

The Decision Model: A Refresher and Recent Advances

ABSTRACT

The recent financial crisis underscores the vital role of data quality and decision quality. Related challenges include improving operational decisions, complex processes, business-automation life cycles, and executing unprecedented transaction volumes. A new, emerging discipline for meeting these challenges, called decision modeling, is an important part of the solution at Freddie Mac.

Part 1 introduces decision modeling. Like the Relational Model, The decision model is a technology and methodology independent model. It is a model for logic, not data. Its theoretical foundation includes normalization principles yielding rigor. Business experts use decision modeling to maintain data quality and operational decision logic. IT solutions consume whole decision models without technical translation, shortening maintenance cycles.

Part 2 focuses on the mortgage industry. Using real-world statistics, Freddie Mac explains how decision modeling enables quick analysis and implementation of policy changes. The presentation explains cultural changes when business people access visual representations of decision models.

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BIOGRAPHY

Barbara von Halle

Managing Partner
Knowledge Partners International, LLC



Barbara von Halle is Managing Partner of Knowledge Partners International, LLC (KPI). She is co-inventor of the Decision Model and co-author of *The Decision Model: A Business Logic Framework Linking Business and Technology* published by Auerbach Publications/Taylor and Francis LLC 2009. The book reveals ground breaking theory. An early reviewer states "This book can become one of the classic books of a new era in computing that will have much traction in the next few years" - Opher Etzion, Ph.D., IBM Master Inventor. Barb writes, with Larry Goldberg, a regular column in TDAN on the Decision Model as well as Modern Analyst.

As the fifth recipient of the Outstanding Individual Achievement Award from International DAMA, Barb inducted into the Hall of Fame in 1995. Known as a data architecture and business rules pioneer, she has consulted for over 25 years. She is an invited keynote speaker at conferences in the US and Europe. She was a very popular columnist in Database Programming and Design magazine for many years.

Her first book, *Handbook of Relational Database Design* published by Addison-Wesley since published in 1989 has over 21 printings and been cited in 28 books. A recent review on amazon.com "Still the best working reference... The only reference book I recommend to anyone needing to understand relational database design" - M.C. Kettelhut, Ph.D." Other book publications include *Business Rules Applied* and *The Business Rule Revolution*. Her recent article in *Intelligent Enterprise* magazine was voted one of the top articles of the year and features case studies from Oregon State, Freddie Mac, Dell Financial Systems, and Pershing LLC.

Barb has consulted in Enterprise Data Architecture and Decision Modeling including clients in the following industries: healthcare, insurance, financial services, package delivery, pharmaceutical, consumer products, and others.

She is an invited speaker at various conferences including IIBA organizations, DAMA organizations, BPM conferences, and vendor user groups conferences.

Barb founded KPI in 1995 as a Data Architecture Consulting company and transformed it over time into a business rule, business decision management, and Decision Modeling company with Larry Goldberg.

Larry Goldberg

Managing Partner
Knowledge Partners International, LLC



Larry Goldberg is Managing Partner of Knowledge Partners International, LLC (KPI), has over thirty years of experience in building technology based companies on three continents, and in which the focus was rules-based technologies and applications. Commercial applications in which he played a primary architectural role include such diverse domains as healthcare, supply chain, and property & casualty insurance.

Larry is co-author of *The Decision Model: A Business Logic Framework linking Business and Technology* (Auerbach, 2009), a co-editor of *The Business Rule Revolution: Running the Business the Right Way* (HappyAbout.info 2007), is on the editorial board of www.BPMInstitute.org and is the Editorial Director of the BDM Bulletin, a monthly e-publication of the BPMInstitute.org.

Larry joins Barbara von Halle, his business partner at KPI, in writing the monthly Business Decision Management column in www.Tdan.com and in www.ModernAnalyst.com (from October 2009). In addition Larry's writings can be read in industry publications such as www.BPtrends.com, www.RequirementsNetwork.com and www.ITMPI.org.

He may be heard, four times a year, as the track chair of the BDM Symposium at the Brainstorm conference, and at many conferences and industry events around the world. He and Barbara von Halle conduct a very popular series of training seminars on Business Decision Management and the Decision Model, both in person and on-line.

Larry can be found at www.TheDecisionModel.com and looks forward to hearing from everyone with an interest in decision management, business rules, BDM, EDM, and BPM.

Tom Schweikert

Business Rules Manager, Information & Decision Mgmt
Freddie Mac



Tom is a KPI-certified Decision Model Analyst, actively working to enhance the way Freddie Mac manages business rules. Prior to joining the Information & Decision Management organization at Freddie Mac, Tom spent four years as a Credit Manager in the Single Family Credit Guarantee organization. Before joining Freddie Mac, Tom held various roles in the Secondary Mortgage Market function at a privately held mortgage company.



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Who is KPI?



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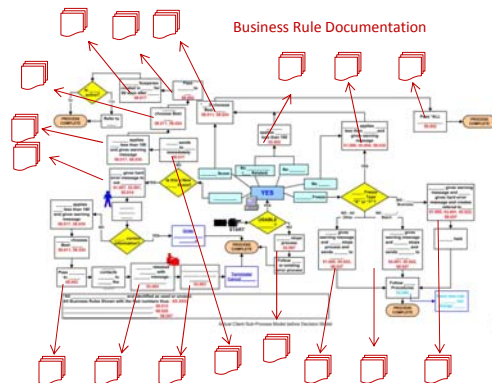



Agenda

- **Current State: Business Rules**
- The Decision Model Bottom Up
- The Decision Model Top Down
- Impact on Business Process
- Recent Advances
- How to Learn More


Business Logic

All Too Familiar? Is this Acceptable?



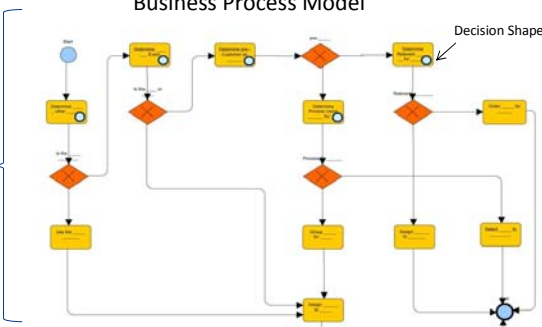


Business Logic




Does this look better?

Business Process Model




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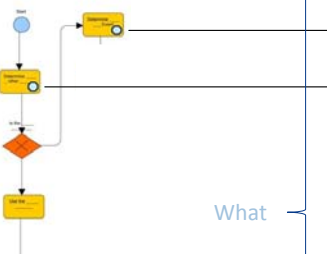
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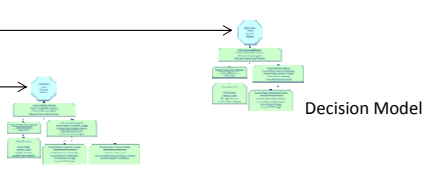
Business Logic



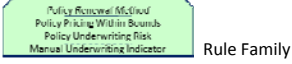
Where did the business rules go?



What



Decision Model



Rule Family

System	Conditions				Conclusion
	Policy Underwriting Method	Policy Pricing Within Bounds	Manual Underwriting Indicator	Policy Rating Method	
1	Is	Unacceptable	No	Is	Manual Review Process
2	Is	Acceptable	No	Is	Manual Review Process
3	Is	Acceptable	Yes	Is	Manual Review Process
4	Is	Acceptable	Yes	Is	Automated Review Process

Rule Family Table

A person has a poor employment history

⇒

A person is highly likely to default on a loan

Atomic Logic Statement

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Definition of Business Logic

Business Logic is the means by which the business derives conclusions from conditions.

The simplest case is the evaluation of a single condition, leading to a single conclusion.

Condition

Person credit rating is less than 650



Conclusion

Person likelihood of defaulting on a loan is high

What is an Atomic Piece of Business Logic?



- One and only one conclusion fact type
- As many conditions as needed, even zero
- All conditions ANDed together
- No Ors, ELSEs, BUTs, OTHERWISEs (these have created the chaos in current systems!)

Simple Rule Family



*“A person who has a credit score below 650, an unstable employment history and a high Other loans assessment is **highly likely to default on a loan.**”*

Conditions		Conclusion	
		Person Likelihood of Defaulting on a Loan	
		is	High

We start by discovering the conclusion in the sentence or paragraph

We see that the conclusion is “A person is highly likely to default on a loan”

We recast the conclusion into a conclusion fact type: Person Likelihood of Defaulting on a Loan, and we assign it a value of “High”



Simple Rule Family

“A *person* who has a *credit score below 650*, an *unstable employment history* and a *high Other loans assessment* is highly likely to default on a loan.”

Conditions						Conclusion	
Person Credit Score		Person Employment History		Person Other Loans Assessment		Person Likelihood of Defaulting on a Loan	
Is less than	650	is	Unstable	is	High	is	High

We identify conditions leading to the conclusion



Two Rule Families

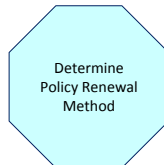
Conditions				Conclusion	
Person Years at Current Employer		Person Number of Jobs in Past Five Years		Person Employment History	

Conditions						Conclusion	
Person Credit Score		Person Employment History		Person Other Loans Amount		Person Likelihood of Defaulting on a Loan	
Is less than	500	Is	Unstable	Is	High	is	High

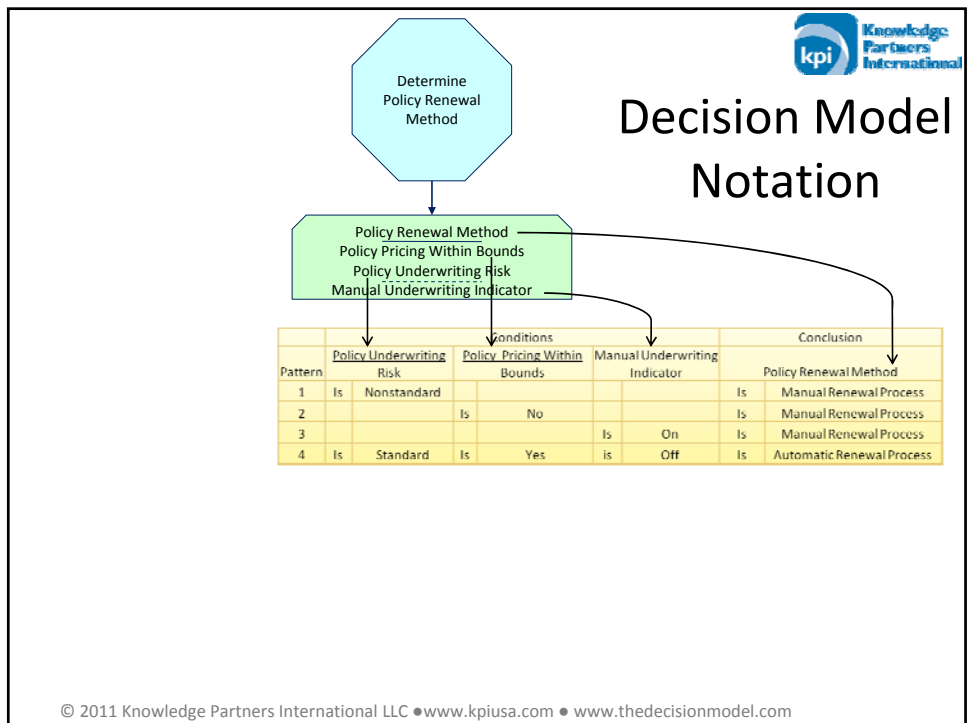
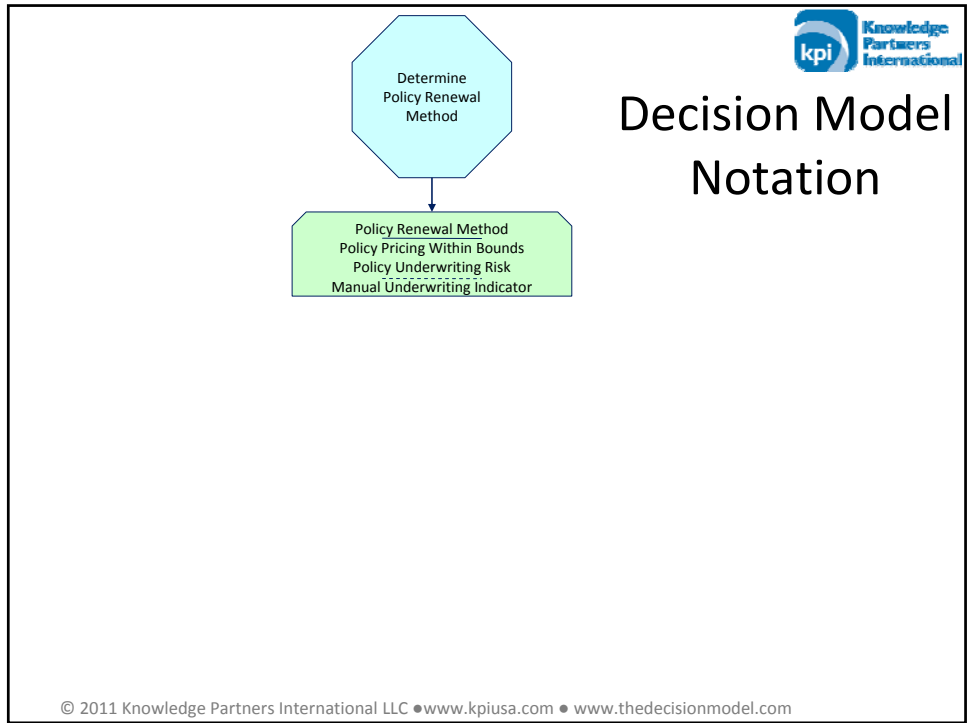
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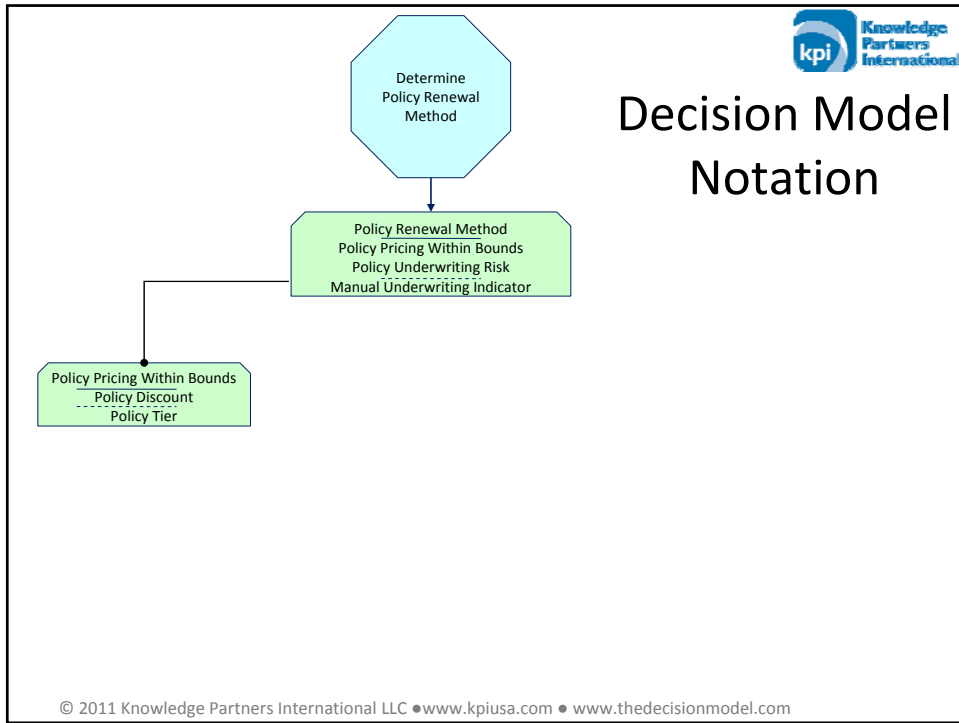


Decision Model Notation

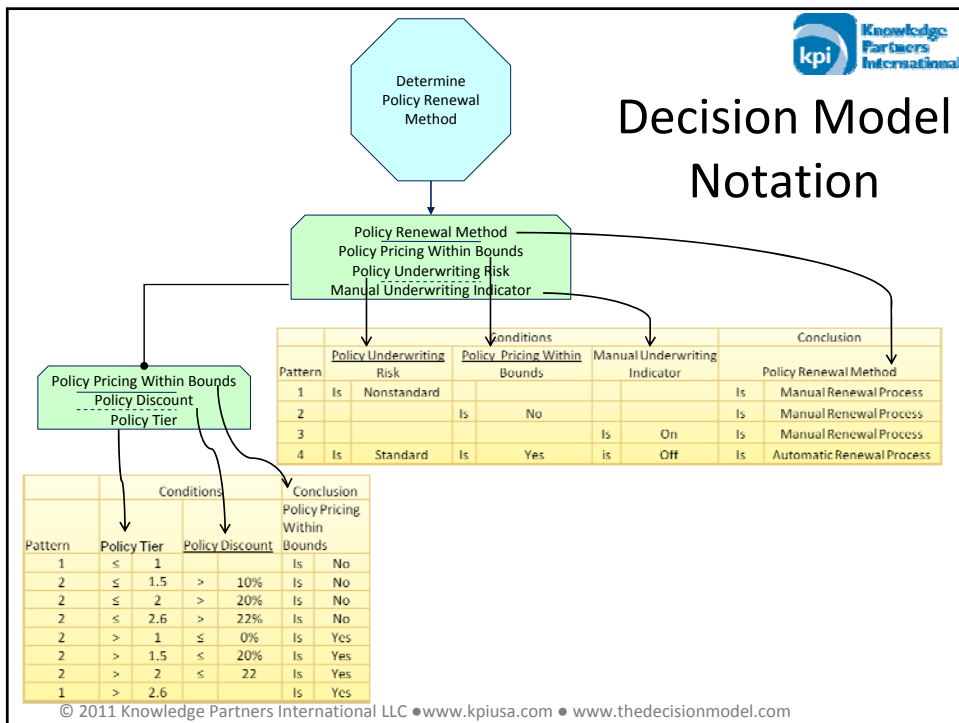


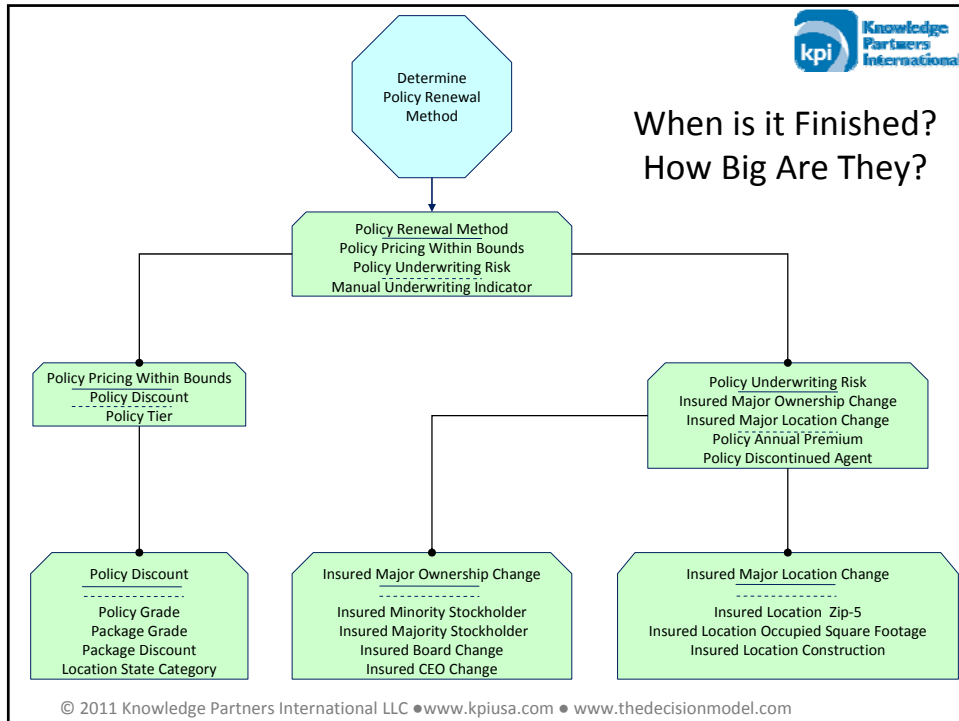


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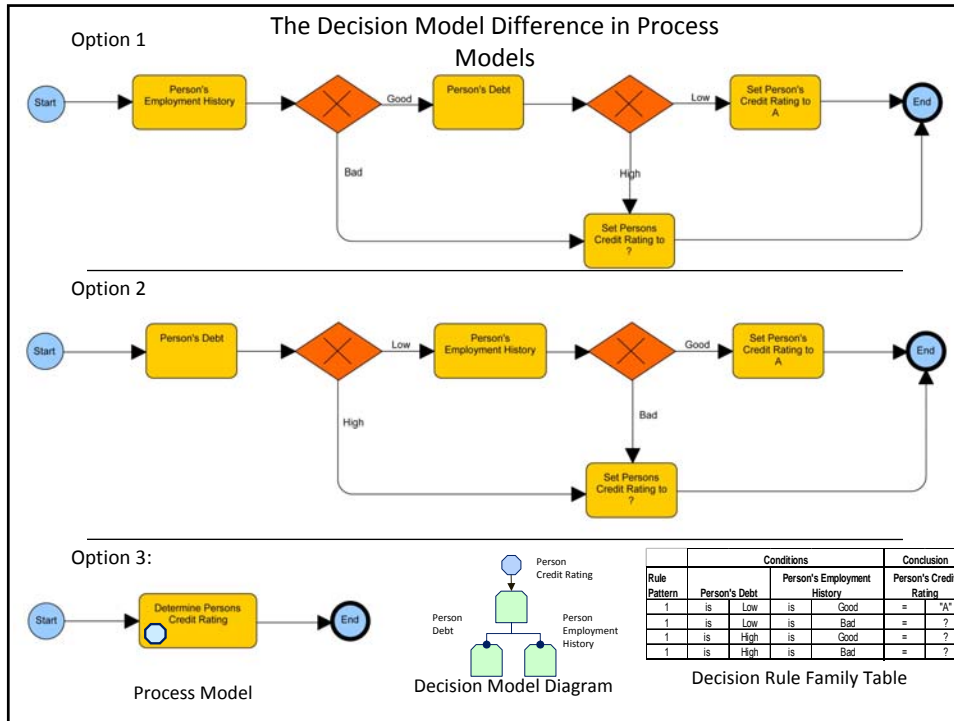


Decision Model Notation





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Evolution since the Book



- **Advances in Practice**
 - Organizations are successfully creating and deploying decision models
 - Advanced topics emerging: Decision Model Views, Automated Testing and Decision Model Messaging
 - Use of Business Decision Maturity Model (BDMM) is growing
 - Supporting technology is appearing
 - OpenRules-BR engine
 - RuleGuide-BR repository
 - Sapiens - BDMS BDMM 4 Decision Management
- **Rate of Adoption**
 - Growing KPI Practice, STEP methodology
 - Volume of emails from adopters, LinkedIn membership
 - Soaring attendance at webinars soaring
 - Consistently rising book sales

Project #1: Business Decisions and Data Quality (3 Months)



Business Motivations

- Increase customer satisfaction
- Improve DQ
- Reduce errors in critical transaction
- 98% error-free by 4Q2011
- 100% error-free by 2012?
- Reduce risk of transactions (delinquent contracts)
- No way to measure before because 98% rules were all over

Challenges, Deliverables

- Policies described error-free conditions, had to discover error conditions
- “overloaded” fact types
- Policies had logic errors
- First Decision Model = 38 hours
- Customized view = 5 hours
- “High” complexity
 - 12 RFs in first decision model
 - 7 RFs in customized view
 - 24 fact types in all
 - Some fact type values not available
- 5 other decision models, one with 70 RFs
- Largest DM = 300 RFs, 44 pages

Project #2: Business Decisions (3-Months)



- **Updated Process Models**

- **Decision Models:**

- Number of Decision Models: 40 (approx.)

- Number of Rule Families: 700 (approx.)

- **Glossary:**

- Total Number of Fact Types: 1,400 (approx.)

- Number of Persistent Fact Types: 750 (approx.)

- Number of Inferred Fact Types: 650 (approx.)

Project #3: Process Improvements (3 Months)



- **Before The Decision Model:**

- 200 transactions with errors → 90 hrs

- 200 transactions without errors → 30 hrs

- **After The Decision Model:**

- 200 transactions with errors → 3 mins 30 secs (with error messages and step by step instructions on how to correct each error)

- 200 transactions without errors → 3 mins 30 secs



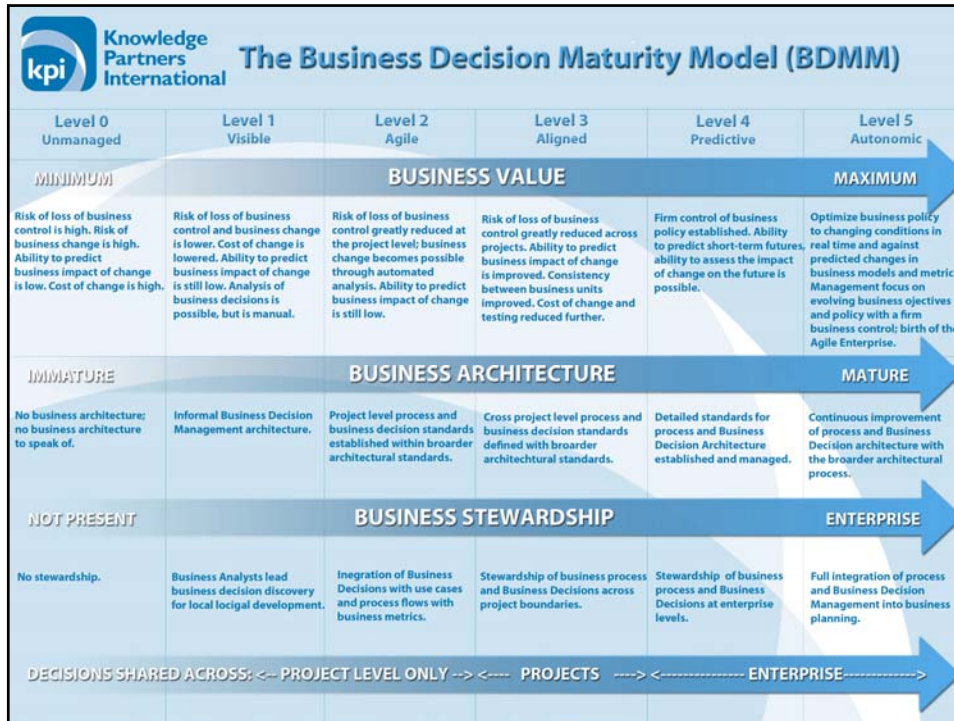
Project #3: How?

- Business logic with no room for misinterpretation
- Business logic easy to understand
- Business logic updated without changing the process and visa versa
- Business logic changed in the system within two business days



Project #3: Statistics

- **5 Decisions**
 - 95 Rule Families
- **10 Weeks**
 - The Decision Models created in approximately 5 weeks
 - Included two iterations of validation
 - Improvements were added through the project (iterative) as a result of analysis
 - Decision Models were programmed and tested in approximately 5 weeks
 - New plans will reduce this time
 - Business rules engine will be ready to run as a service early next year
- **30-60 Hours of Testing**
 - 2,200 test cases created in approximately 2 weeks
 - Most test cases are automated
 - A new release takes 30 minutes to 2 hours to test



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