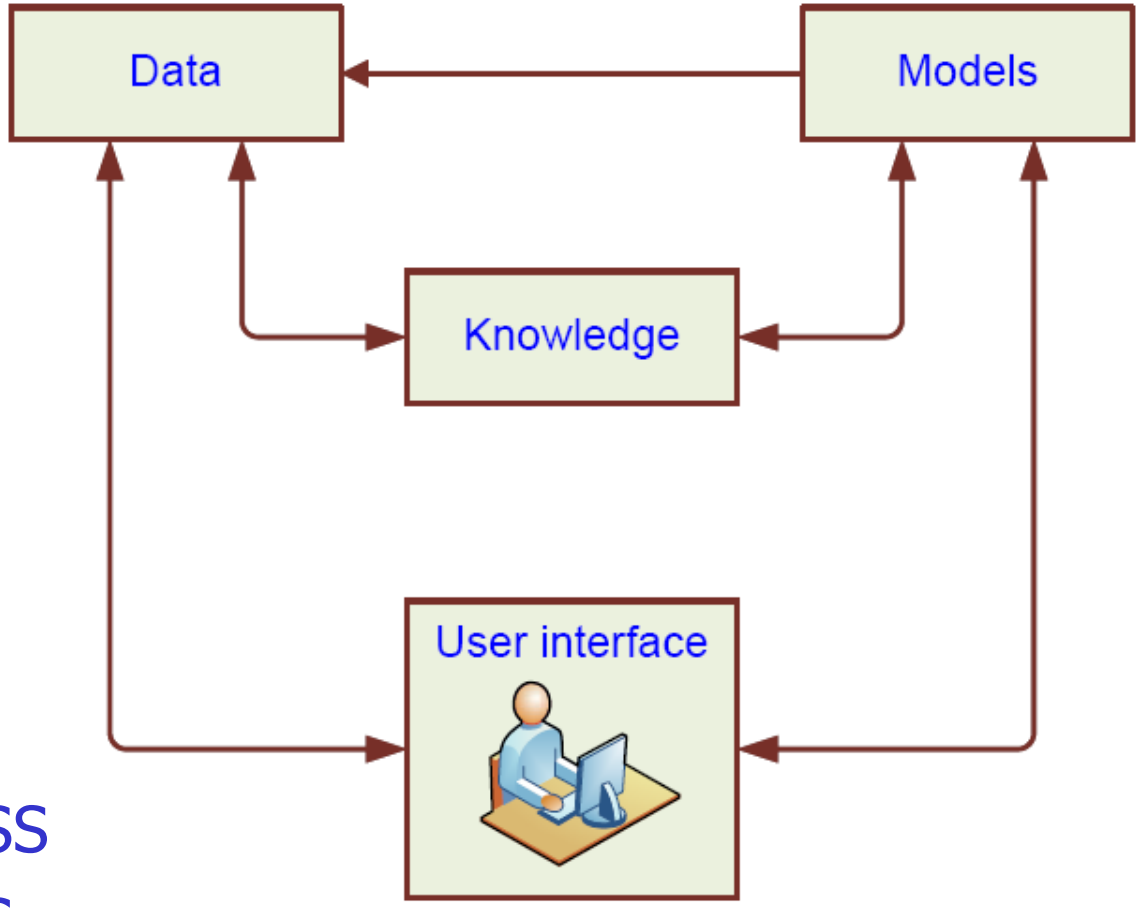
- Demanded Hours versus Total Actual Hours versus Total Actual Hours with New Hires

DSS Configurations

- Many configurations exist; based on
  - management-decision situation
  - specific technologies used for support
- DSS have three basic components
  1. Data
  2. Model
  3. User interface
  4. (+ optional) Knowledge

DSS Configurations

- Each component
  - has several variations; are typically deployed online
  - Managed by a commercial of custom software
- Typical types:
  - Model-oriented DSS
  - Data-oriented DSS



DSS Description

- An early definition of DSS
  - A system intended to support managerial decision makers in semistructured and unstructured decision situations
  - meant to be adjuncts to decision makers (extending their capabilities but not replacing their judgment)
  - aimed at decisions that required judgment or at decisions that could not be completely supported by algorithms
  - would be computer based; operate interactively; and would have graphical output capabilities...

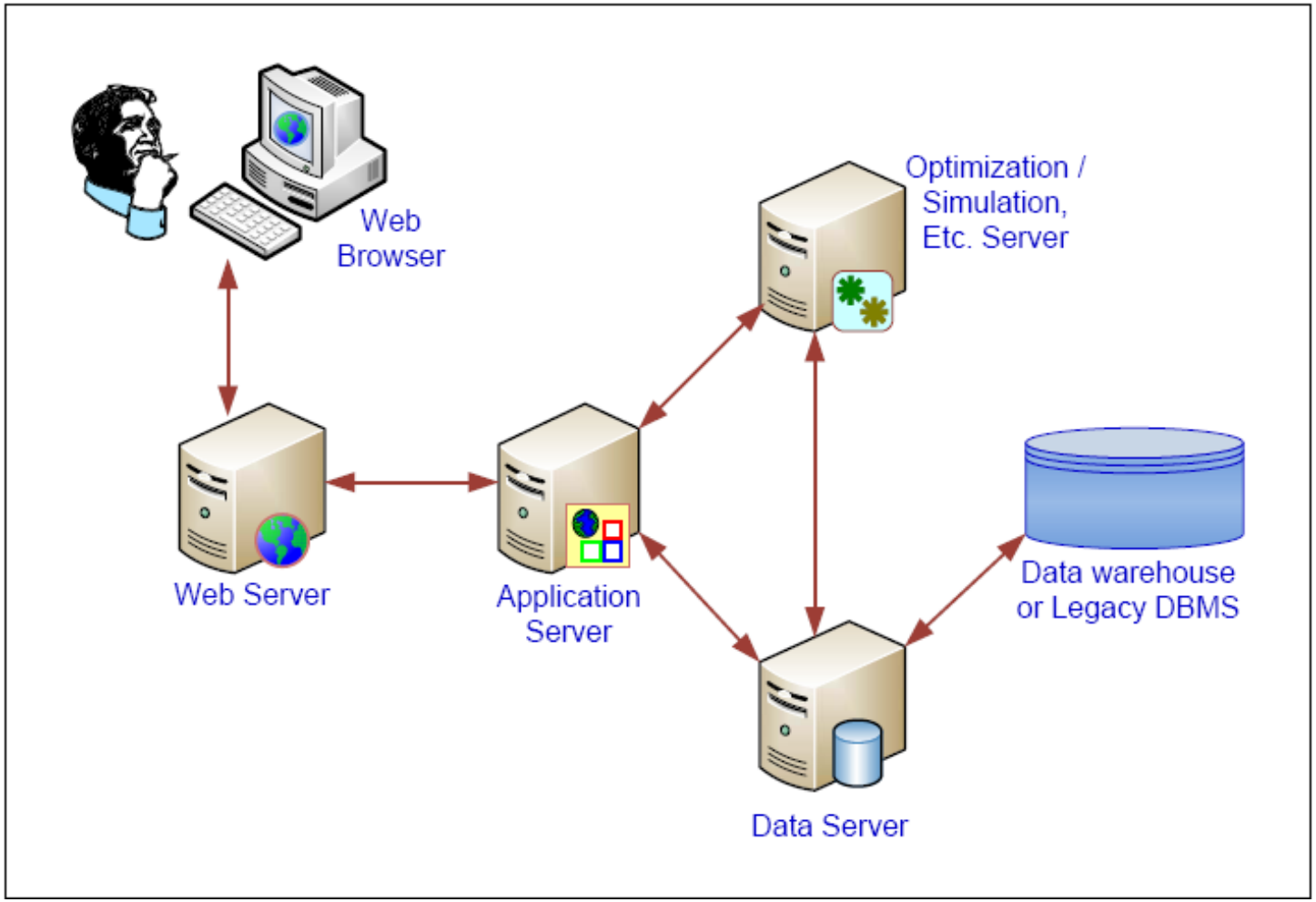
DSS Description

- A DSS is typically built to support the solution of a certain problem (or to evaluate a specific opportunity). This is a key difference between DSS and BI applications
  - BI systems monitor situations and identify problems and/or opportunities, using variety of analytic methods
  - The user generally must identify whether a particular situation warrants attention
  - Reporting/data warehouse plays a major role in BI
  - DSS often has its own database and models

DSS Description

- DSS is an approach (or methodology) for supporting decision making
  - uses an interactive, flexible, adaptable computer-based information system (CBIS)
  - developed (by end user) for supporting the solution to a specific nonstructured management problem
  - uses data, model and knowledge along with a friendly (often graphical; Web-based) user interface
  - incorporate the decision maker's own insights
  - supports all phases of decision making
  - can be used by a single user or by many people

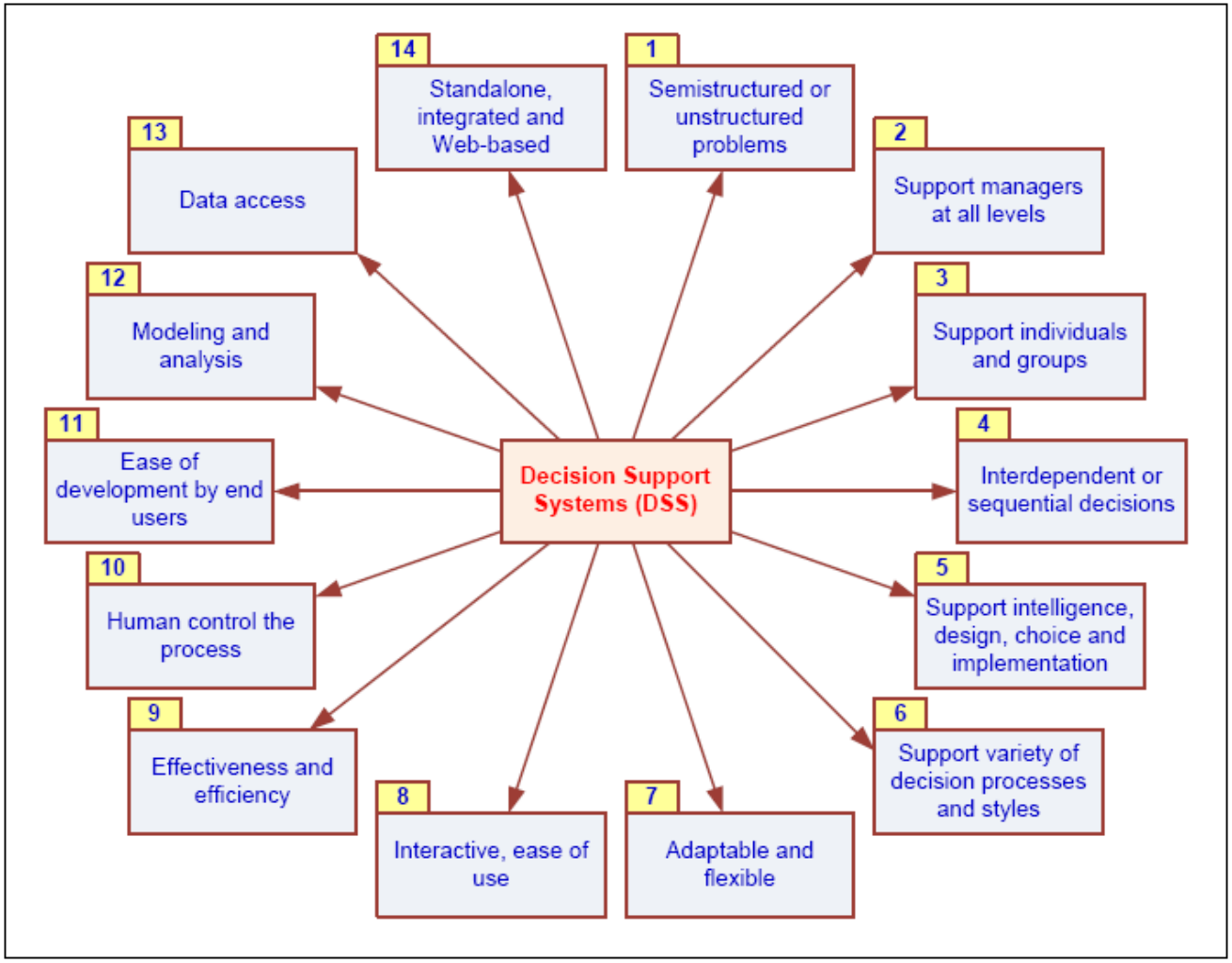
A Web-Based DSS Architecture



DSS Characteristics and Capabilities

- DSS is not quite synonymous with BI
  - DSS are generally built to solve a specific problem and include their own database(s)
  - BI applications focus on reporting and identifying problems by scanning data stored in data warehouses
  - Both systems generally include analytical tools (BI called business analytics systems)
  - Although some may run locally as a spreadsheet, both DSS and BI uses Web

DSS Characteristics and Capabilities



DSS Characteristics and Capabilities

- Business analytics implies the use of models and data to improve an organization's performance and/or competitive posture
- Web analytics implies using business analytics on real-time Web information to assist in decision making; often related to e-Commerce
- Predictive analytics describes the business analytics method of forecasting problems and opportunities rather than simply reporting them as they occur

DSS Classifications

- Other DSS Categories
  - Institutional and ad-hoc DSS
  - Personal, group, and organizational support
  - Individual support system versus group support system (GSS)
  - Custom-made systems versus ready-made systems

DSS Classifications

- Holsapple and Whinston's Classification
  1. The text-oriented DSS
  2. The database-oriented DSS.
  3. The spreadsheet-oriented DSS
  4. The solver-oriented DSS
  5. The rule-oriented DSS (include most knowledge-driven DSS, data mining, management, and ES applications)
  6. The compound DSS

DSS Classifications

- Alter's Output Classification

Orientation	Category	Type of Operation
Data	File drawer systems	Access data items
	Data analysis systems	Ad hoc analysis of data files
Data or models	Analysis information systems	Ad hoc analysis involving multiple databases and small models
Models	Accounting models	Standard calculations that estimate future results on the basis of accounting definitions
	Optimization models	Calculating an optimal solution to a combinatorial problem

DSS Classifications

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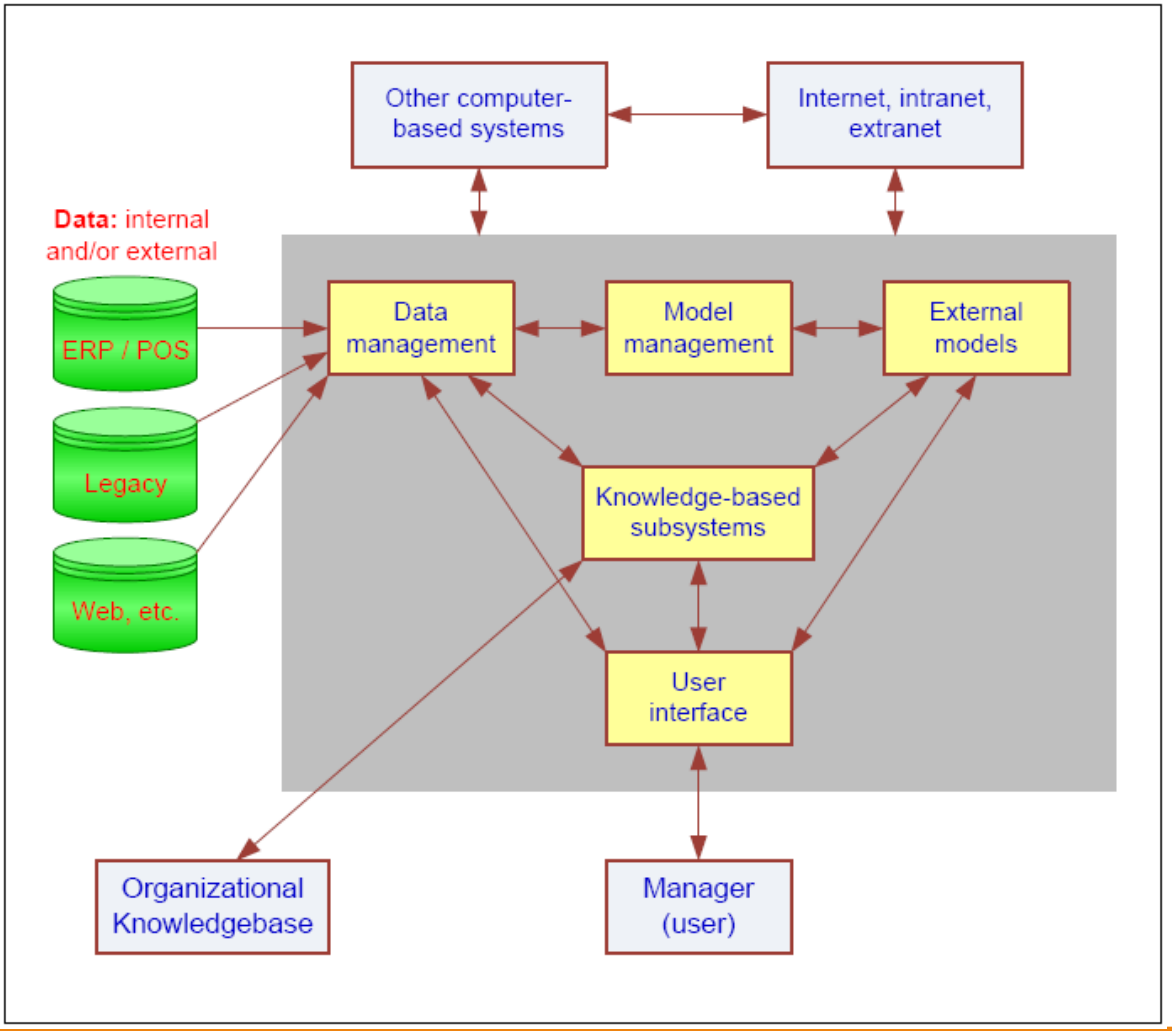
Components of DSS



Components of DSS

- Data Management Subsystem
  - Includes the database that contains the data
  - Database management system (DBMS)
  - Can be connected to a data warehouse
- Model Management Subsystem
  - Model base management system (MBMS)
- User Interface Subsystem
- Knowledgebase Management Subsystem
  - Organizational knowledge base

Overall Capabilities of DSS

- Easy access to data/models/knowledge
- Proper management of organizational experiences and knowledge
- Easy to use, adaptive and flexible GUI
- Timely, correct, concise, consistent support for decision making
- Support for all who needs it, where and when he/she needs it

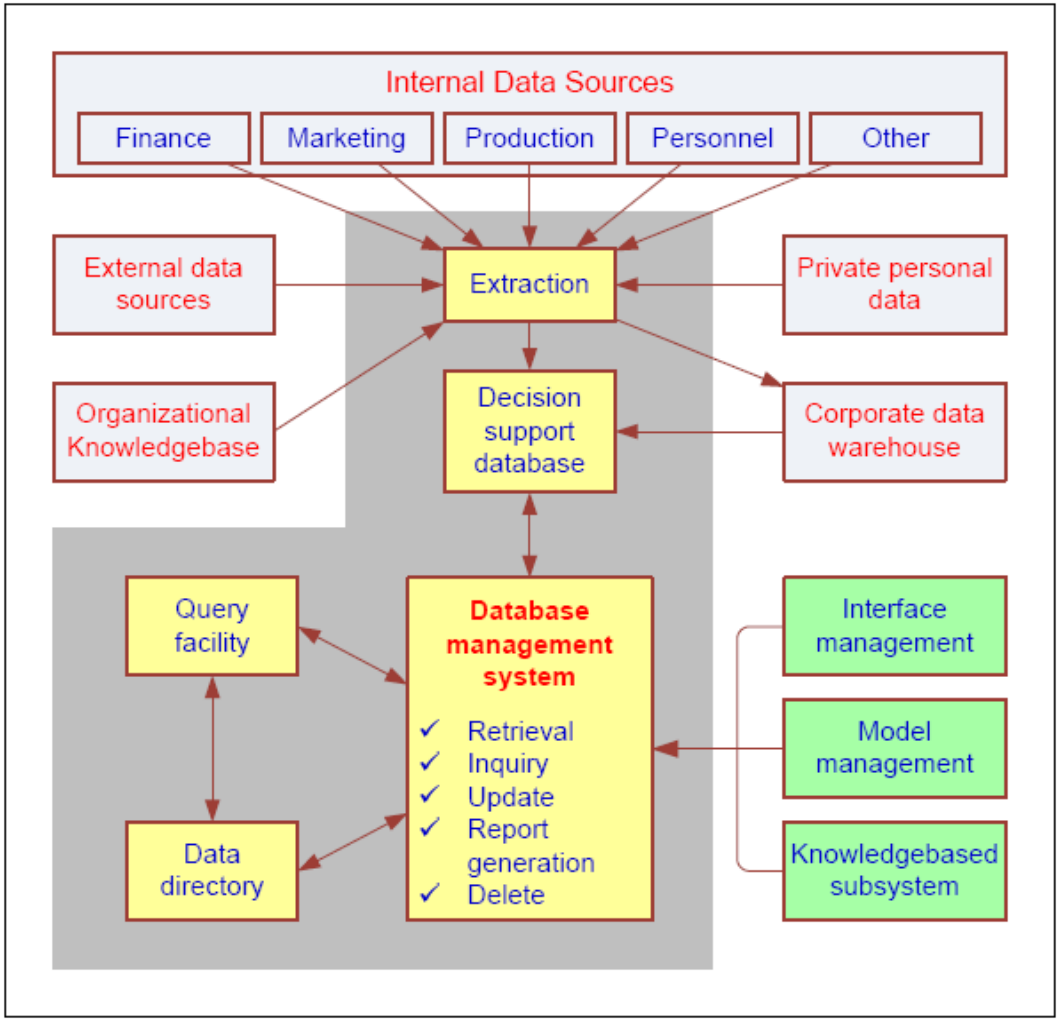
- See Table 3.2 for a complete list...

DSS Components and Web Impacts

- Impacts of Web to DSS
  - Data management via Web servers
  - Easy access to variety of models, tools
  - Consistent user interface (browsers)
  - Deployment to PDAs, cell phones, etc. …
- DSS impact on Web
  - Intelligent e-Business/e-Commerce
  - Better management of Web resources and security, … (see Table 3.3 for more…)

DSS Components
Data Management Subsystem

- DSS database
- DBMS
- Data directory
- Query facility



Database Management Subsystem Key Data Issues

- Data quality
  - "Garbage in/garbage out" (GIGO)
- Data integration
  - "Creating a single version of the truth"
- Scalability
- Data Security
- Timeliness
- Completeness, …

10 Key Ingredients of Data (Information) Quality Management

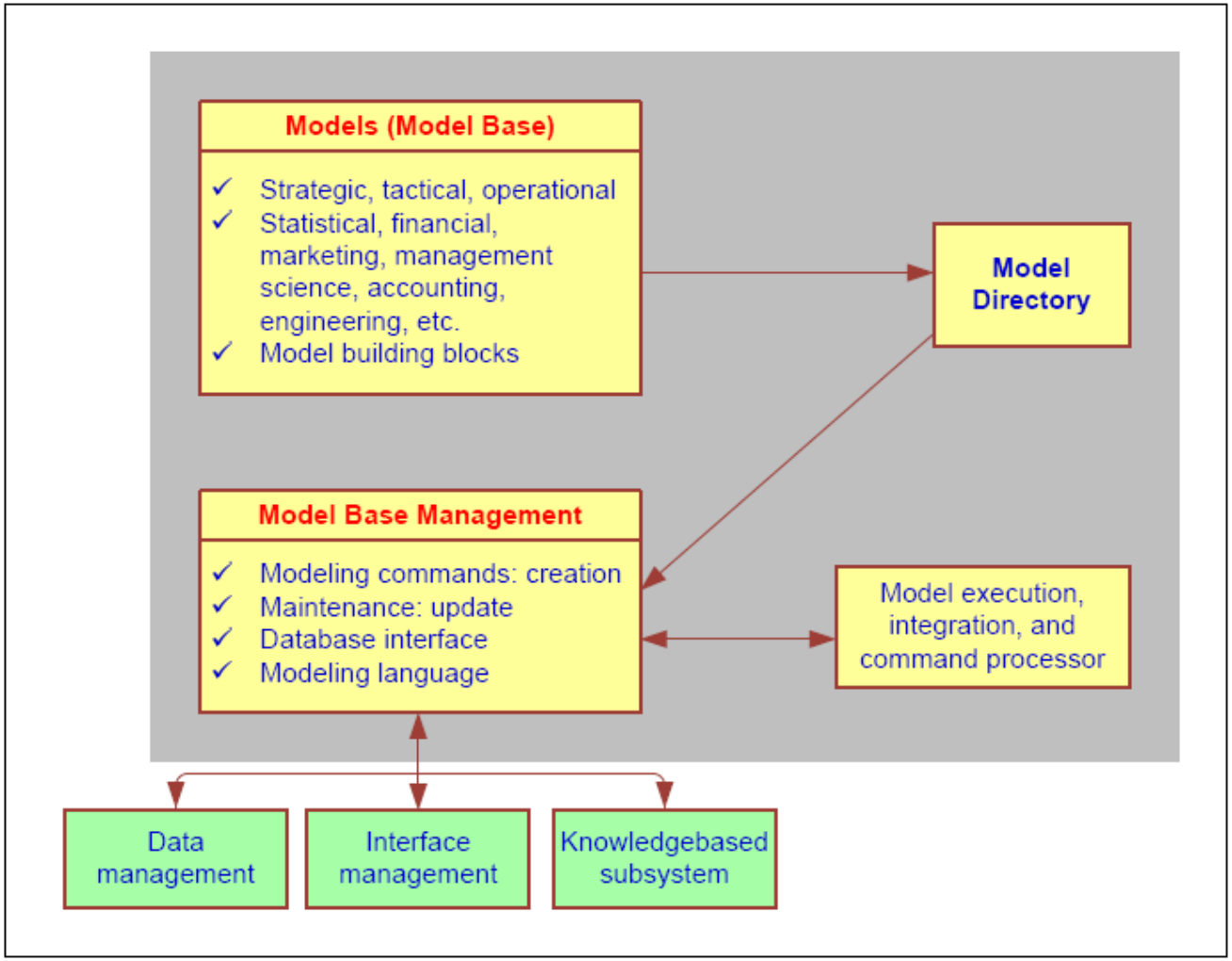
1. Data quality is a business problem, not only a systems problem
2. Focus on information about customers and suppliers, not just data
3. Focus on all components of data: definition, content, and presentation
4. Implement data/information quality management processes, not just software to handle them
5. Measure data accuracy as well as validity

10 Key Ingredients of Data (Information) Quality Management

6. Measure real costs (not just the percentage) of poor quality data/information
7. Emphasize process improvement/preventive maintenance, not just data cleansing
8. Improve processes (and hence data quality) at the source
9. Educate managers about the impacts of poor data quality and how to improve it
10. Actively transform the culture to one that values data quality

DSS Components
Model Management Subsystem

- Model base
- MBMS
- Modeling language
- Model directory
- Model execution, integration, and command processor



DSS Components
Model Management Subsystem

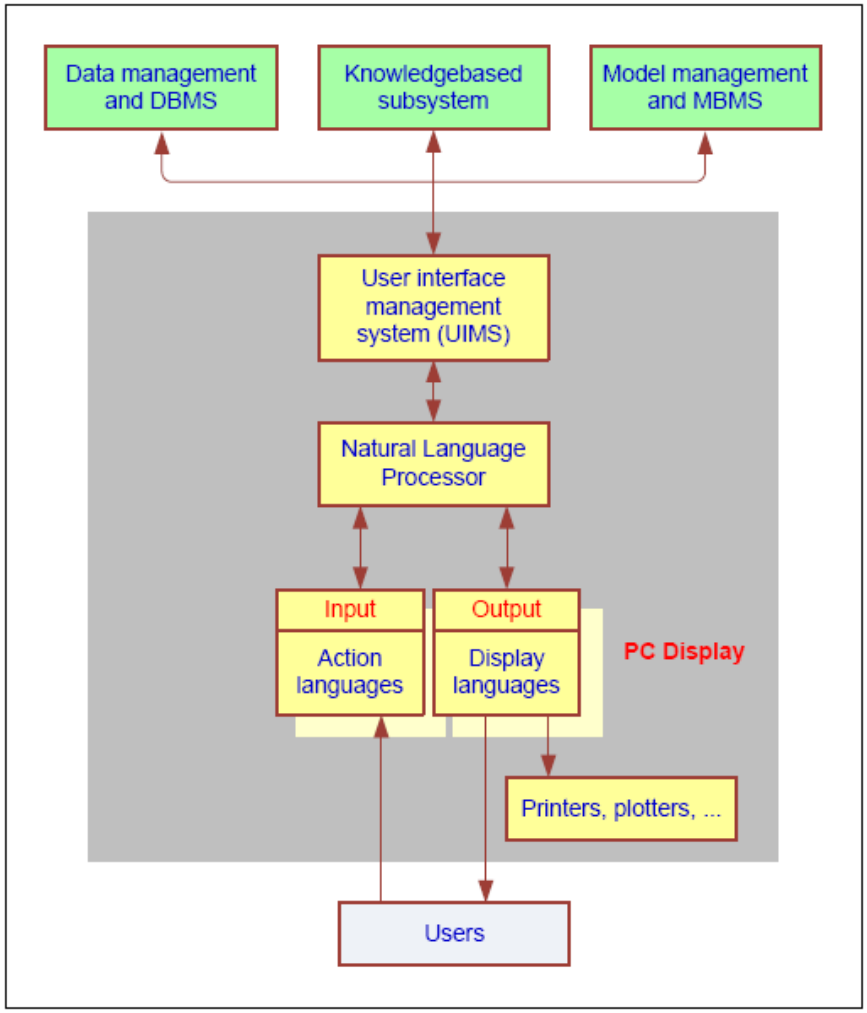
- Model base (= database ?)
- Model Types
  - Strategic models
  - Tactical models
  - Operational models
- Analytic models
- Model building blocks
- Modeling tools

DSS Components
Model Management Subsystem

- The four (4) functions
  1. Model creation, using programming languages, DSS tools and/or subroutines, and other building blocks
  2. Generation of new routines and reports
  3. Model updating and changing
  4. Model data manipulation
- Model directory
- Model execution, integration and command

DSS Components
User Interface (Dialog) Subsystem

- Interface
  - Application interface
  - User Interface
    - Graphical User Interface (GUI)
- DSS User Interface
  - Portal
  - Graphical icons
    - Dashboard
  - Color coding
- Interfacing with PDAs, cell phones, etc.



DSS Components
Knowledgebase Management System

- Incorporation of intelligence and expertise
- Knowledge components:
  - Expert systems,
  - Knowledge management systems,
  - Neural networks,
  - Intelligent agents,
  - Fuzzy logic,
  - Case-based reasoning systems, and so on
- Often used to better manage the other DSS components

DSS Components
Future/current DSS Developments

- Hardware enhancements
  - Smaller, faster, cheaper, …
- Software/hardware advancements
  - data warehousing, data mining, OLAP, Web technologies, integration and dissemination technologies (XML, Web services, SOA, grid computing, cloud computing, …)
- Integration of AI -> smart systems

DSS User

- One faced with a decision that an MSS is designed to support
  - Manager, decision maker, problem solver, …
- The users differ greatly from each other
  - Different organizational positions they occupy; cognitive preferences/abilities; the ways of arriving at a decision (i.e., decision styles)
- User = Individual versus Group
- Managers versus Staff Specialists [staff assistants, expert tool users, business (system) analysts, facilitators (in a GSS)]

DSS Hardware

- Typically, MSS run on standard hardware
- Can be composed of mainframe computers with legacy DBMS, workstations, personal computers, or client/server systems
- Nowadays, usually implemented as a distributed/integrated, loosely-coupled Web-based systems
- Can be acquired from
  - A single vendor
  - Many vendors (best-of-breed)

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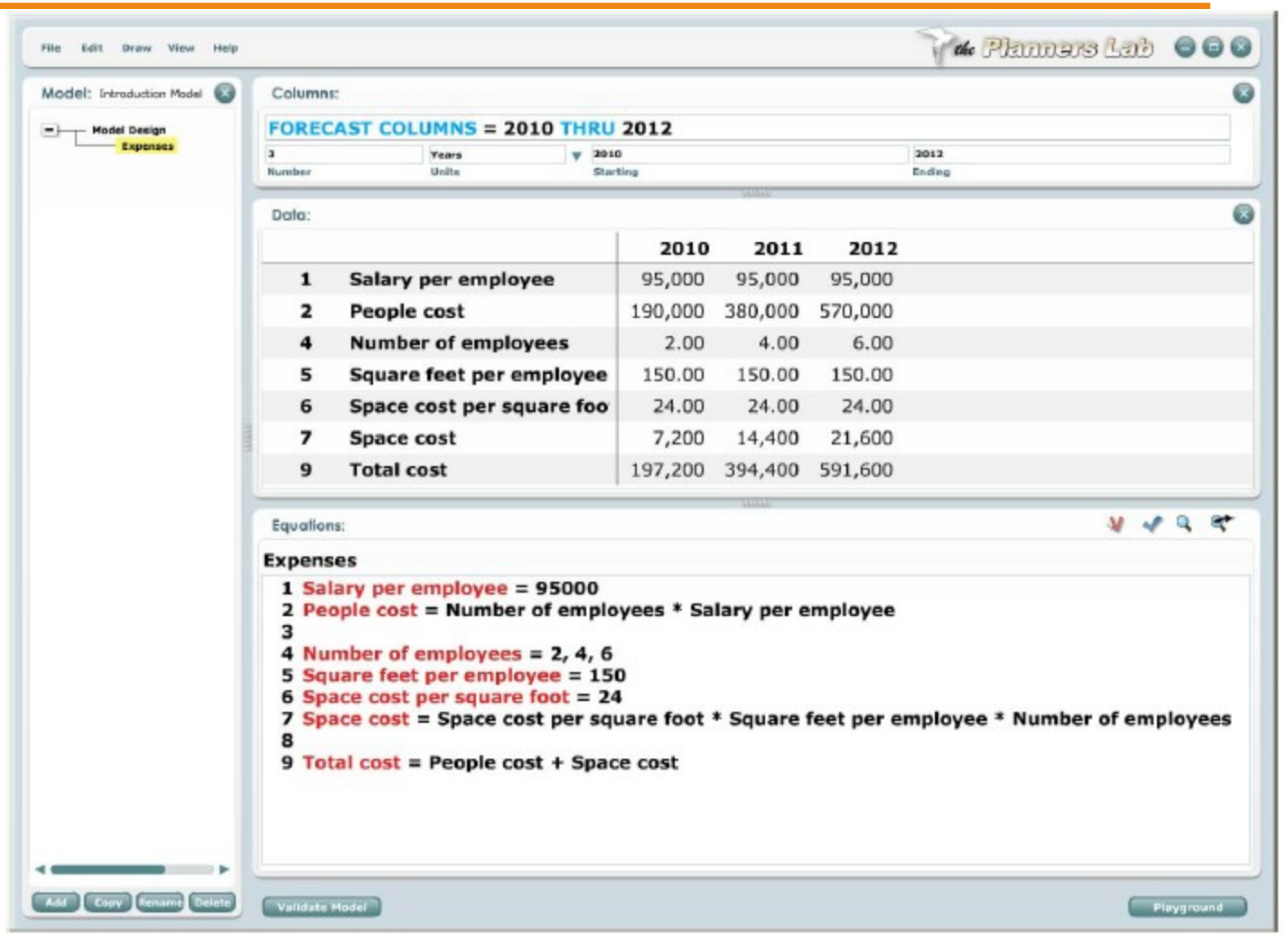
- Generating Assumptions



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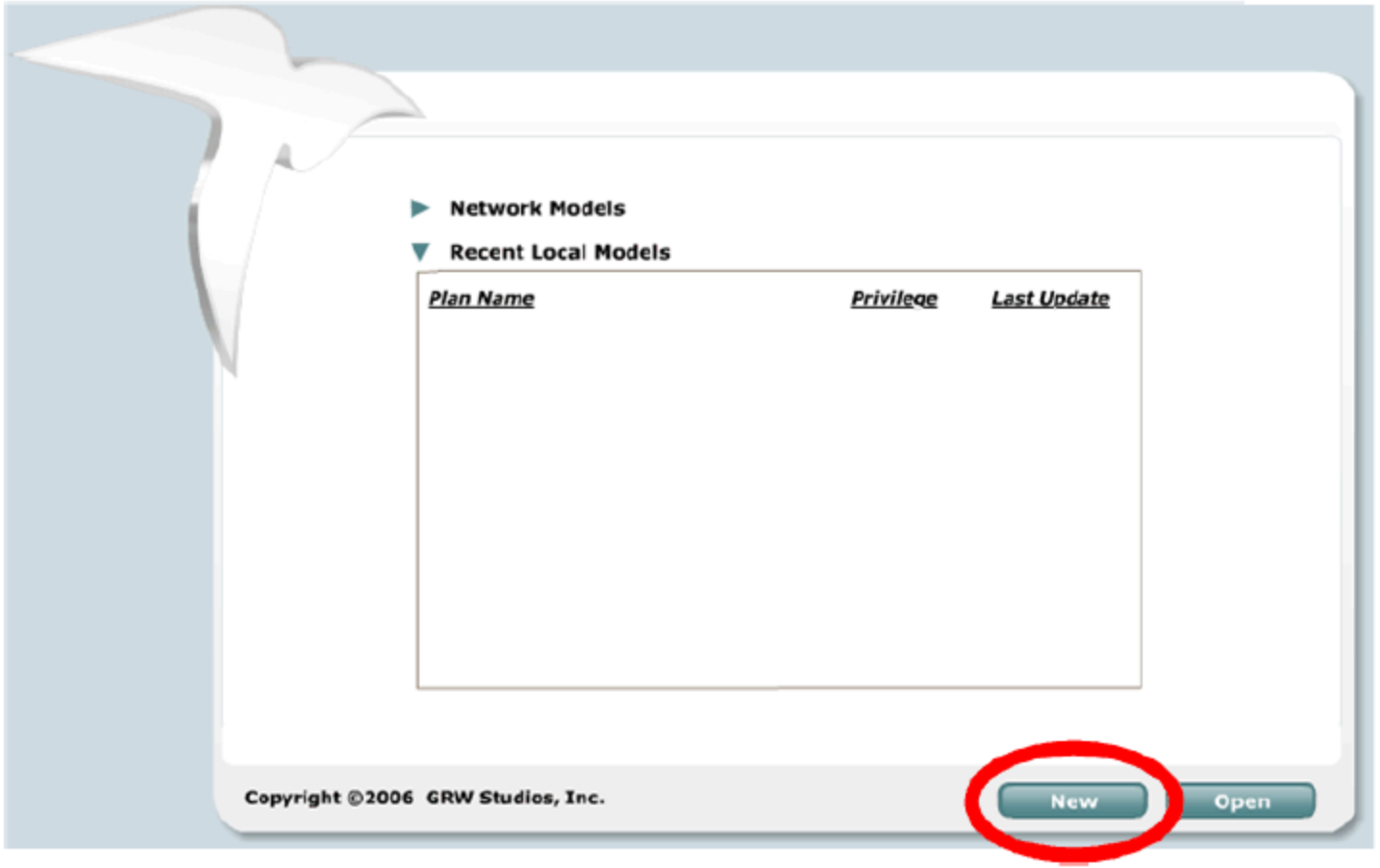
- Creating a new model



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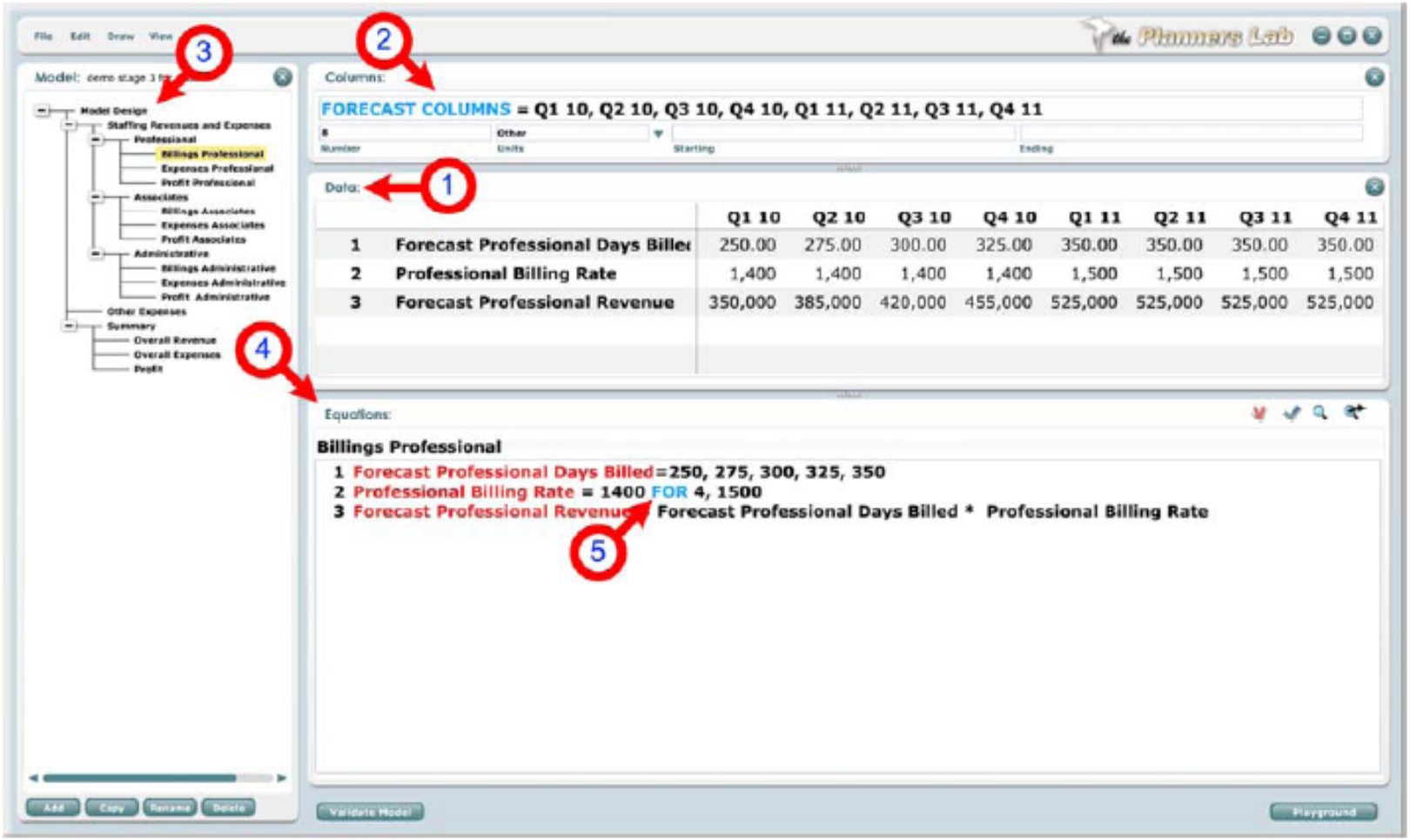

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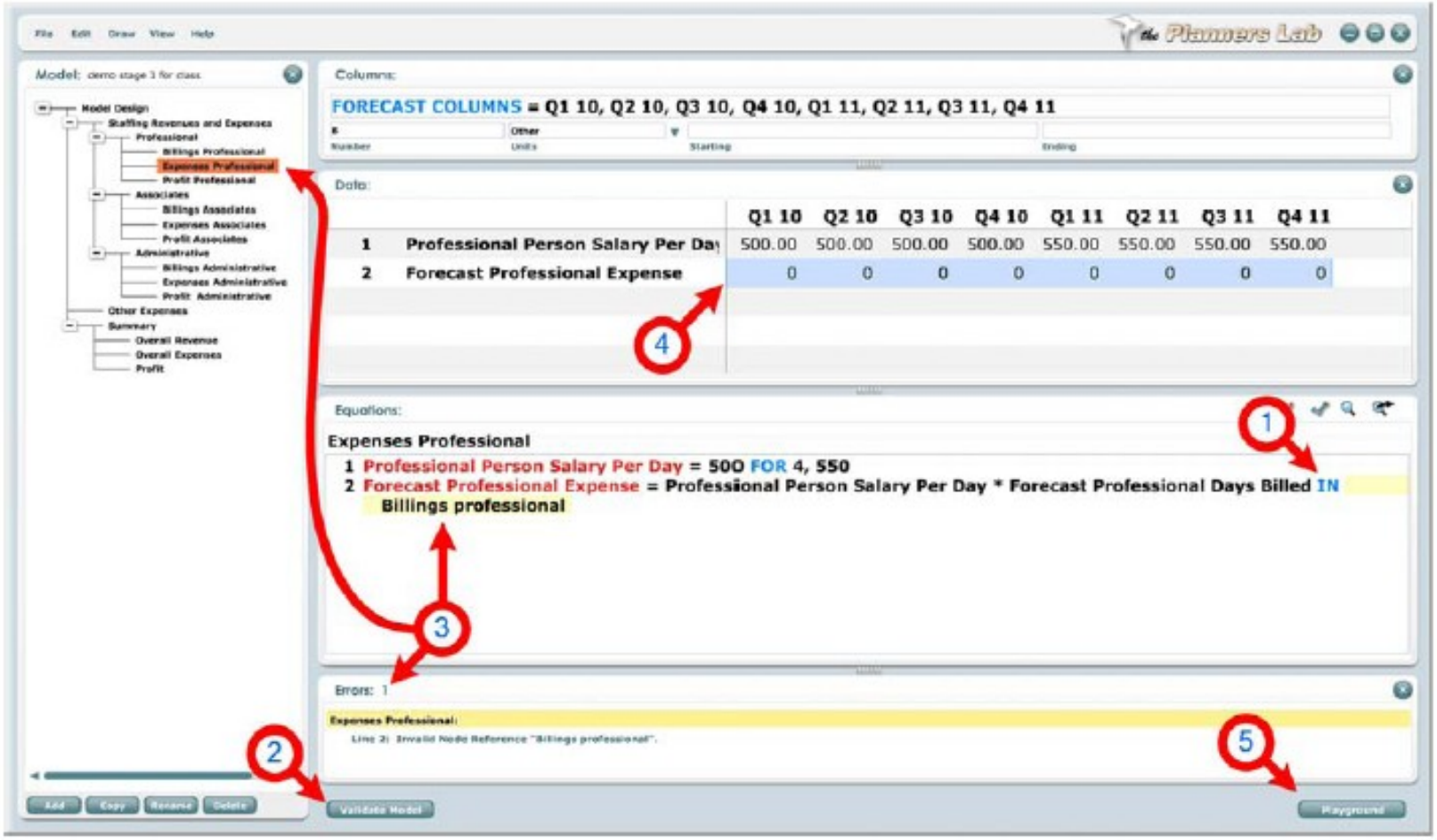

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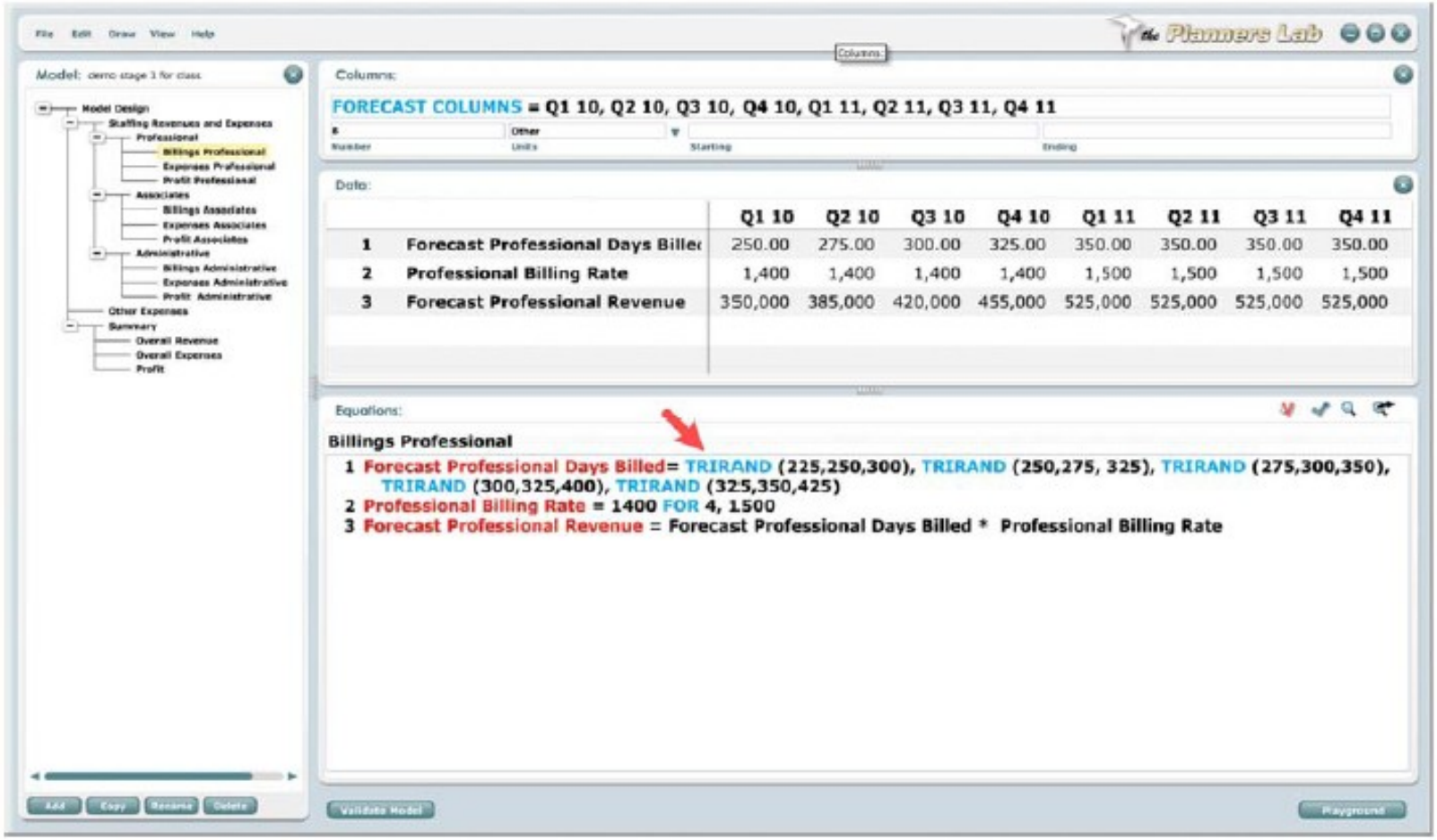

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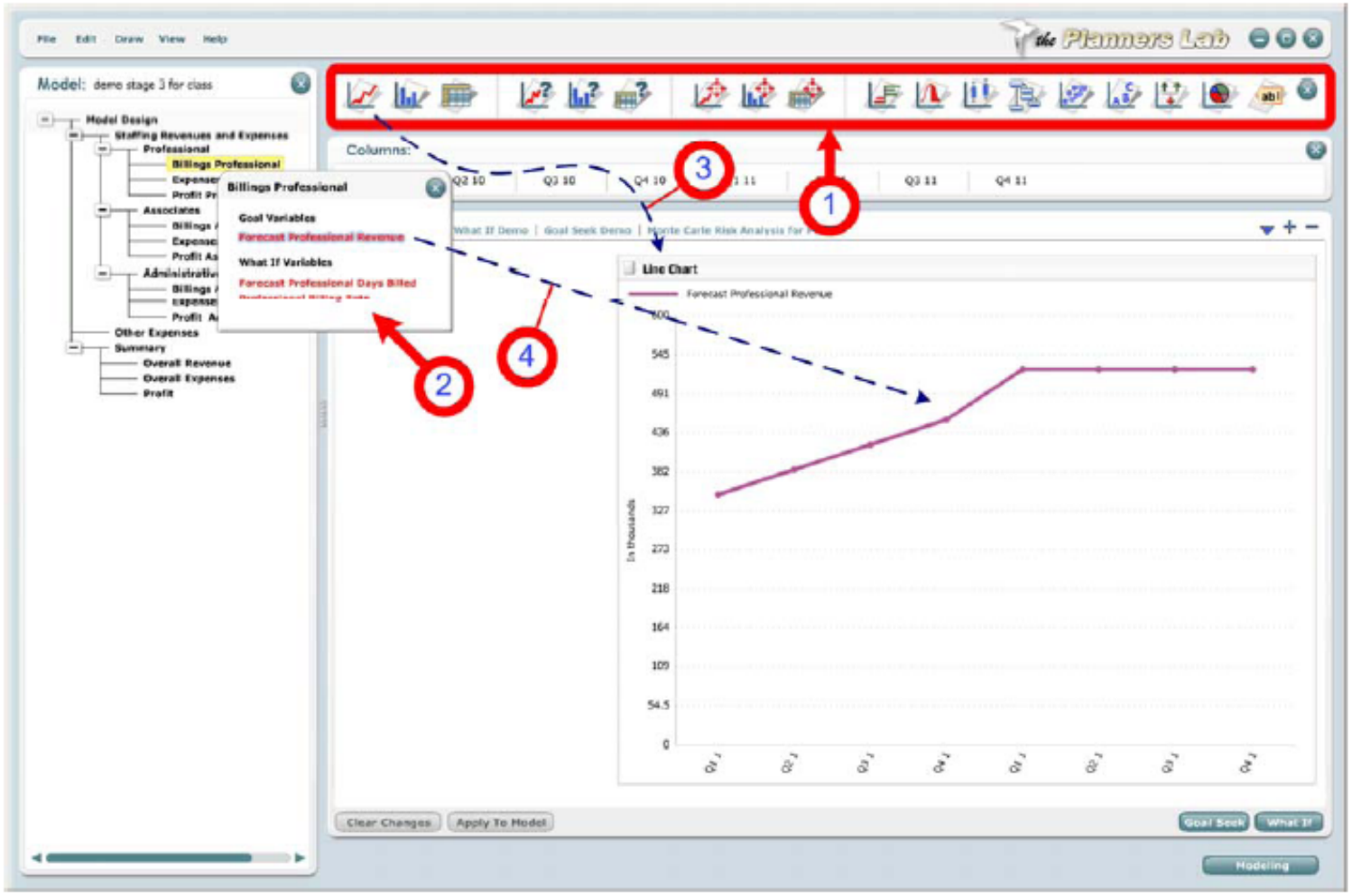

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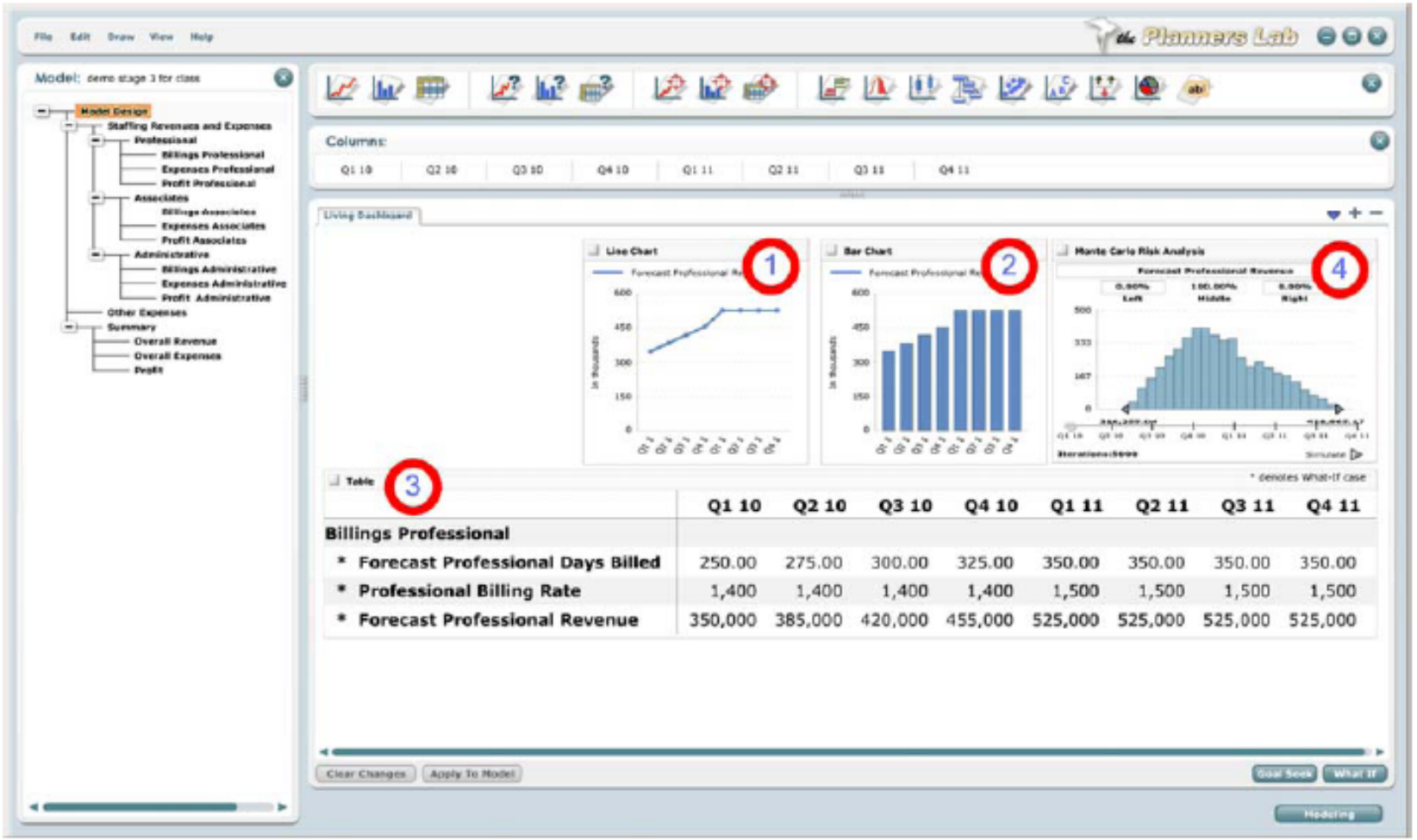

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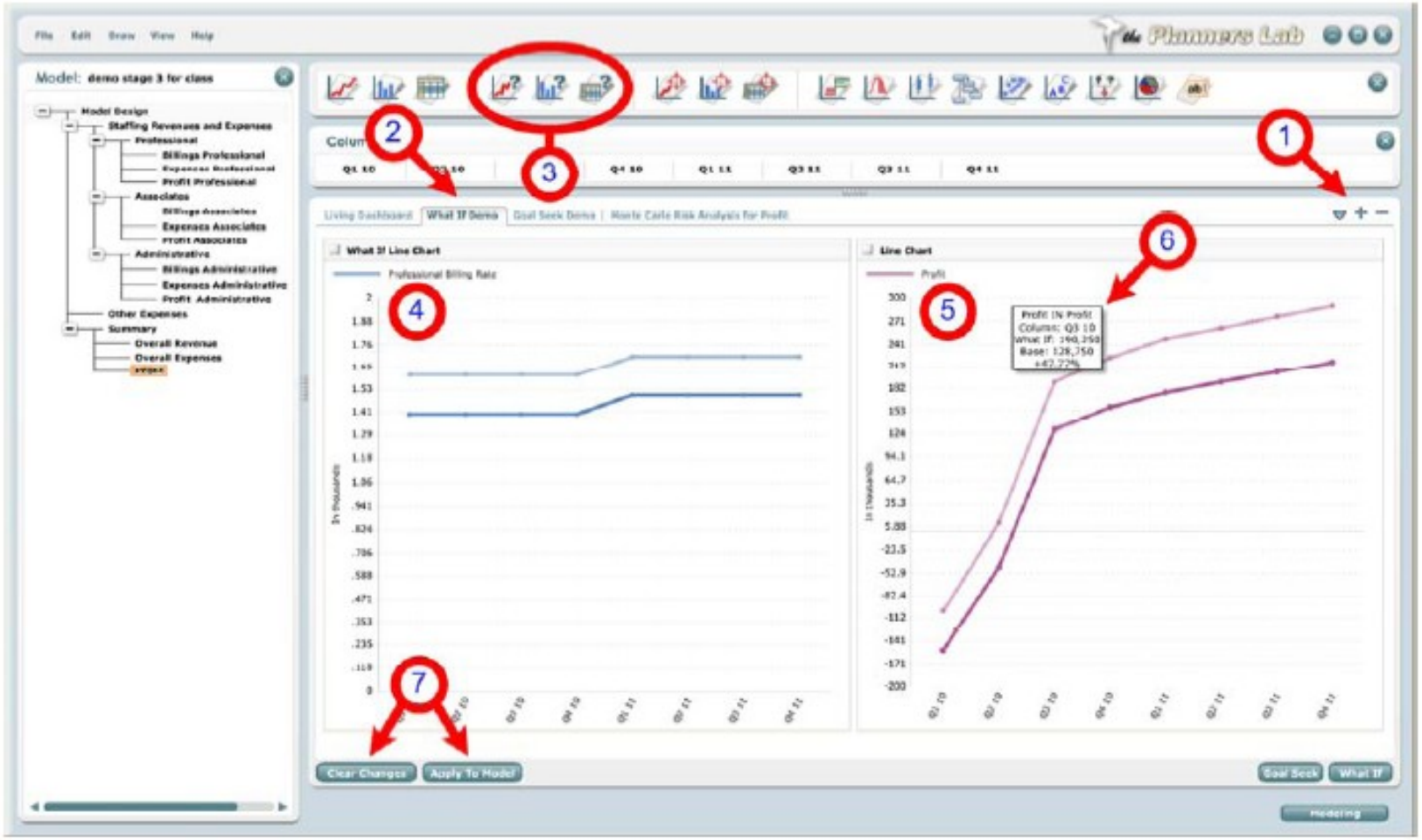

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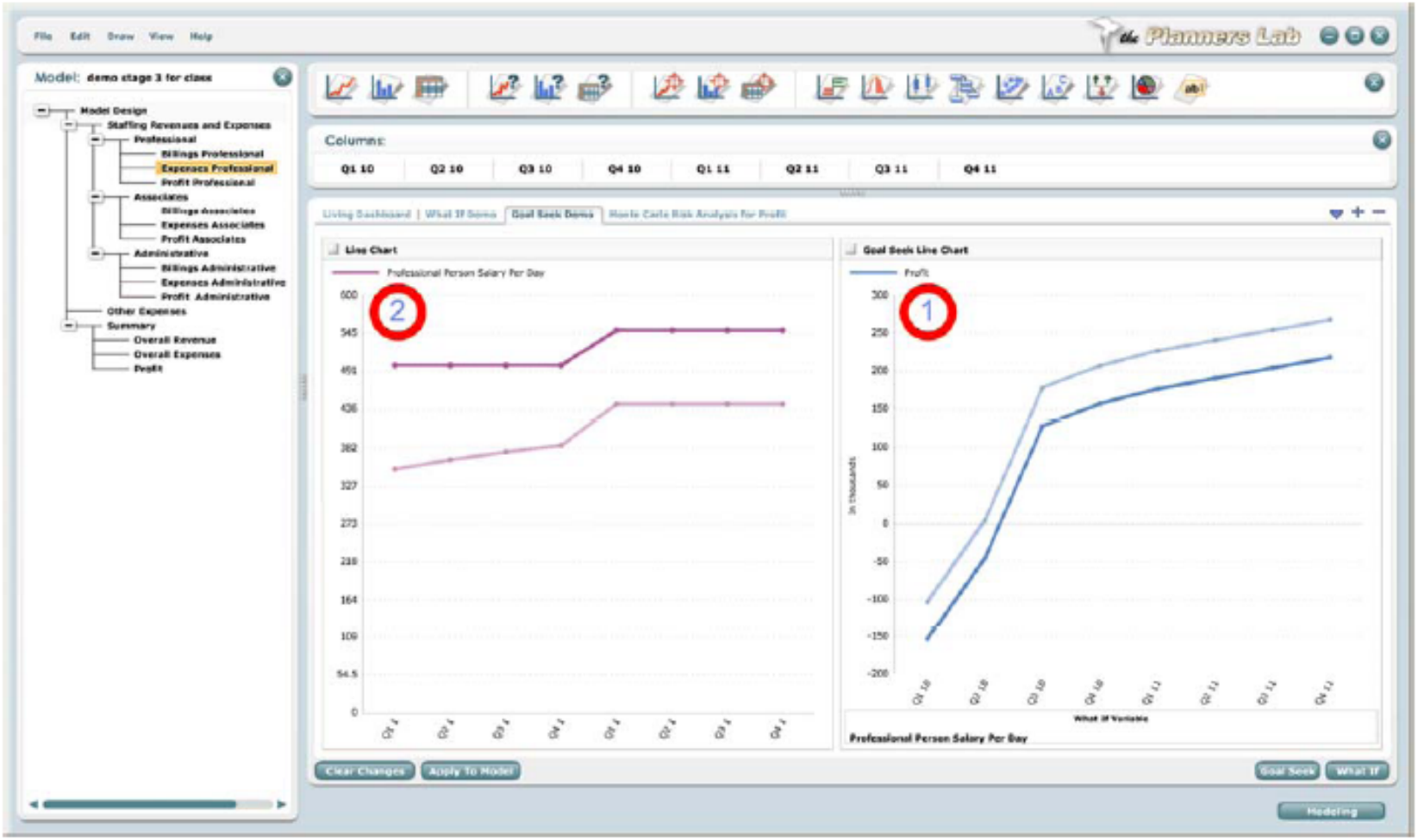

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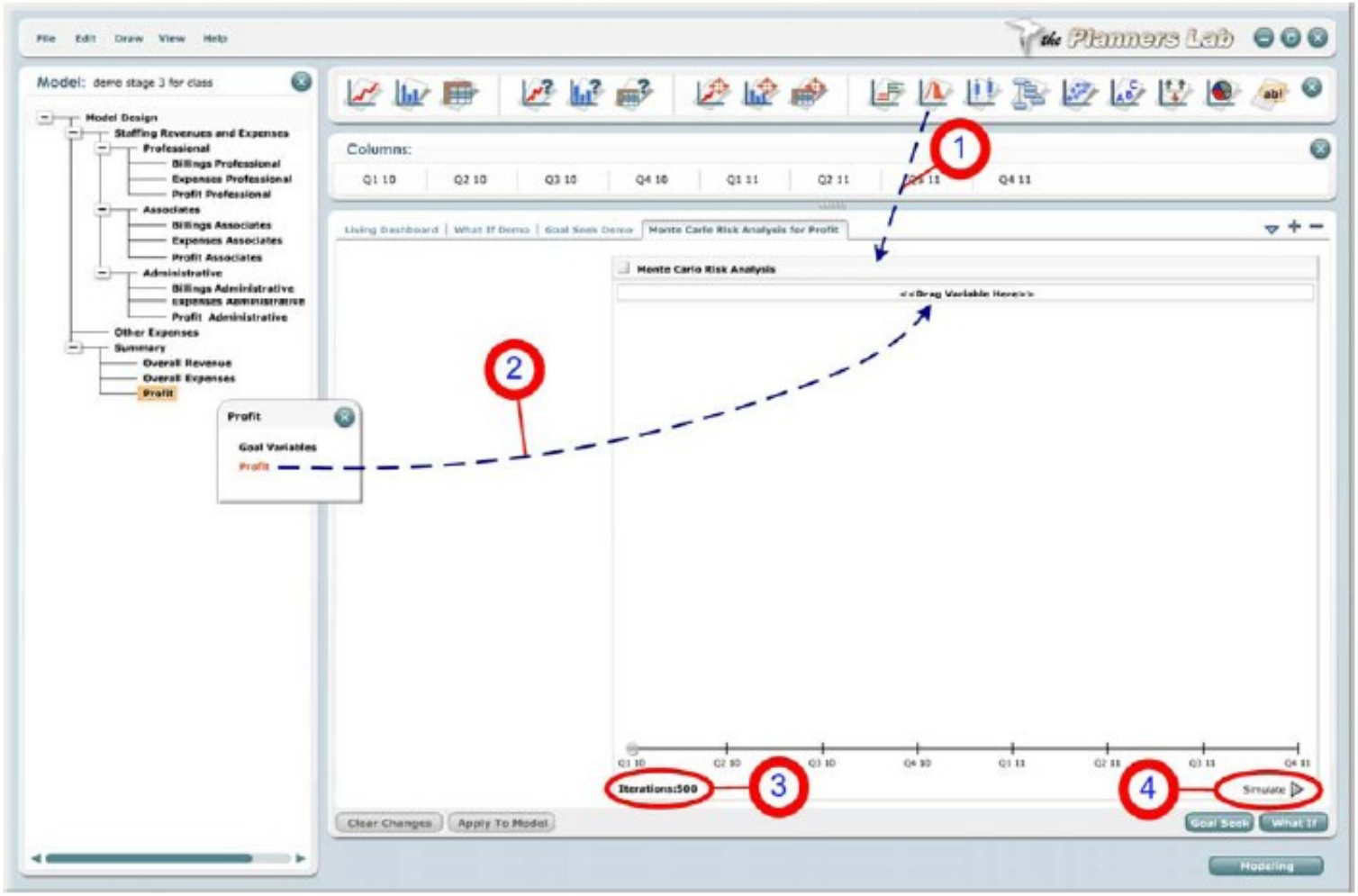

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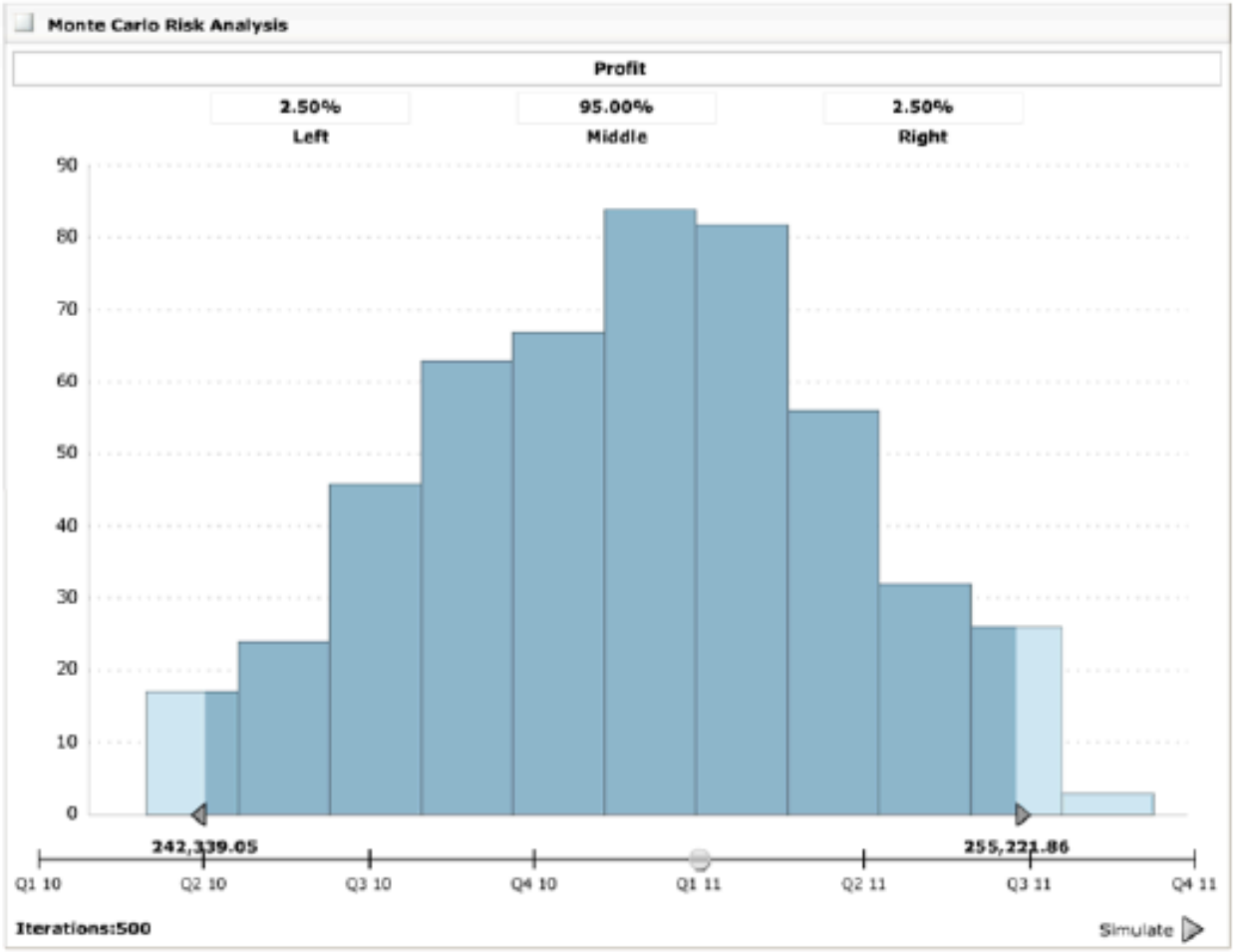

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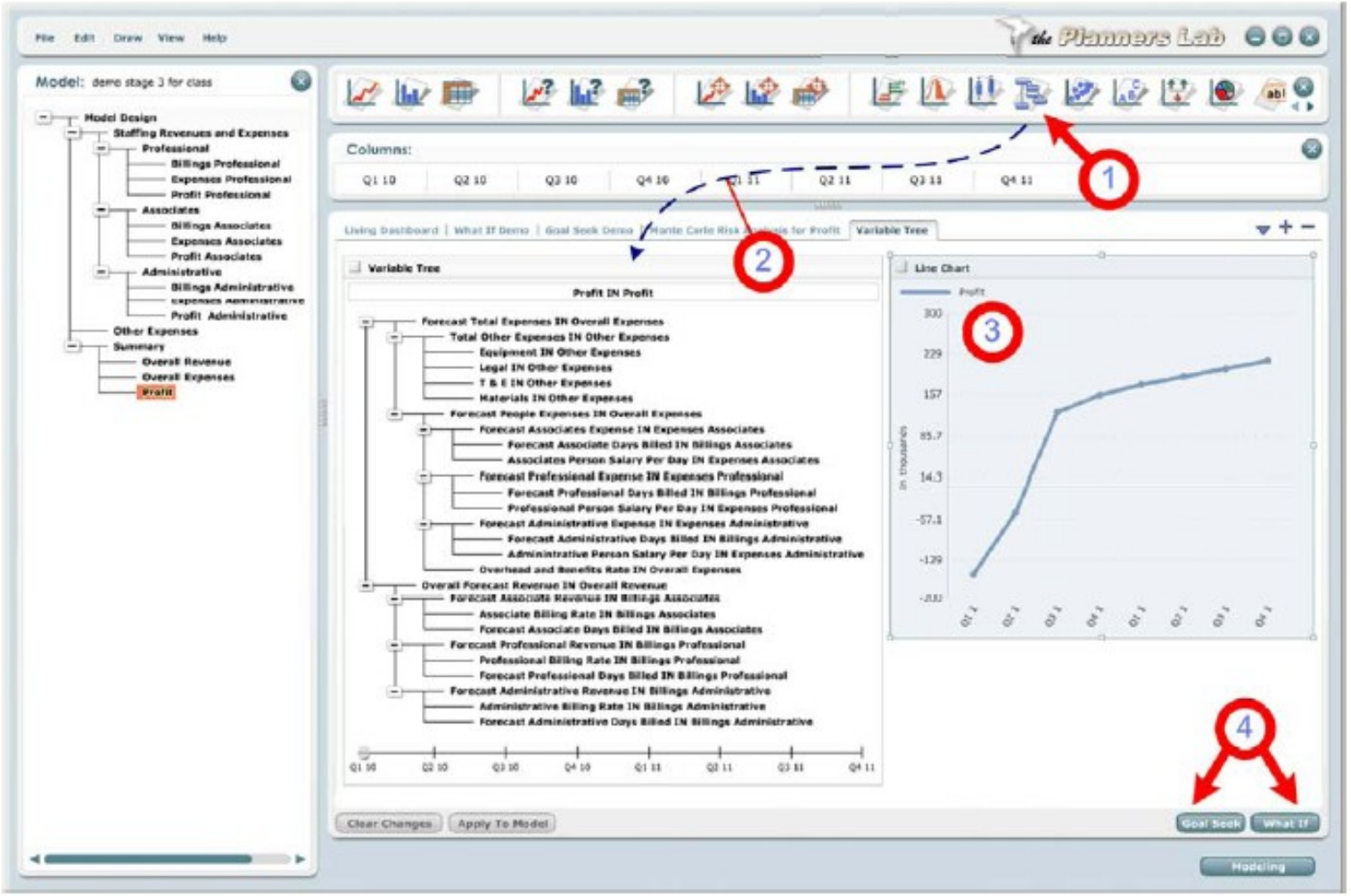

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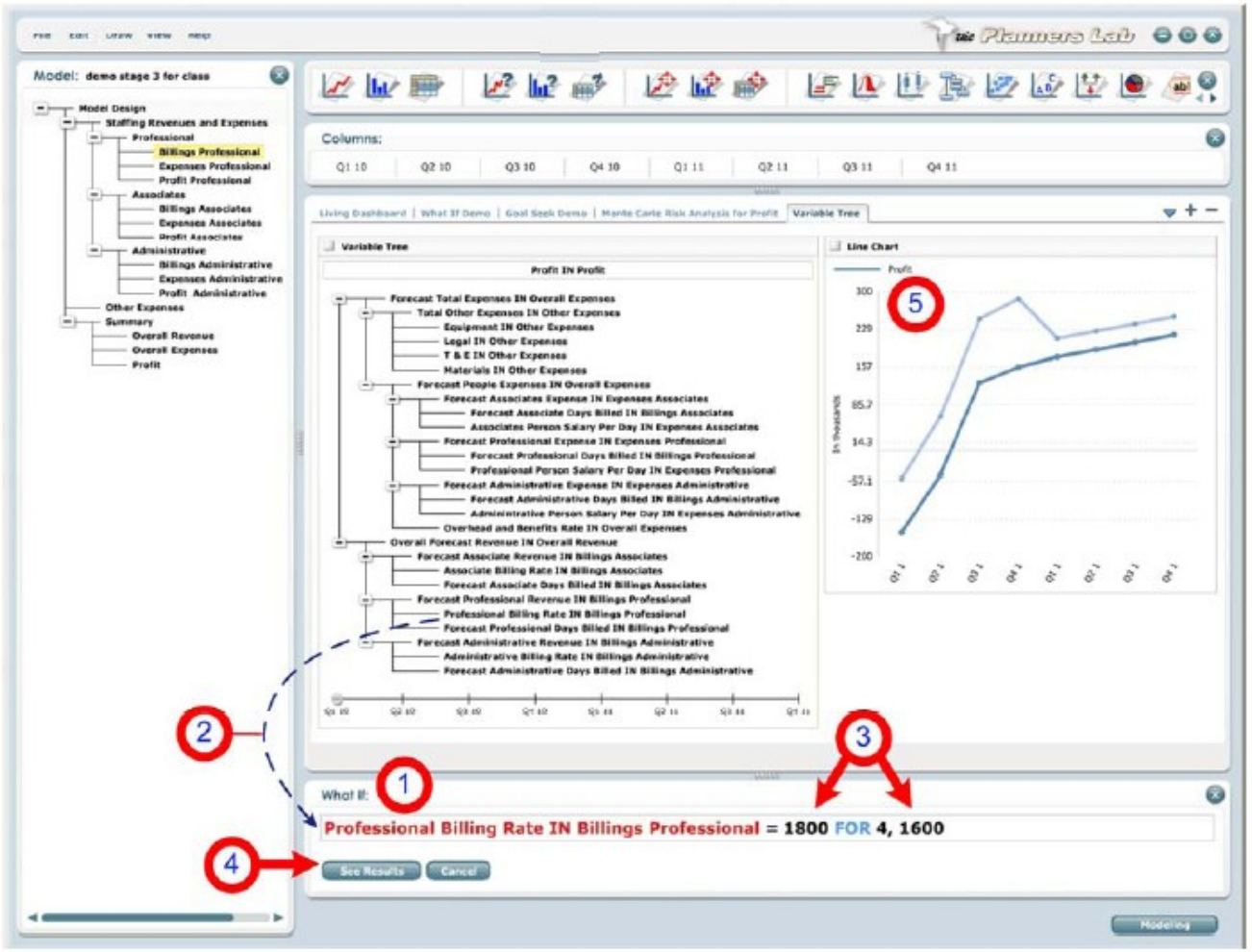

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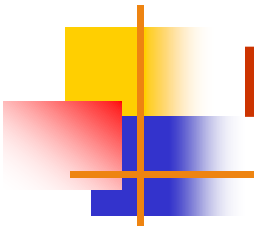
	Line Chart		What If Line Chart		Goal Seek Line Chart
	Bar Chart		What If Bar Chart		Goal Seek Bar Chart
	Table		What If Table		Goal Seek Table
	Impact Analysis		Risk Analysis		Variable Tree
	Pie Chart		Sticky Note		



End of the Chapter

- Questions / Comments…