

How to Write the Rules of CRM, eBusiness, and eGov

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Business Rules Forum New Orleans, LA November 2001 Rolando@BizRules.com

Why are we here?



- **Who cares about rules anymore**
 - Our lives have really changed a lot since we met last year
 - We were all hurt and truly saddened by the loss we shared two months ago
 - And business is in bad shape
- **Yet we're all here despite the economy**
 - We're looking for solutions and new ideas to make things better
 - Right now we're all focused on three things:
 - Increasing revenue, Reducing costs, and Satisfying customers
 - This talk will help you whether you're in the Boardroom or the Computer Room
- **Why are we here?**

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Why do you need the Business Rules Approach ?

- Business rules solve the **biggest** problems in IT:

- **Systems are too hard to build** and even harder to maintain



- **It takes months to change rules** and programs because they are "hard-coded"

- Yet it takes just minutes to change data

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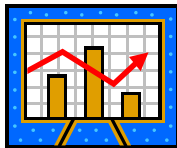
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Rules Cut System Development & Maintenance Costs by 50%

- Rule engine technology stores rules as **data not code**

- **Lets users change rules in minutes** instead of months



- Companies **save millions of dollars**

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Guess how Sabre plans to change rules 75% faster ?

- **8.28.2001 – Sabre announces their “Next Generation Travel Technology Platform”**

- Replaces 30 year-old legacy application

- **Rules are the key to the benefits**

- Rules will “**improve developer productivity** by 100%”
- Rules will “**reduce cycle time to update fare requirements** (rules) by 75 percent”



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Our Clients Save Millions of Dollars using Business Rules

- **Fortune 500 Clients**

- **Exxon Mobil, IBM, EDS, Pepsi-Cola, Burger King**

- **eGov Clients**

- BIZRULES.COM wrote the business rules in Canada's \$300 million **Social Security System** Modernization Project
- BIZRULES.COM is the key Business Rules SME on the IRS PRIME/CADE project, a \$10 billion 10-year program to modernize the **U.S. Internal Revenue Service**
 - This is the largest civilian systems modernization project in the world



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Who is BizRules.com?

- We provide business rule solutions, components, and consulting services for eBusiness and eGov
 - Specialize in CRM, Personalization, AI, Expert Systems, and Business Rules
- We modernize legacy applications & create eBusiness applications
- We serve the largest companies & governments in the world
 - The U.S. Internal Revenue Service
 - The Government of Canada Social Security Department
 - IBM, EDS, Burger King, and American Classic Voyages
- We work with the leading AI & Business Rules vendors including CA, Blaze, MindBox, ExSys, and SoftLaw



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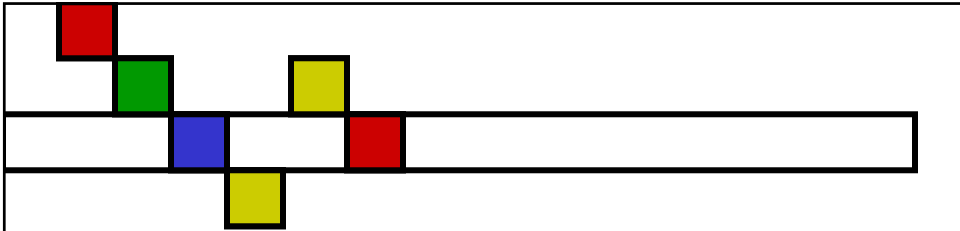
Who is Rolando Hernandez?

- Consultant in CRM Business Rules, Personalization, Expert Systems, and Rule Engines
 - Bachelor of Science, Systems Analysis, 1986
 - Master of Science, Artificial Intelligence, 1988
- Fortune 500 Experience
 - Created Exxon Mobil's Global Expert Systems/Knowledge Management Strategy using AI & Business Rules
 - Helped implement Pepsi-Cola's Sales & Distribution System in Brazil
 - Helped develop Royal Caribbean Cruise Lines' eCommerce websites CelebrityCruises.com and RCCL.COM, which was selected as "Best of the Web Travel Sites" by Forbes on 5/21/2001
- Founded BizRules.com in Miami in 1995 to help Fortune 500 companies Write the Rules of eBusinessSM

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**Why has it taken so long for
Business Rules to “emerge”
and become mainstream?**


— — — — —

It's actually a very positive indicator...



**Truly groundbreaking
innovations take over 30 years
to reach their full potential**

- Electricity showed up extensively in factories in the 1880s and 1890s
 - But the first big productivity improvements as a result of electricity didn't occur until the 1920s
- It took 30 years to create the 1-GHz CPU
 - But it only took 18 months to create the 2-GHz CPU
- First e-mail was sent 30 years ago in 1971
 - 80s PC boom introduced e-mail to enthusiasts
 - 90s WWW boom popularized e-mail
 - By the 00s, e-mail is mainstream



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The Internet was 30 years old before the Web was invented

■ Internet_{1960s} + Hypertext_{1980s} = WWW_{1990s}



■ AI_{1970s} + WWW_{1990s} = Intelligent Systems_{2000s}

■ ES_{1970s} + WWW_{1990s} = Business Rules_{2000s}

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Time to automate the Middle Tier

■ Presentation tier

- We used to write low-level code to paint screens – HOW
- Today we call high-level Presentation Services – WHAT

■ Data tier

- We used to write low-level code to CRUD flat files – HOW
- Today we use high-level SQL & DBMS Database Engines to manage data – WHAT

■ Middle tier



- Today many companies are **still hard-coding rules** “by hand” using low-level procedural languages – HOW
- Leading companies are starting to use high-level declarative Business Rules languages & “RBMS” Rule Engines – WHAT

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"CRM Personalization is the Killer App for Business Rules" Ron Ross

- First groundbreaking application that really leverages and needs rules
- CRM Personalization packages are enabling business executives to maintain their own rules for the first time
- Enterprises finally have a compelling reason to manage rules

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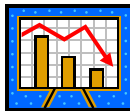
What's wrong with "Hard-Coding" Business Rules ?

Business People will want to change their own rules instead of waiting for IT to do it



What's wrong with "Hard-Coding" Business Rules ?

- In most companies business rules are not formally documented or managed at all
- The people who write the rules are not the business executives who design them
- You cannot reuse these rules in other programs



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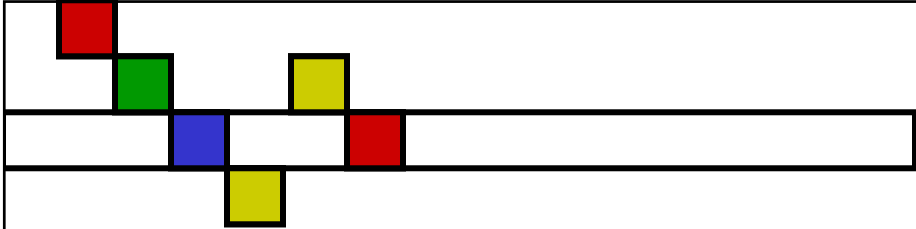
It's Better to Separate Rules from Code and Store Rules as Data

- Enables business people to create and modify their own rules
- Helps align IT with the business & brings rules back into the business side
- Removing rules from code simplifies programs and reduces the amount of code


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The Days of Hard-Coding Business Rules are Over!




Why do it the "hard" way when you can do it the "smart" way?



Store Rules as Data not Code

- Artificial Intelligence makes applications smarter
- Business Rules makes applications easier to develop
- Both help you cut costs, raise revenues, and increase customer satisfaction



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Store Rules as Data not Code

- Business Rules make systems even easier to maintain than they are to build in the first place!
- That's groundbreaking, because we are used the fact that systems usually cost more to maintain than to build
- There is a better way

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What's the biggest problem in your IT Dept?

- I mean, the biggest problem with system development & maintenance...
 - According to IT developers?
 - IT managers/executives?
 - Business users?
 - Business executives?
 - The CEO?

- *The answer is...*

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How many rules do you have?

- In your dept?
 - In your division?
 - In your **enterprise**?
- | | | |
|------------|-----------|------------|
| ■ 100 | 1,000 | 10,000 |
| ■ 100,000, | 1,000,000 | 10,000,000 |
- *How many rules do you have?*
 - *How many of you don't know?*

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Do you have specs? Do you know what the rules are?

- Can you list all the rules that run your business?
 - *Do you have an inventory of rules?*
 - Do you need one?
- What if your CEO says I want a list, a report of core enterprise business rules, ASAP?
 - *What would you do?*

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Are your rules effective-dated?

- Do you need to know what/how many rules turn on next week?
 - *Can you turn rules on/off as necessary, without "changing hard-code"?*
- Do you need to know what rules were in effect a few years ago because you're being audited today?
- Are you required by law to keep rules from say 30 years ago when a life insurance premium was calculated?

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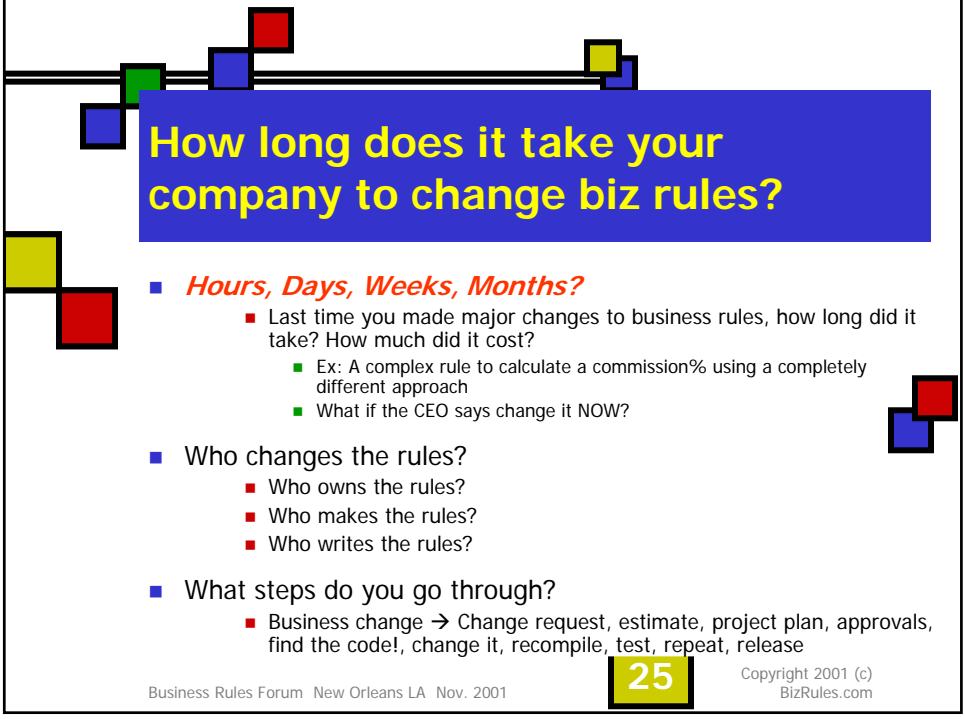
How do you write rules?

- *Hard-code?*
- COBOL, C++, VB, Delphi, Java, etc?
- HTML, XML?
- *Business Rules / Rule Engines?*

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How long does it take your company to change biz rules?

- **Hours, Days, Weeks, Months?**
 - Last time you made major changes to business rules, how long did it take? How much did it cost?
 - Ex: A complex rule to calculate a commission% using a completely different approach
 - What if the CEO says change it NOW?
- Who changes the rules?
 - Who owns the rules?
 - Who makes the rules?
 - Who writes the rules?
- What steps do you go through?
 - Business change → Change request, estimate, project plan, approvals, find the code!, change it, recompile, test, repeat, release

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How long does it take your company to change biz rules?

- Do you have "Cross Teams" ?
 - **A large cruise line does: To change 1 rule in their 5 reservation systems, they put together 5 cross teams to make the same change in 5 systems at the same time**
 - They have to go live with all changes at the same time
- Why are the same rules in 5 different systems?
 - The answer is...
- Are there any other ways to just make the change once?
 - The answer is...

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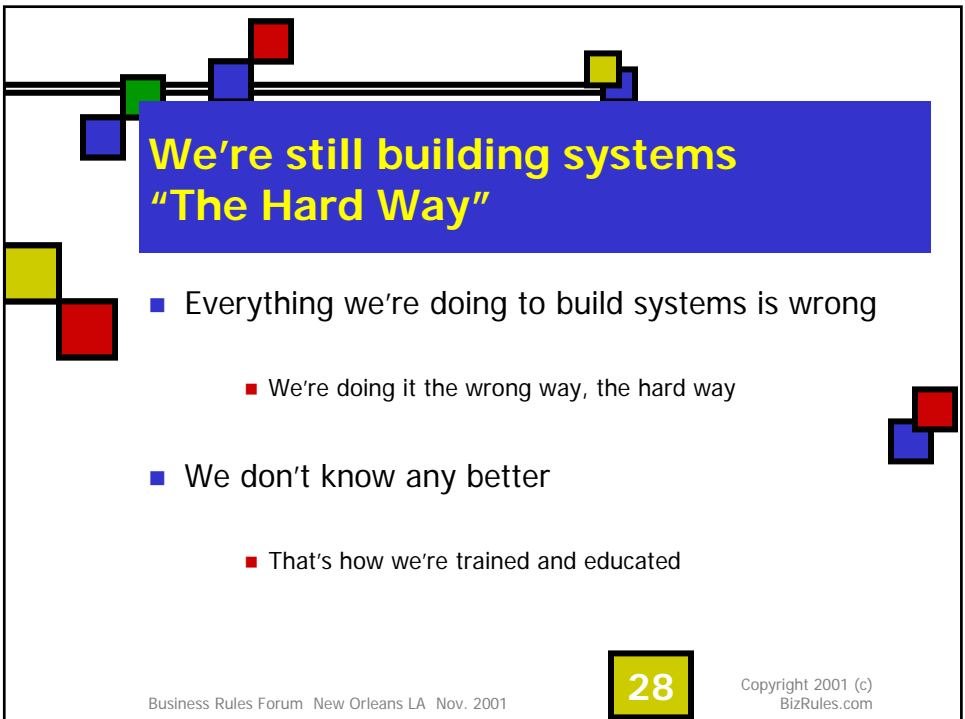
How long does it take you to change data?

- **Minutes, seconds?**
 - Example: A commission% amount, say 20% to 25%...
- Who makes the change?
 - The business or IT?
 - Does the business ever call IT to change data?
- IT empowers Business people to do it themselves
 - Excel, Word, Web...
- **CRM packages are now enabling business people to change their own rules!**

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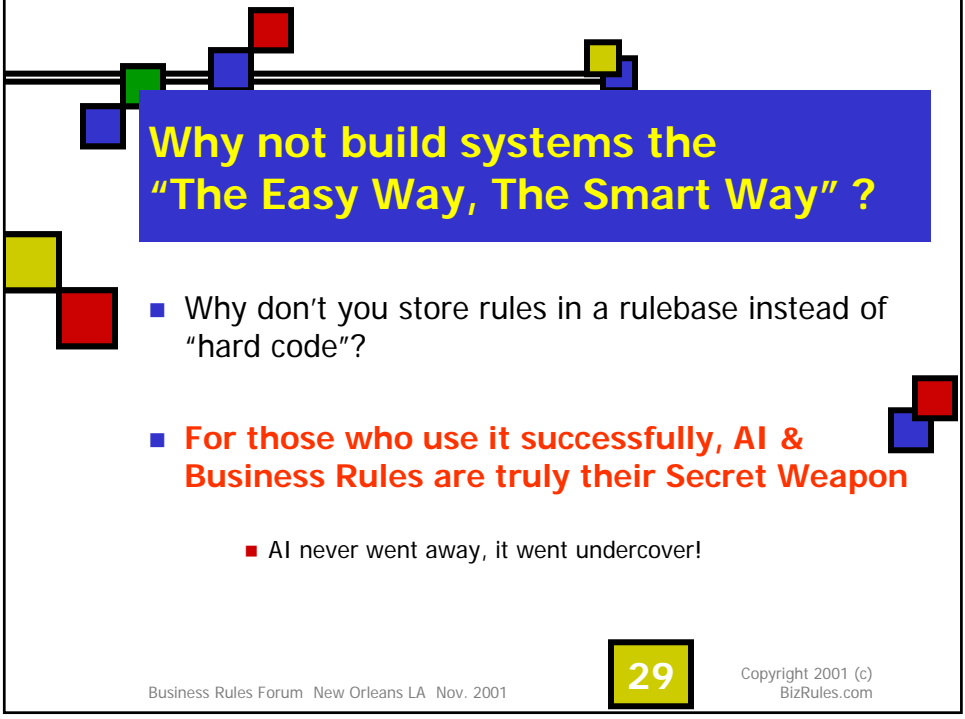
We're still building systems "The Hard Way"

- Everything we're doing to build systems is wrong
 - We're doing it the wrong way, the hard way
- We don't know any better
 - That's how we're trained and educated

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Why not build systems the "The Easy Way, The Smart Way" ?

- Why don't you store rules in a rulebase instead of "hard code"?
- **For those who use it successfully, AI & Business Rules are truly their Secret Weapon**
 - AI never went away, it went undercover!

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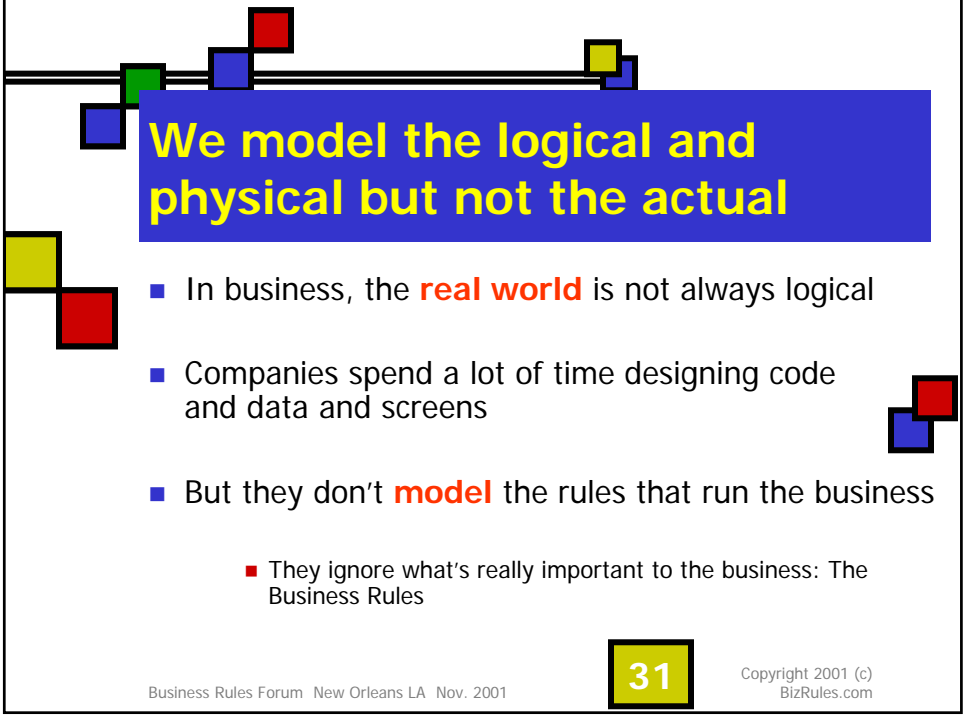
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Why do so many CRM, eBusiness, and eGov projects fail ?

They ignore what's really
important to the business



We model the logical and physical but not the actual

- In business, the **real world** is not always logical
- Companies spend a lot of time designing code and data and screens
- But they don't **model** the rules that run the business
 - They ignore what's really important to the business: The Business Rules

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What do we need to do to win at CRM and eBusiness ?

- **Focus** on the business rules during analysis and design
- **Train** the business side to create and manage business rules
- **Separate** the rules from the data and the code

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Why is Customer Relationship Management so important ?

— — — — —

Customers Rule the Web

What can CRM and 1-to-1 Personalization do for me?

- Help you Strengthen Customer Relationships**
- Increase Customer Loyalty & Retention**
- Deliver expert advice & recommendations to your customers**
- Build One-to-One Relationships with your customers**
- Let customers help themselves**
- Streamline Business processes that touch customers**
- Deliver personalized service to your Customers**
- Leverage Customer & product knowledge**

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What can CRM and 1-to-1 Personalization do for me?

Help you Streamline business

Strengthen Customer Relationships

Make it easier for customers to do business with you than with competitors

Increase Customer Loyalty & Retention

Relate with your customers

Let customers help themselves

Leverage Customer & product knowledge

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Business challenges in 2001

Managing business rules

Need ability to change business rules instantly

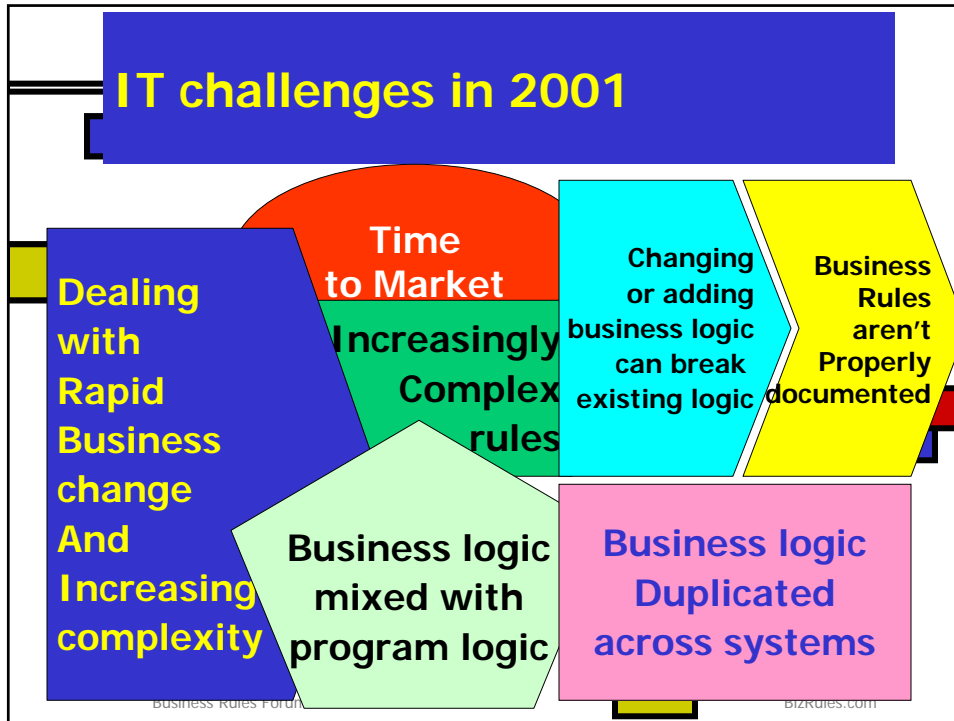
Need to provide personalized one-to-one service to Consumers and Partners

Can't wait for IT to change Business Rules

Need to simplify Business Rules & Business Processes

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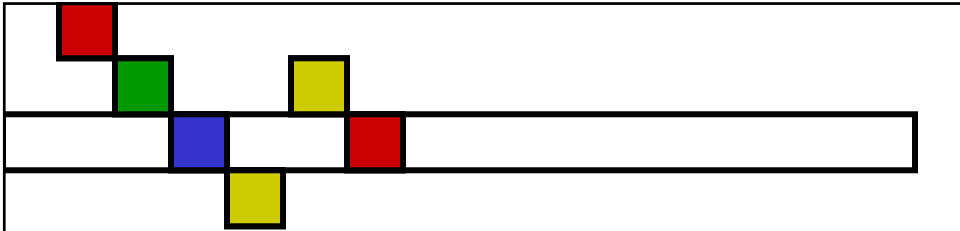


IT Opportunities in 2001

- **Rules can give you these benefits:**
 - Eliminate redundancy, improve effectiveness, and cut costs
 - Turn your company's knowledge and expertise into a valuable corporate asset
 - IT and Business people finally speak a common language: Business Rules
 - Use rules metrics to estimate time and effort, and to track progress
 - Sharpens your competitive edge


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What are some of the best practices of CRM, eBusiness, and eGov?

Make it easier for customers to do business with you than with competitors



Make it easier for customers to do business with you


- Assign all of your **best** customer service experts to each and every customer
 - Expert systems let you do just that
- Customers are **smarter**, better equipped, and more savvy
 - We need to make our systems smarter

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Inject the knowledge of your top customer service experts back into your websites



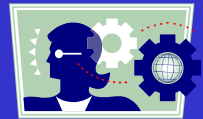
- The web eliminates the expert **middleman**
- Customer Service **Reps** are the real experts
- **Expert** systems make your web systems smarter
 - They give the same results as the experts

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Get customers to do the work



- **Cut costs** by getting customers to do the work
 - Use automated self-service systems Expert Systems
- Let customers **manage** their own personal privacy and permission profile
- Don't automate existing processes
 - **Reinvent**, revolutionize, and simplify first → then automate

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Add Intelligence to your Systems



- **Remember** key facts about the customer
- **Populate** fields automatically
- **Learn**
 - Use AI to learn more about the customer from every transaction

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Centralize rules in one rulebase



- Take a **broader** view of the customer
 - If you just lost my luggage, stop sending me email or text pages with special offers → I'm not happy with you right now

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Cross-sell & up-sell



- Integrate multiple **brands** to drive loyalty

- Cendant owns Ramada and Days Inn
- Royal Caribbean owns Celebrity Cruises

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Treat customers individually



- The web was originally about the **lowest price**
- Today it's about customization, **personalization** – anytime, anywhere, anyhow
- Customer **service** will be more important than price

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One-to-One Marketing



- Stimulate Demand
 - If I tell you that I like to fly from Miami to San Francisco, then let me know whenever you have a special offer for that city pair
- Do Targeted, Segmented Marketing
 - Major US airline used to do 3 huge direct/mass mail pieces/yr → 1% return
 - Now do 30/month, targeted and segmented → 10% return

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Personalize Complex Products using Business Rules



- Select the **right product** for the person
- Select a product for which the customer is **eligible**
- Select a product that you will **make money** on

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Give Customers Expert Advice



- For products that support a sales force
 - Use Expert Systems to get all your salespeople to work at the level of your best experts
- For products that do not support a sales force
 - Use Expert Systems to give customers expert advice directly from your website

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Speak my Language



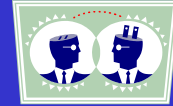
- Many call centers speak different languages
- Your systems should too
 - Let the customer decide what language he wants to use when he interacts directly with your systems
- Rule engines make this easier
 - You don't want to reprogram rules in each language – One rule engine can support multiple languages

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No One Company will Own the Customer



- The customer will own you
 - He will decide when and where to use you
 - So, Make it easier for him to do business with you
- Build your systems from the customer's point of view
- Build your systems to share data with your partners

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Customers now access your internal systems



- The web opens up your legacy systems to consumers who aren't familiar with your internal business rules or business processes
 - These systems were designed for use by trained employees who know your systems and all their workarounds
- Consumers now get to see what shape your systems are really in
- Competitors and shareholders do too!
 - Do you really want competitors to see and exploit all the weaknesses in your systems and processes?

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Build Trust Online



- The looker to booker ratio is not getting better because consumers don't trust companies
 - Most consumers shop/research online but buy offline
 - Privacy, Price, Security (credit card)
- Next generation will trust us more
 - Older consumers getting net-enabled
 - Kids already net-enabled
 - Over the next five years we will see a huge and permanent shift to online buying as kids become consumers

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eBusiness Requires new Business Models

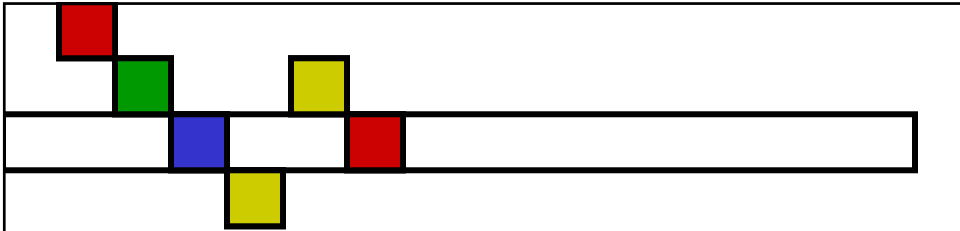


- Attract customers
- Convince Customers to buy online
- Deliver satisfaction
- Support and service customers
- Encourage loyalty & retention

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How to start using business rules in your company

— — — — —

Without resistance!



Just start writing the rules as you learn them

- Soon you will have a “Rule Book” with hundreds of rules
- Pass it around and ask for corrections/feedback
- Keep it updated
- In most cases it will become a valuable corporate asset
 - EXAMPLE: Cruise line was consolidating rules from across 2 brands – When VPs met to review existing rules and decide the new rules, they called me in because I was the only one who knew all the rules
 - My “Rule Book” was the only document they had to use

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There are only 3 Ways to Document Rules

- Pictures – Decision Trees
- Charts – Decision Tables
- Words – Written English Business Rules
 - If a picture is worth a 1,000 words, why do we say that in words?

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Written English Business Rules → Actual HMO Rule

EMERGENCY CARE DETERMINATION

SH4BBC5

A condition qualifies for emergency care if services are required to provide an immediate diagnosis and treatment for a condition of unpredictable onset which has the capability, or is perceived to have the capability, to produce severe pain, loss of consciousness, excessive bleeding or becomes a threat to life or limb if medical care is not received immediately.

Qualified emergency care would include, but is not limited to; penetrating wound such as a knife or gunshot wound; foreign body in the throat; burns involving blisters over a large area of the skin; displaced limbs; head injuries accompanied by drowsiness, vomiting, confusion, blurred vision or bleeding from the ears or throat; sudden or severe continuous chest pain; sudden breathing difficulty; sudden loss of vision or hearing; persistent or sudden bleeding from the nose, mouth or vomiting of blood; seizure occurring for the first time or recurrent frequent seizures unresponsive to current medication; suspected or confirmed overdose of drugs accidentally or intentionally; suspected or confirmed swallowing or breathing of poisonous substance; or unconsciousness.

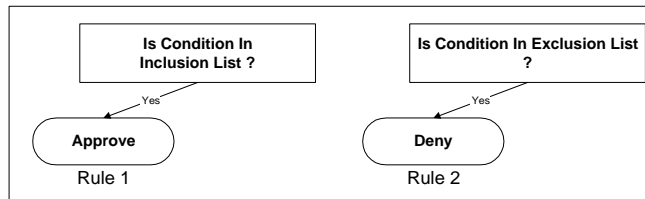
Qualified emergency care does not include; colds, sore throat or flu; arthritis that is recurrent; chronic less severe pain such as earache, headache, sore "pulled muscles" or indigestion; small bruises or scrapes of the skin; insect bites; or wounds not requiring stitches.

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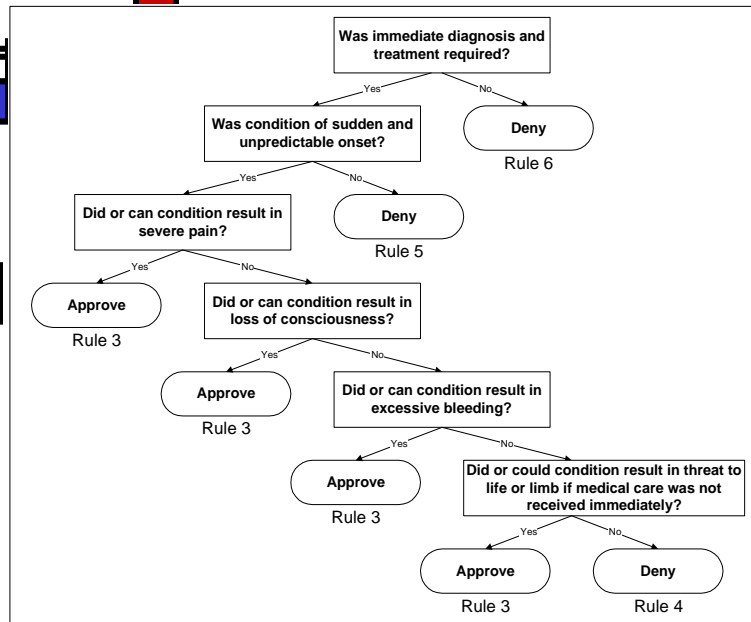
Decision Trees



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Decision Tables

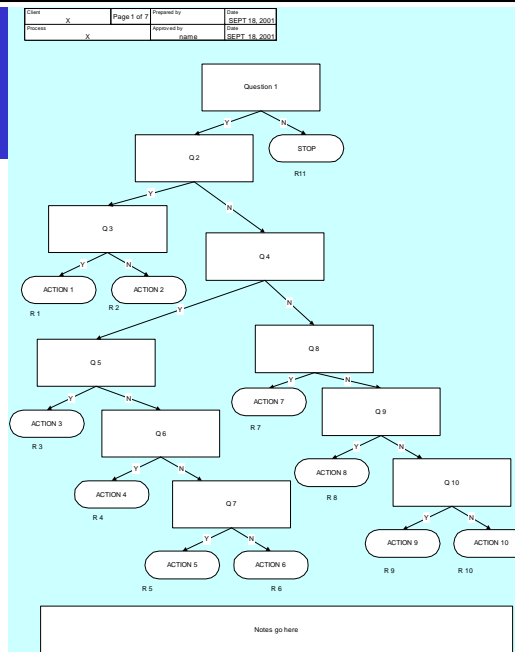
HMO RULE BOOK	R6	R5	R3	R3	R3	R3	R4
EMERGENCY CARE DETERMINATION RULES							
IF							
Was immediate diagnosis and treatment required?	N	Y	Y	Y	Y	Y	Y
Was condition of sudden and unpredictable onset?	-	N	Y	Y	Y	Y	Y
Did or can condition result in severe pain?	-	-	Y	N	N	N	N
Did or can condition result in loss of consciousness?	-	-	-	Y	N	N	N
Did or can condition result in excessive bleeding?	-	-	-	-	Y	N	N
Did or could condition result in threat to life or limb if medical care was not received immediately?	-	-	-	-	-	Y	N
THEN							
Emergency Care Determination Decision is	DENY	DENY	APPROVE	APPROVE	APPROVE	APPROVE	DENY

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Another tree example



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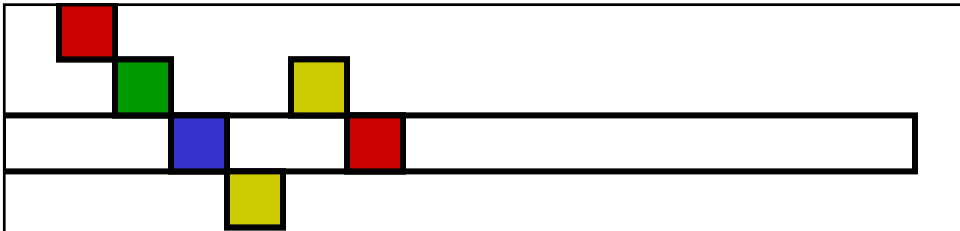


One Technique for Harvesting Rules

- Tour the forest →
- Plant the trees →
- Trim the Branches →
- Draw the leaves →
- Identify all the trees
- Design & Analyze each decision tree
- Simplify & Redesign the CONDITION logic
- Write the Rules and ACTION logic

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How to get management commitment and buy-in for a business rules strategy

— ■ ■ ■ —

Ask
**“Do you want to rule your customers,
 or do you want competitors to rule you ?”**

Rule Engines are an Insurance Policy

- Government of Canada Social Security System
 - \$300 million ISPR project was cancelled during development
 - All PowerBuilder code was lost – If rules had been hard-coded, they would have been lost too
 - Since we had all the thousands of rules in an Aion rulebase, we kept all the rules even the the code was thrown away
 - The rulebase was used as a starting point for the redesign
- United Airlines – January 31, 2001
 - Website priced San Francisco to Paris for \$24.98
 - United initially refused to honor tickets - Bad PR eventually led them to honor all 150 tickets
 - One rule could have prevented that loss



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Rule Engines Simplify Complexity

- Orbitz weakness → Limits you to 4 pax per search, because that works with all the airline systems
- Why? Each airline Rez system has different limitations or rules
 - US Airways, American → Max 4 PAX/BKG
 - Delta → Max 7 PAX/BKG
 - United → Max 9 PAX/BKG
 - Expedia, Travelocity → Max 6 PAX/BKG
 - Delta → Max 7 PAX/BKG
- Rules could allow Orbitz to support dynamic, variable limits, depending on airline restrictions

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Do you let business executives or IT own business rules?

- The Business owns the customer
- The Business makes the rules
- IT programs and automates the rules

Smart companies enable Business People to create, manage, and write Business Rules

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Who writes the rules in your industry?

Without Business Rules / Rule Engines	Using Business Rules / Rule Engines
Systems limit what The Business can do	Systems enable the business to do things they couldn't do before
Business has to adapt to system constraints	Systems adapt to meet business requirements
Rule changes require reprogramming, retesting, and migration	Analysts can change rules instantly, without reprogramming, and as easily as they change data
Adding or changing rules can break other parts of the application	Adding or changing rules should not break other parts of the application

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Could Business Rules improve your bottom line?

Without Business Rules / Rule Engines	Using Business Rules / Rule Engines
Don't know how many rules there are, or where they are – Rules are mixed in with program code	Rules can be easily managed & updated – Rules are isolated from code
Rules are duplicated in many systems	Rules are stored once in a rule engine
Rule changes need to be made across duplicated systems (“cross-teams”)	Need to change one rule in one place

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The Bottom Line

- **If your IT Dept & your IT Vendors use a Business Rules-driven approach to building systems, you will:**
 - Cut system development time by 30-50%
 - Cut system development costs by 30-50%
 - Cut maintenance time & costs by 30-50%
 - Minimize testing costs
 - Be able to add and change business rules instantly, without breaking the rest of the system

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Lessons Learned: Mobil's Experience with AION

Actual Results with AIONDS

System	Compressor Equipment Troubleshooting Knowledgebase	Grease Product Recommendation Knowledgebase	EHS Safety Audit Knowledgebase
Scope	Full-size	Full-size	Prototype
Rules	300	300	100
Experts	8	9	1
Clients	2	1	1
Users	> 200	> 200	< 20
IT Team	3	2	1
Dev Days	207	112	60
Budget	5% Over	9% Under	1% Over

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What's the Secret?

- **The secret is treating business rules as data not code**
 - You want to change business rules as easily as you change data, without having to call IT !
- **You do not want to have to change the program just to change the rules**
 - You do not have to write a change request, business specs, program specs, make code changes, test, debug, compile, and migrate programs just to change business rules

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What's the Key?

- **The key is using a rule-based language and using a rule engine**
 - You tell the system what you want, and let the system figure out how to program it
- **You have less code to write, so you finish faster, have fewer bugs, and save lot of \$\$\$**
 - Changing or adding rules never breaks the system!

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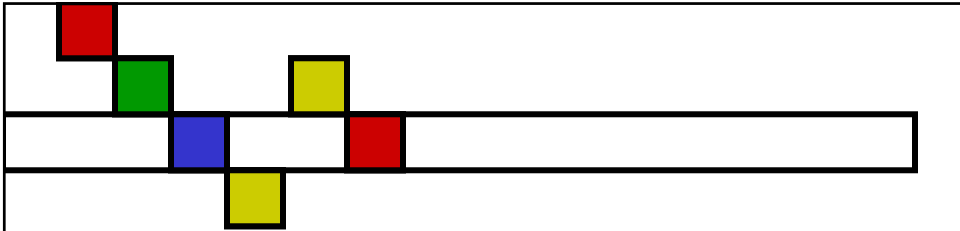
What if you don't use the Business Rules approach?

- **If your custom applications are not designed with rule engines, they'll be too hard to maintain and won't last**
- **If your vendor packages don't embed rule engines, they won't be able to keep up with changing requirements**
- **Competitors will rule you**

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**The Fortune 500 use business rules
to rule e-Business**

— — — — —

**They have been getting \$100s of millions of
dollars in benefits from ES/BR for years –
It is their secret weapon**



**90% of the Fortune 100 use AI
and Business Rules**

- **Amazon.com**
 - Uses rules and AI & Collaborative Filtering to **Personalize recommendations** – “people like you also like...”
- **Dell Computer**

 - Uses rules & AI to Configure PCs to meet your requirements, and to do **Dynamic Pricing**
 - Support is personalized for your specific computer
- **Wall Street’s proprietary AI trading systems**
 - Handle hundreds of billions of dollars worth of investments – **operations would stall without AI and Business Rules**

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Business Rule Engines Power the Fortune 500

- **Payday → ADP**
 - Tax rules and calculation engines cut your check
- **Apply for a credit card → Visa**
 - CRM / e-Business engines for web-based Profile Management System
- **Go shopping and charge it → AMEX**
 - **35,000 business rules** in "Authorizer's Assistant" Rule-Based Expert System handles all credit card authorizations worldwide
 - System has never been down in 13 years!
 - **Only five people maintain** this mission-critical rule-based Charge Authorization System

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You Can Add Intelligence and Business Rules to Existing Systems

- **Swipe your credit card → First Data**
 - Commission engines – Many rules apply, **finds the best rules that yields the highest commission**
- **Check your credit report → Equifax**
 - Credit scoring business rule engine
- **Buy a home → Countrywide**
 - Loan approval rule engines
- **Buy your mortgage → Fannie Mae**
 - Underwriting rule engines

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Rule Engines Insure Policies

- **Insurance Underwriting → State Farm**
 - The largest insurance companies in the world rely on rule engines for underwriting, rating, and compliance
 - "Don't know what we'd do without them"
- **Loan Underwriting → Banks**

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Rule Engines Drive the Travel Industry

- **Search for the lowest airfare → Orbitz.com**
 - Intelligent flight & airfare search engine was built by MIT AI Ph.Ds at ITA Software
- **Airline frequent flyer program → American Airlines**
 - One-to-one personalization driven by business rules
- **Board your plane → Northwest Airlines**
 - Airport Gate Scheduling System is an AI Expert System

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Government Online Instead of People In Line SM

- **Apply for Social Security Benefits → Canada**
 - AION Rule Engine handles entitlement & eligibility
- **Apply for Social Security Benefits → Australia**
 - STATUTE Expert Rule-Based Expert System handles entitlement & eligibility
- **Pay your Taxes → US IRS PRIME/CADE**
 - Rule Engine will process tax returns & maintain taxpayer records
 - Analysts say this 10-year \$10 billion program will be the largest civilian systems modernization project in the world
 - Will be **one of the largest rule-based systems ever built**

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Outsmart your Competitors with Artificial Intelligence

- AI makes your systems smarter
- AI is not widely used or well understood
- **But those who use it successfully cannot live without it**

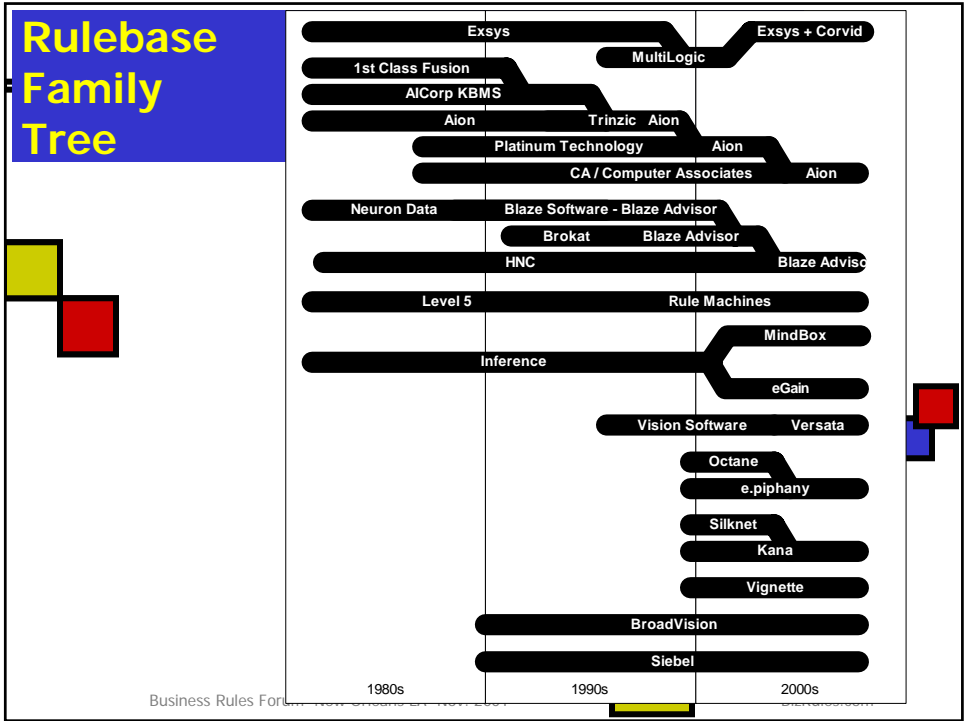


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Outsmart Your Competitors with Artificial Intelligence

Rule Your Customers with Business Rules

Modernize
LEGACY SYSTEMS

Simplify
AND REDESIGN BUSINESS PROCESSES

Automate
KNOWLEDGE-INTENSIVE BUSINESS PROCESSES

Recommend
COMPLEX PRODUCTS ON THE WEB WITH EXPERT SYSTEMS

Develop
CRM, PERSONALIZATION AND eBUSINESS RULES

Automate
DECISION-MAKING WITH A.I. - ARTIFICIAL INTELLIGENCE

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