

**The 6th World Multiconference on
Systemics, Cybernetics and Informatics**

July 14 - 18, 2002 ~ Orlando, Florida

Delivering E-Type Solutions through Requirements Validation

July 15, 2002

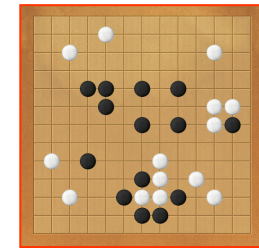
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sente 先手
Corporation 株式会社

www.sente.com

sente means competitive initiative
in the game “Go”



**Our focus is on productivity
enhancements through Faster:**

- delivery of customer solutions
- delivery of information to users
- implementation of organizational changes

1. Software Investment Insights

- Existing Requirements-Driven Development-Paradigm Rarely Delivers a Good Return on Investment (ROI)
- **The Challenge is to Deliver Solutions vs. Software**
 - **Software Pollution™**
 - **The Ever Increasing Development Backlog**
 - **Requirements Validation** - deploy better investments
 - **E-Type vs. S-Type Systems**

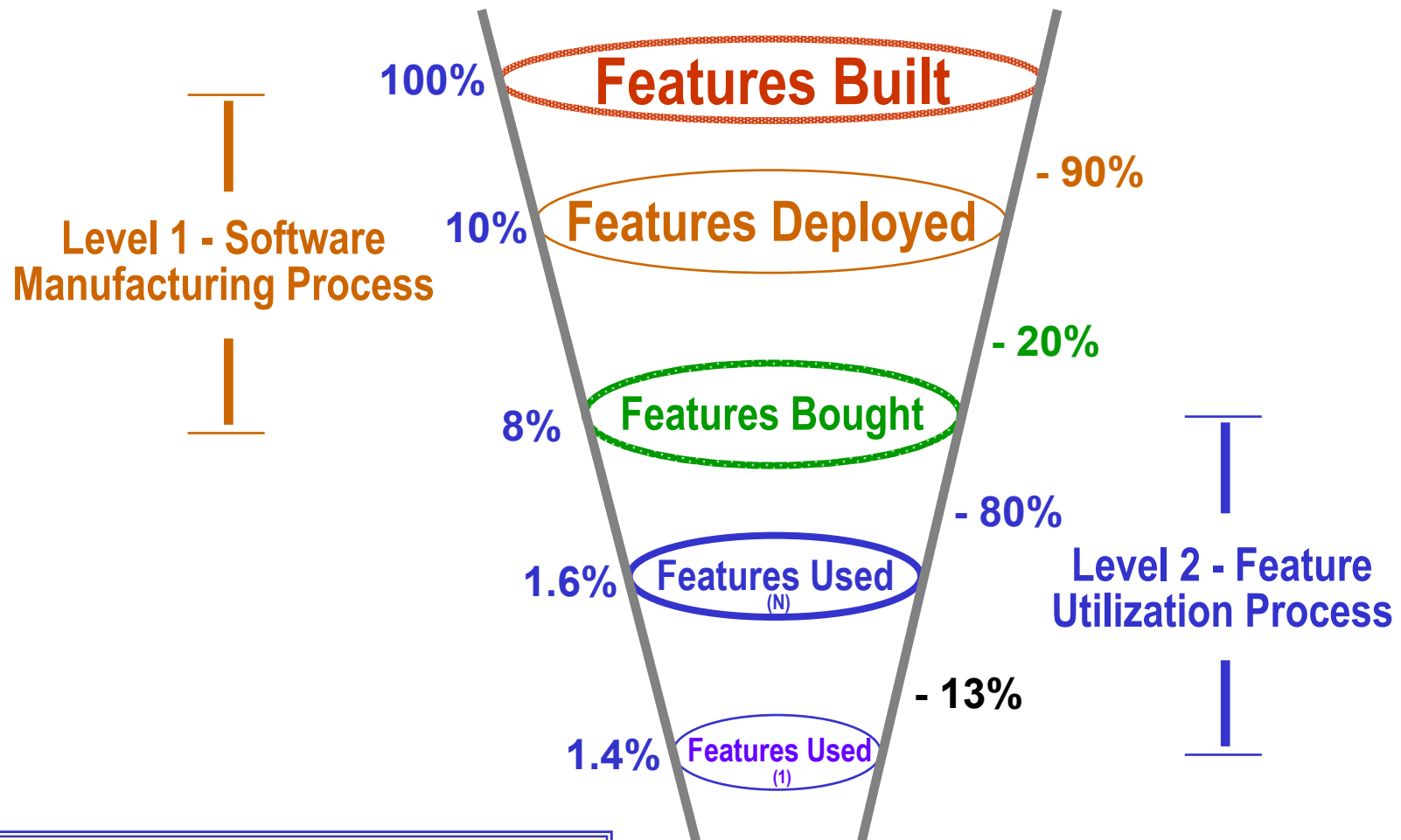
2. The *eccm* toolkit capabilities for Requirements Validation

- **Architecture**
- **Configuration Management**
- **Center Productivity Management**

3. Summary

Software Pollution™ (1/2)

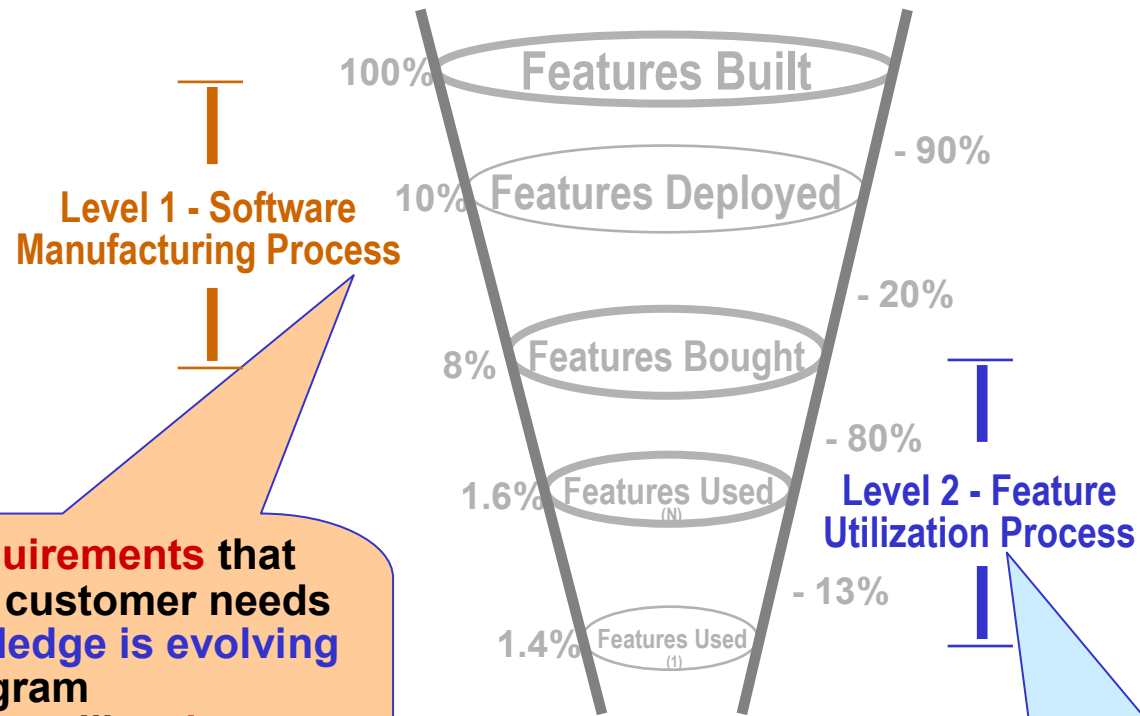
Feature Manufacturing and Utilization Analysis



Ability to Remove Features
Guide for Re-engineering Programs

Software Pollution™ (2/2)

Feature Manufacturing and Utilization Analysis



- **Incomplete Requirements** that do not capture customer needs
- **Customer knowledge is evolving** during the program
- Development Team likes **long delivery programs**
- Development Team uses **“bleeding edge”** technology

- Users' ability to **absorb new features** is limited
- Features do not fit into **any** useful process
- Late delivered features **no longer relevant**

Requirements Pollution Levels
Aspec 100:1 Bspec 60:1 B1Spec 25:1

Software Investment (1/4)

The Requirement Driven Paradigm Fails to Deliver ROI



Business Needs Transformed into Requirements

The Problem is Here

- Requirements Track Record:
- Incomplete, Inaccurate, Incorrect
 - Ad Hoc Validation, Reviews
 - 5 - 8% of Program Cost

Requirements By Release
Existing Software Development Process

Meets Need

Continue Investment

ROI Good

We Try to Fix It Here

- More Releases (e.g., 6months; \$5M)
 - Architecture, User Interface, BRs, Processes, Reports, Flow-Through, and Training
 - Unstable Operations
- More Time and Investments
 - Never Meets Objectives 1st Time
 - Over 90% of Investment

Programs Cancelled Before Deployment

Most Programs Fail to Deliver ROI Because Business Irrelevance It Takes Too Long to Get It Right

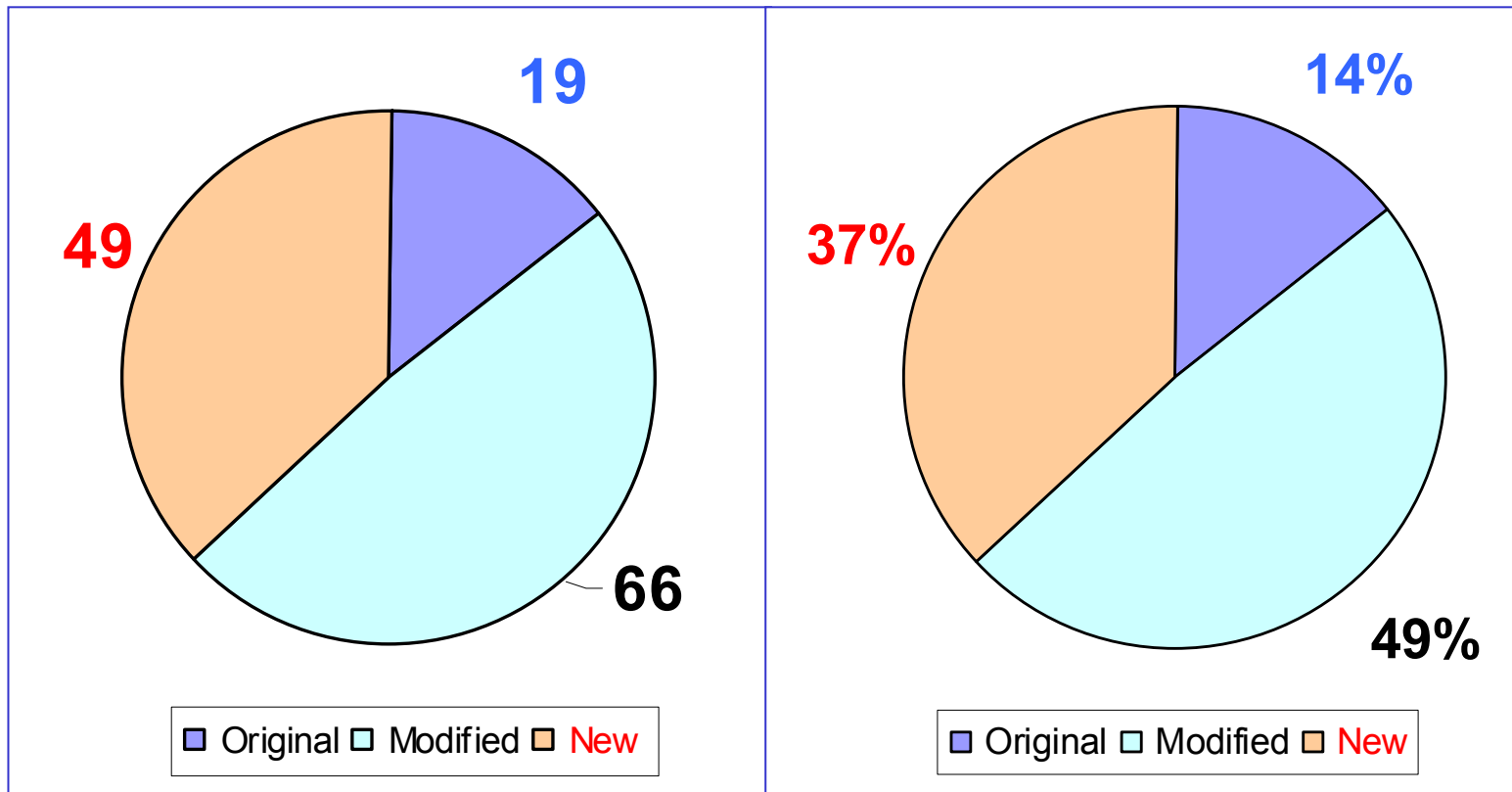
“Successfully Tested All Aspec/Bspec Requirements But Could Not Make a Call”

The DEAL That Worked Well for Over Half a Century



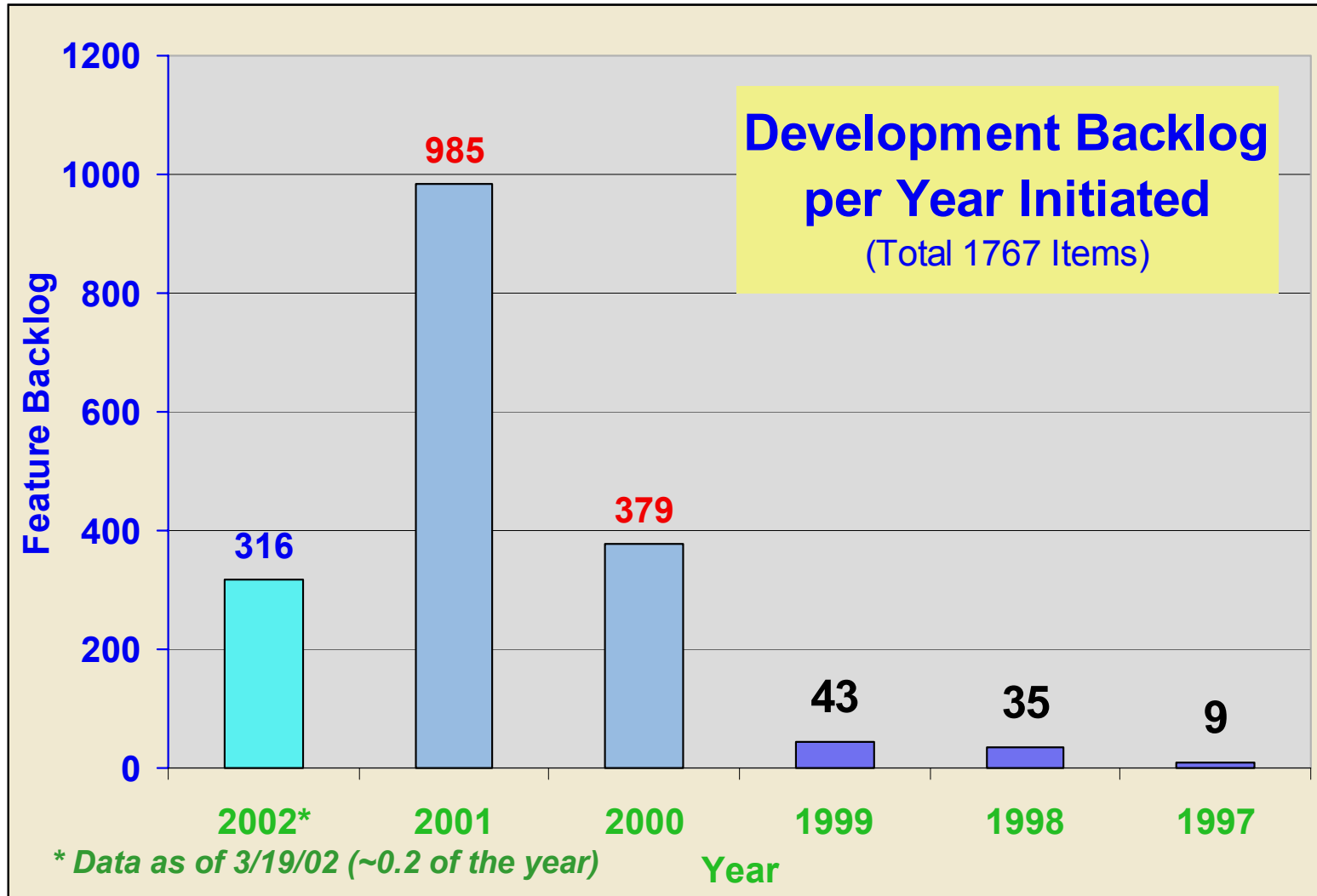
- **The Business Invests in Software Solutions Based on **Incomplete and Inaccurate** Requirements**
 - the business unit produces the requirements; therefore, **it is its own fault** when the solution is unsatisfactory
 - the development team sticks to the “feature coding assignment”
- **The Business Is Required to Continue Funding Enhancements to an Unsatisfactory Solution**
 - the solution is not able to keep up with the evolving business needs (new or newly learned)
 - the users are continuously living with incomplete (irrelevant) solutions; manual workarounds are the norm
- **The Development Team Is Rewarded With Ongoing Funding While It Delivers Barely Relevant Solutions**
 - not accountable for ROI and shows no interest expanding scope beyond “feature development”
 - System Integrators (SIs) are doing *barely better* (they shift always accountability back to business unit)

Business Rule - Validation Results



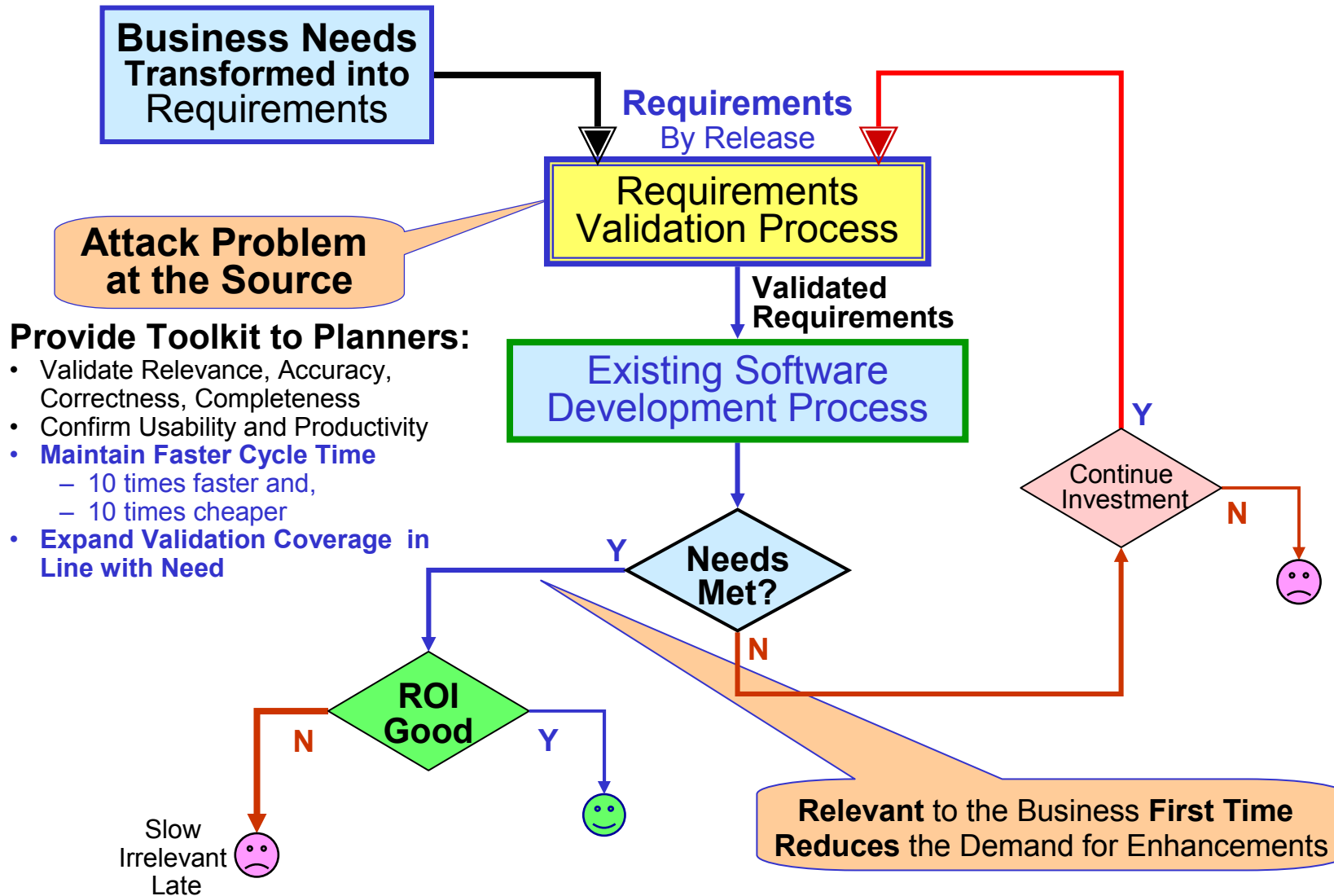
The Business Rules Were Professionally Maintained
Two Orders of Magnitude More Complex Than "The Boolean Expression"

Feature Development Backlog per Year Historical Summary (e.g., 9 features still open since 1997)



Software Investment (2/4)

Improve Requirements Quality through Validation



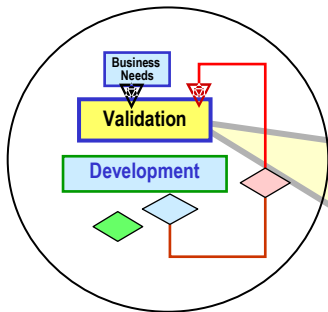
Provide Toolkit to Planners:

- Validate Relevance, Accuracy, Correctness, Completeness
- Confirm Usability and Productivity
- **Maintain Faster Cycle Time**
 - 10 times faster and,
 - 10 times cheaper
- **Expand Validation Coverage in Line with Need**

- **Responsible for provisioning data circuits for the wireless industry**
 - connectivity between switches, antennas, etc.
- **Over 500 customers (revenue \$2B/year)**
 - 50 Reps, 40 System Designers
- **Over 80,000 orders per year**
 - orders are received in the center through faxes and emails
 - it takes an average **~1.5 hours** to process an order per Rep *including related clarifies and escalations*
 - each new order must be processed within 12-24 hours
- **Center staffing growing ~30% per year in line with customer orders**
 - recruiting is major challenge
 - it takes **~6 months** to get a new Rep trained/productive
- **The Success Criteria: Improve Rep Productivity to Eliminate Staff Growth**

Software Investment (3/4)

Supports Validation of Capabilities in Six Key Areas



**Architecture
Configuration Management**

Web Based UI

*electronic customer
contact management*

eccm Toolkit
Release V.25

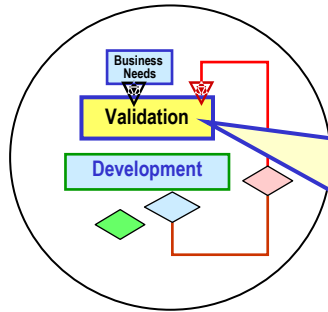
Business Rules

**Operational Processes
Center Productivity Management**

- 10 Times Faster
Cycle Time (Robust)
- Validation Coverage
Expanded with Need

Software Investment (4/4)

eccm Validation Capabilities (Six Key Areas)



eccm
Release V. 25

The ***eccm*** Toolkit
Delivers Cost Effectively
Business Solutions

• Architecture

- cost effective implementation of learning cycles through daily/weekly SW releases
- scalability (25, 100, 1000 users)
- new-release related, center disruption-management (operational and trial versions concurrently in deployment)
- integrated order management with clarify and escalation processing
- incremental and targeted flow-thru automation

• Configuration Management

- over 200 configurable options *without coding* (robust solution) (new product, fields, BRs, navigation, process definition, etc.)
- customer and center collaborative order management

• Easy Web Based UI and Training

- custom display and search functions
- business-rules knowledge-based help function
- supports all order transactions through a uniform user interface (intelligent edit filters)
- context sensitive action buttons
- integrated training and operational databases
- management of Rep proficiency during training process

• Business Rules (BRs)

- the development of a consistent baseline
- the integration with the create/edit functions
- the uniform application of BRs to all user activities (e.g., clarifies, escalations)

• Operational Processes

- a rigorous 4-way definition and baseline
- a table driven implementation
- increased accountability through process transparency

• Center Productivity Management

- Rep, team, and account level productivity, quality and throughput reports (real time, weekly, monthly)
- session and order life cycle analysis
- historical and cause analysis (reduce center load)
- intelligent work list management

Definition of S-Type vs. E-Type Systems

The Vendor Incentives Drive the Results [Lehman 1985]



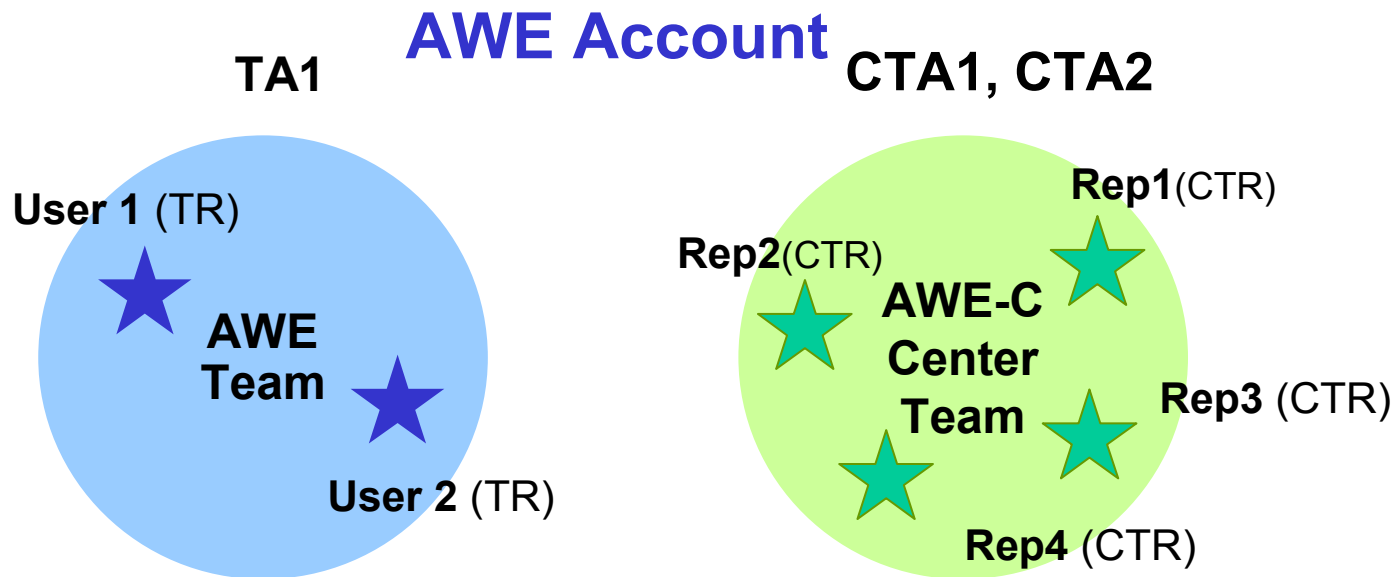
S-Type System:

- **Specification** based software treats each release as reflected by the requirements; no capabilities are added to reflect life cycle expectations beyond software maintenance (e.g., operating system, DBMS, platforms)
 - there is no developer interest in understanding application – just do this or that
- Software is always getting bigger, more complex with an incrementally reduced capability to fix bugs or adding features cost effectively
 - There is a clear dependency between the demand for new features and increased software complexity (cause and effect)
 - The ROI is getting incrementally worse – we never hit the wall because the business unit is forced to reduce feature-demand by relevance and cost considerations
 - The IT Organization has only ONE alternative, that is to start a new replicated development programs to fight the “software development bottleneck” (developers rarely able to reuse previous platforms because of code ownership, obsolescence and reuse considerations)
 - Software pollution becomes an ROI measure (increased pollution reduces solution’s life cycle)

E-Type System:

- **Evolution** Based Software is designed to handle tasks and to evolve with *expected* changing needs through configuration management (CM) capabilities
 - Requirements are viewed as representative of possible needs into the future
 - Success criteria includes the ability to expand capabilities without software development (e.g., new business rules, process changes, report changes)
 - Software complexity of E-Type systems is increasing at a **slower rate**
 - Software complexity is proactively reduced through
 - reimplementing of functionality with increased e-capabilities
 - removal of features that are no longer needed/used but add complexity and maintenance cost
- A validation platform can be used to validate requirements reducing the software churning in search of the “true” business-need definition (requirements)

Account Configuration



SA - SA1, SA2, SA3

TA - team administrator

TR - team Rep

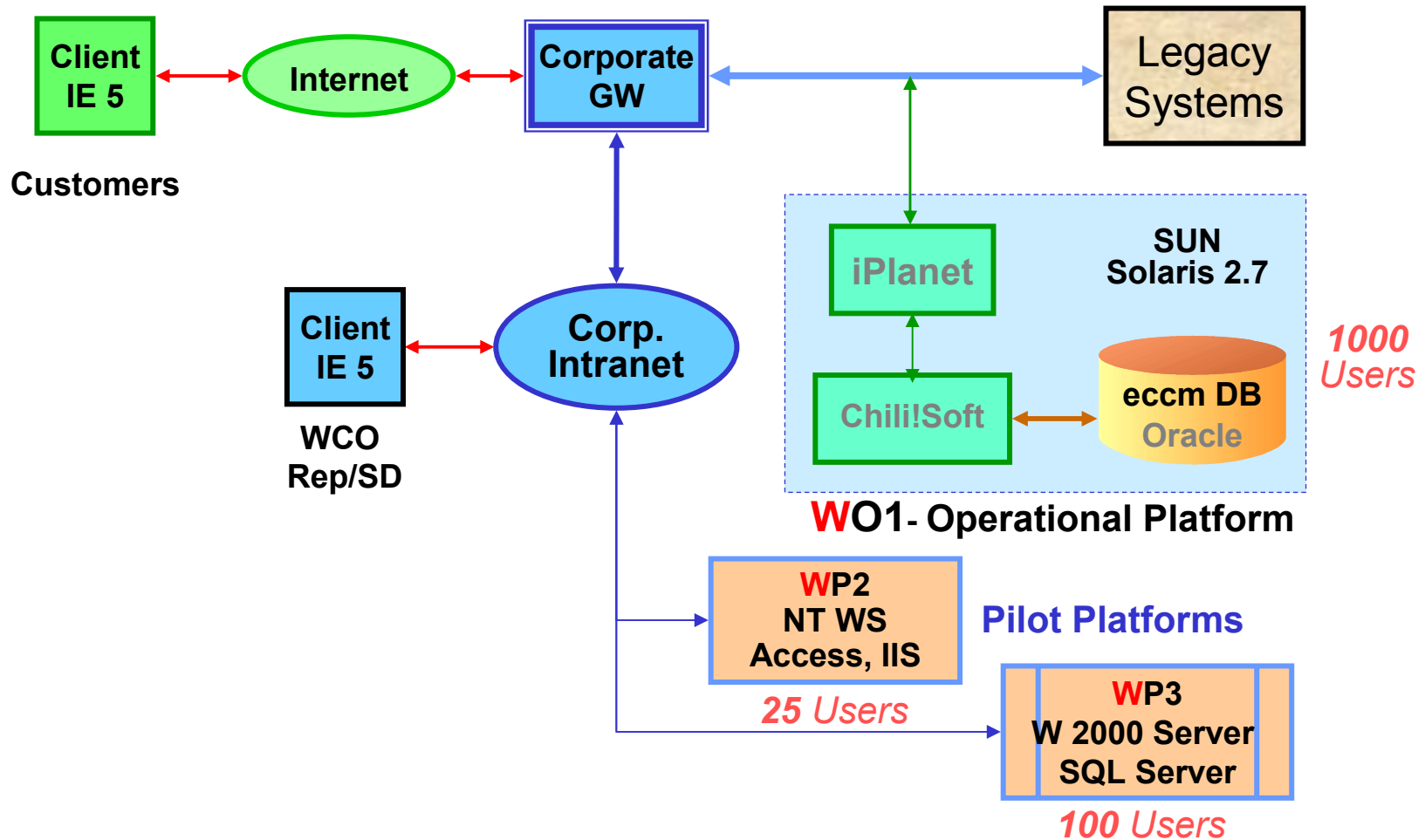
CTA - center team administrator

CTR - center team Rep

SA - system administrator

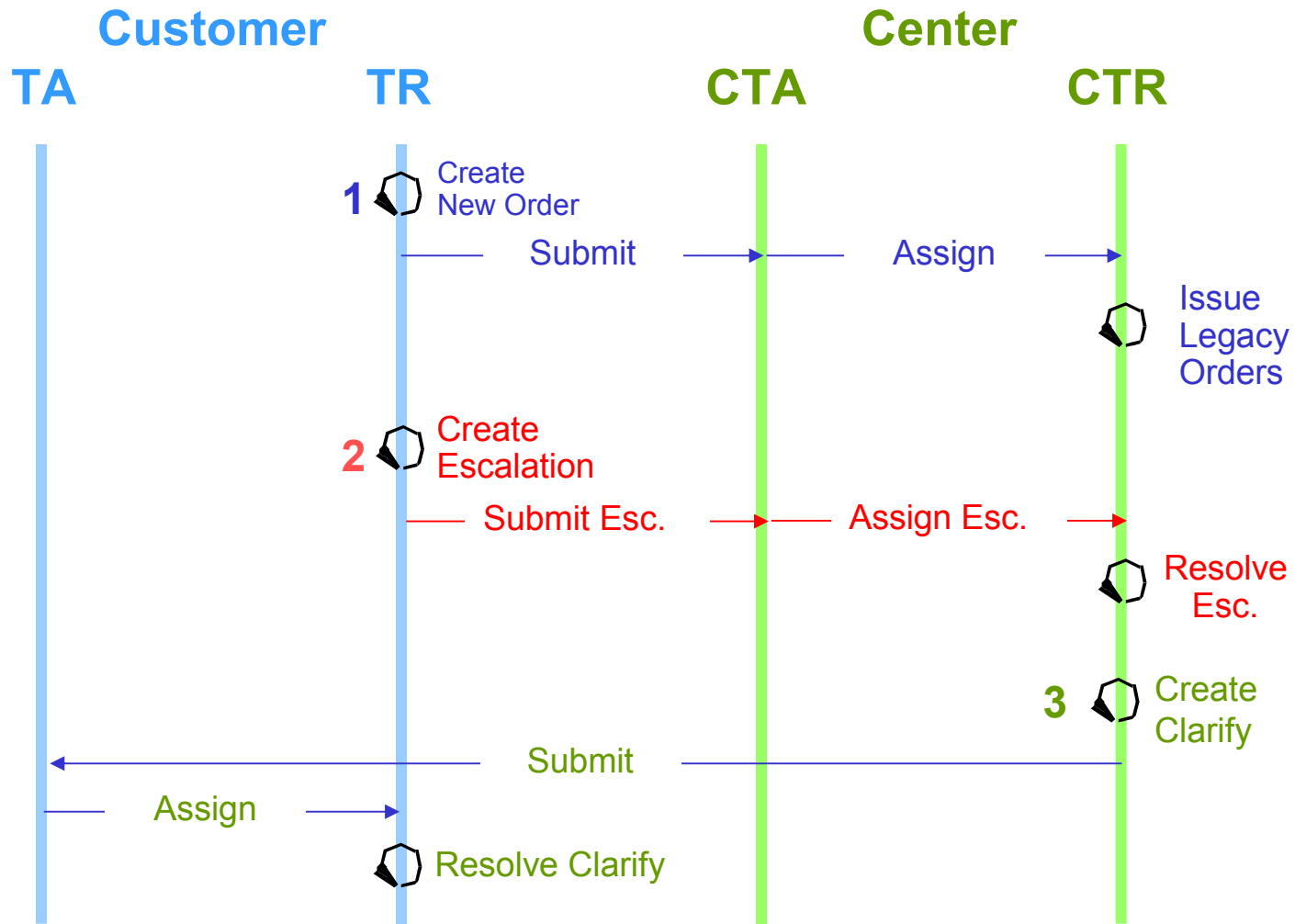
Wide Deployment Architecture

Managing Change Management



Operational Processes Validation

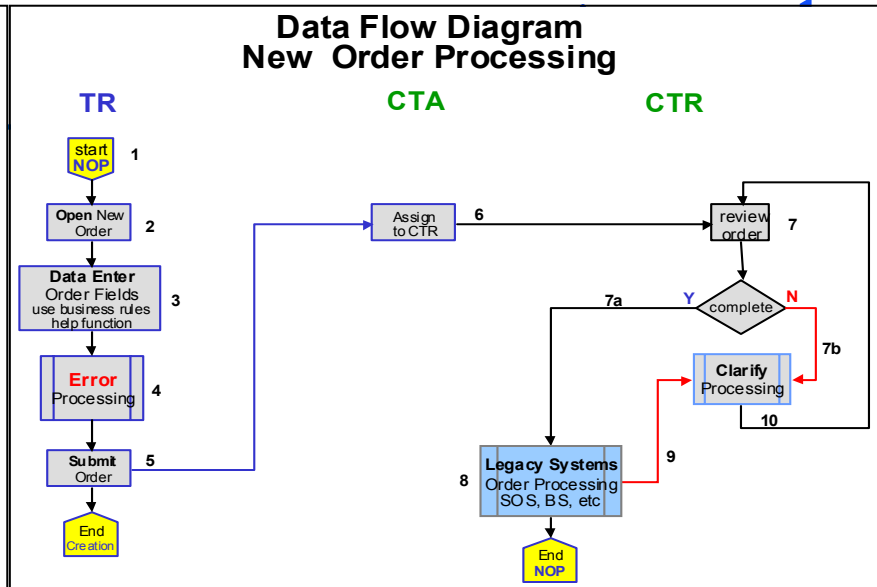
Create New Order, **Escalation** and **Clarify** Processing



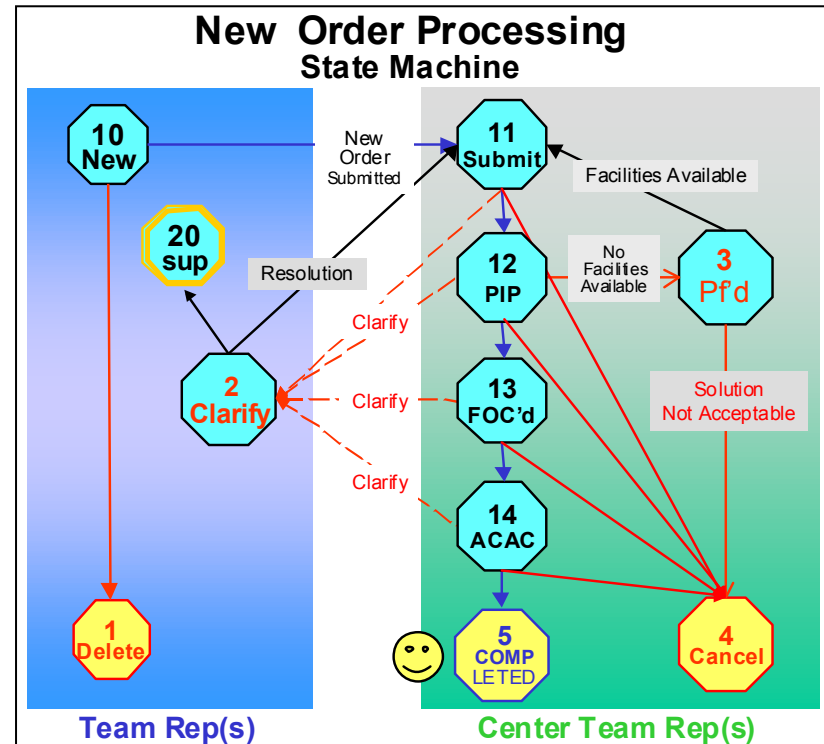
Process Definitions in 4D

Description
New Order Processing

- Initial Conditions:** The Customer Wants to Purchase a Link (e.g., Prem to Prem) to Meet their Wireless Network Needs.
 A TR is assigned by the TA to Create a New Order in Line with the business needs.
- The TR Logs-in to the **ecm** application:
 - selects **Prem to Prem MEGALINK/Light/Plus**
 - selects **Create New Order**
- The TR Data Enters the details of the new order - one field at a time
 - periodically the TR saves the content of the order
 - periodically the TR may verify completeness of the order
 - error messages will be presented in a separate window
 - errors can be fixed incrementally or once the data entry was completed
 - if necessary the session can be terminated and the data entry operation can be renewed at a later time
- The TR makes all the error corrections
 - clicking on each error message will position the cursor at the right field for correction
 - required and conditionally required business rules are enforced
 - data integrity business rules (telephone number, date, email) are enforced
 - any attempt to submit an incomplete order results in automatic verification with all defects presented in the error window
- The TR Submits the verified (completed) order to the CTA
 - the order status is changed from New to Submitted
 - the TR no longer can make changes to the order unless a Sup Order is created
- The CTA Assigns the New Order to appropriate CTR
- The CTR Reviews Order for completeness
 - If the order is not complete issues a Clarify to the TR
- Initiate Legacy System Processing



Screen Layouts
New Order Processing (1/23)



Data Entry User Interface



Prem to Prem MEGALINK/Light/Plus (New/Supp) Contents

[Overview \[0 - 8\]](#)
[Section A: Administrative \[10 -17\]](#) ← 2
[Section B: Circuit Locations \[18-46\]](#)
[Location A \(Originating Customer Prem\) \[19-32\]](#)
[Location B \(Terminating Customer Prem\) \[33-46\]](#)
[Section C: Options for Prem to Prem Megalink \[47\]](#)
[Section D: Billing/Contract Information \[48-61\]](#)
[Section E: Remarks/Driving Directions \[62-64\]](#)

Project ID:
Project Name:
Order ID: 10 ← 3
Version: 1
Order Status: Created
Days in Status: 111
Prior Order Status: New

Assigned To:
AWE: Jason Nelson

Created By:
AWE: Jason Nelson

Order History:
Modified 2/1/01 12:38:47 PM, JN
Modified 11/4/00 5:38:07 PM, JN ← 5
Modified 10/28/00 6:30:06 PM, DJ
Modified 10/13/00 2:32:55 PM, JN
Modified 10/13/00 2:28:35 PM, JN
Created 10/13/00 2:23:35 PM, JN

Required Field Error Summary

No Required or Conditionally Required errors.

Create/edit: Prem to Prem MEGALINK/Light/Plus (New/Supp)

Overview [0 - 8] [545]

0a. Rate Quote Requested [238] Yes No

0b. Service Type [239] R

0c. Originator [240] O

0d. Pre-assigned Order Number [241]

0e. FOC Order Number [242] ← 1

1. State [243] R

2. [244]

3. PON [245] O

4. Related PON [246] O

5. From [247] R

6a. TN [248] R

6b. Fax No. [249] C

6c. E-mail [250] ← 6
Fax TN or email must be provided for preparer of request, if this is not populated, then 6c must be or form will not be released.

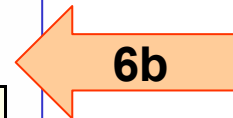
7a. FOC Case Name [251] O

← 4

Business Rules Knowledge Base Integrated with the Browser



6a. TN	<input type="text"/>	R
6b. Fax No.	<input type="text"/>	C
6c. E-mail	Fax TN or email must be provided for preparer of request, if this is not populated, then 6c must be or form will not be released.	
7a. FOC Cust Name	<input type="text"/>	
7b. FOC TN	<input type="text"/>	O



13. Order Firm or Inquiry	<input type="text" value="Firm Order"/>	R
14a. Order Type	<input type="text"/>	C
14b. Explain	If Firm order=yes, then this is a required field	



List of Orders - User Interface



» Home » Logoff

Search

Proc Level

Current Status

Active Status **1**

Days in Status:

- GT (>)
- LE (<=)

Proj ID

Acct

Prime User Type

CUS User

CEN User

Product Type

Order Type

State

PON

Billing Name

View

Inactive Status Displayed For:

<= 30 Days

Order List (Rep View)

[Create Order](#) [Add/Remove Project](#)

8 Order forms meet the search criteria:

ID	V A e r s i n e #	Proc Level	Current Status	Status Occur Date	Days in Status	Status Deadline Date	Proj ID	Proj Name	Acct	Prime User Type	CUS User	CEN User	# E S C S S L C C A - - - S R S R	# E C S L C A - - - S R	# C A A - - - R	Product Type	Order Type	State	PON	
9	1	Y	Work	SubmitAsg	11/15/2001 1:53:52 PM	2.1				AW	CEN	Howard, Anita	Green, Bryant	0	0	0	Mini MgLnk	New		111133
10	1	Y	Work	SubmitAsg	11/15/2001 2:54:12 PM	2.1				AW	CEN	Nelson, Jason	Green, Bryant	0	0	0	PtoP MgLnk	New	Georgia	312-456789
20	1	Y	Work	SubmitAsg	11/16/2001 3:54:34 PM	1				AW	CEN	Nelson, Jason	Green, Bryant	0	0	0	Mini MgLnk	New		NL26235120
24	1	Y	Work	SubmitAsg	11/17/2001 4:04:42 PM	0				AW	CEN	Howard, Anita	Green, Bryant	0	0	0	Mini MgLnk	Discon		NL26235124
23	1	Y	Work	SubmitAsg	11/17/2001 4:05:09 PM	0				AW	CEN	Howard, Anita	Green, Bryant	0	0	0	PtoP MgLnk	New	North Carolina	1314567
7	1	Y	Status	PIP	11/17/2001 3:52:01 PM	0				AW	CEN	Lord, Kevin	Green, Bryant	0	0	0	Mini MgLnk	New		NL26235106
5	1	Y	Status	PIP	11/17/2001 3:52:56 PM	0				AW	CEN	Lord, Kevin	Green, Bryant	0	0	0	Mini MgLnk	New		111120
1	1	N	Done	Complete	11/17/2001 4:06:25 PM	0				AW	NON	Nelson, Jason	Green, Bryant	0	0	0	Trunk MgLnk	New	Georgia	456789

Default Search Templates By Rep
Urgency, Submitted Date, All Active Orders

S - Submitted
R - Resolved

Business Rules Validation



Prem to Prem MEGALINK/Light/Plus Contents

- [Overview \[0 - 8\]](#)
- [Section A: Administrative \[9 -17\]](#)
- [Section B: Circuit Locations \[18-46\]](#)
- [Location A \(Originating Customer Prem\) \[19-32\]](#)
- [Location B \(Terminating Customer Prem\) \[33-46\]](#)
- [Section C: Options for Prem to Prem Megalink \[47\]](#)
- [Section D: Billing/Contract Information \[48-61\]](#)

Order ID: 13
Version: 1
Order Status: Created
Days in Status: 0
Prior Order Status: New

Assigned To:
AWE: Jason Nelson

Created By:
AWE: Jason Nelson

Order History:
Modified 10/21/00 1:28:04 PM, JN
Modified 10/21/00 12:29:52 PM, JN
Modified 10/21/00 12:29:24 PM, JN
Created 10/21/00 12:24:24 PM, JN

Required Field Error Summary

Total Errors: 16 **16 errors**

The following fields are Required (R) or Conditionally Required (C):

- [0b. Service Type \(R\)](#) ← 1
- [1. State \(R\)](#) ← 2
- [9. CMRS Provider Name \(R\)](#)

Create/edit a Prem to Prem MEGALINK/Light/Plus

Overview [0 - 8]

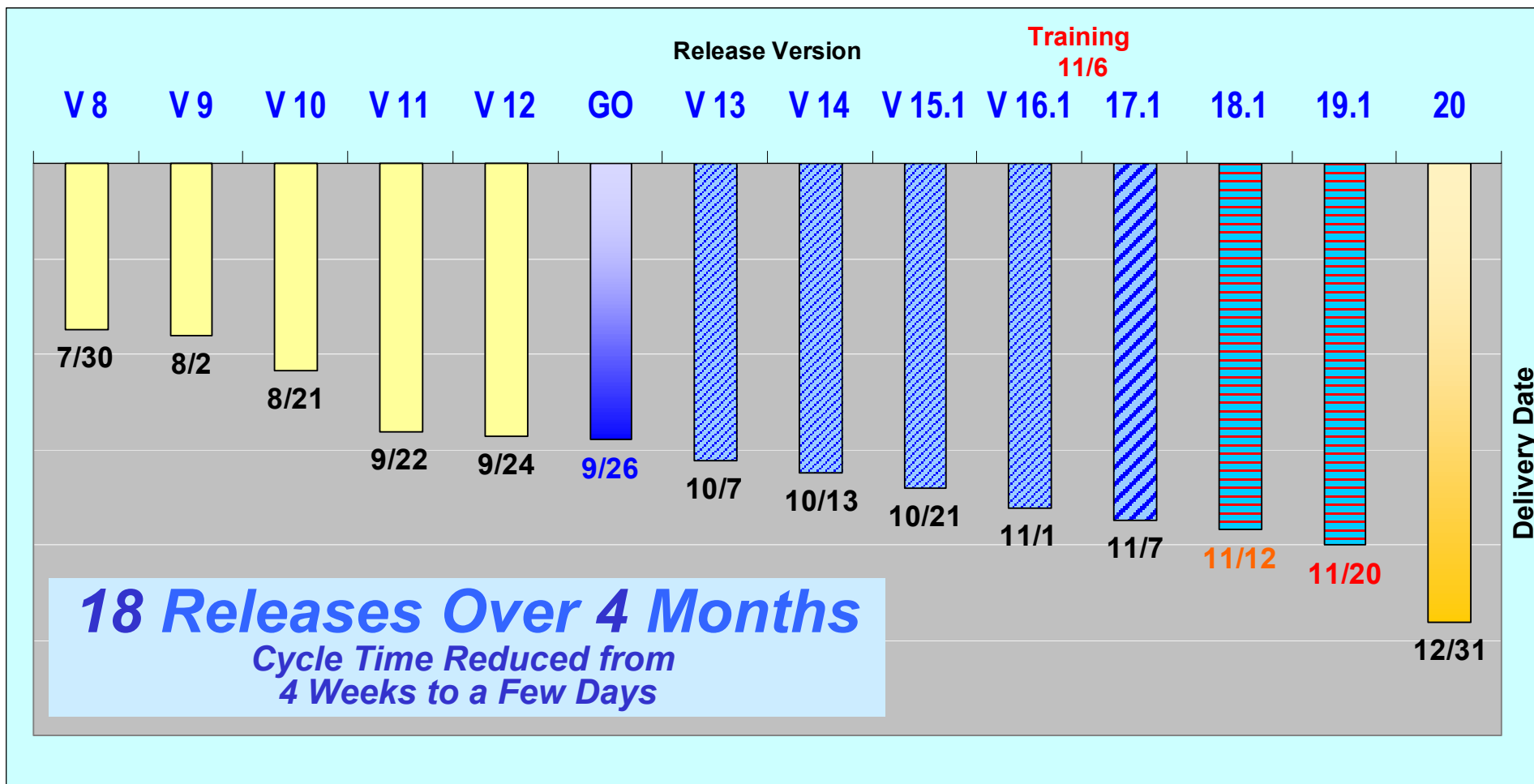
0a. Rate Quote Requested	<input type="text" value="No"/> O
0b. Service Type	<input type="text"/> R ← 1
0c. Originator	<input type="text" value="Customer"/> O
0d. Pre-assigned Order Number	<input type="text"/> O
0e. FOC Order Number	<input type="text"/> O
1. State	<input type="text"/> R ← 2
2. Date	<input type="text" value="10/21/2000"/> R
3. PON	<input type="text" value="3245678"/> O
4. Related PON	<input type="text"/> O
5. From	<input type="text" value="Sprint PCS"/> R
6a. TN	<input type="text" value="512-234-6666"/> R
6b. Fax No.	<input type="text" value="512-234-7777"/> C
6c. E-mail	<input type="text"/> C

4

3

Save Exit Verify Submit Escalate Copy Delete

eccm Software Releases



Summary CM Capabilities

Fields, Forms and System Parameters



Administer Users and Teams

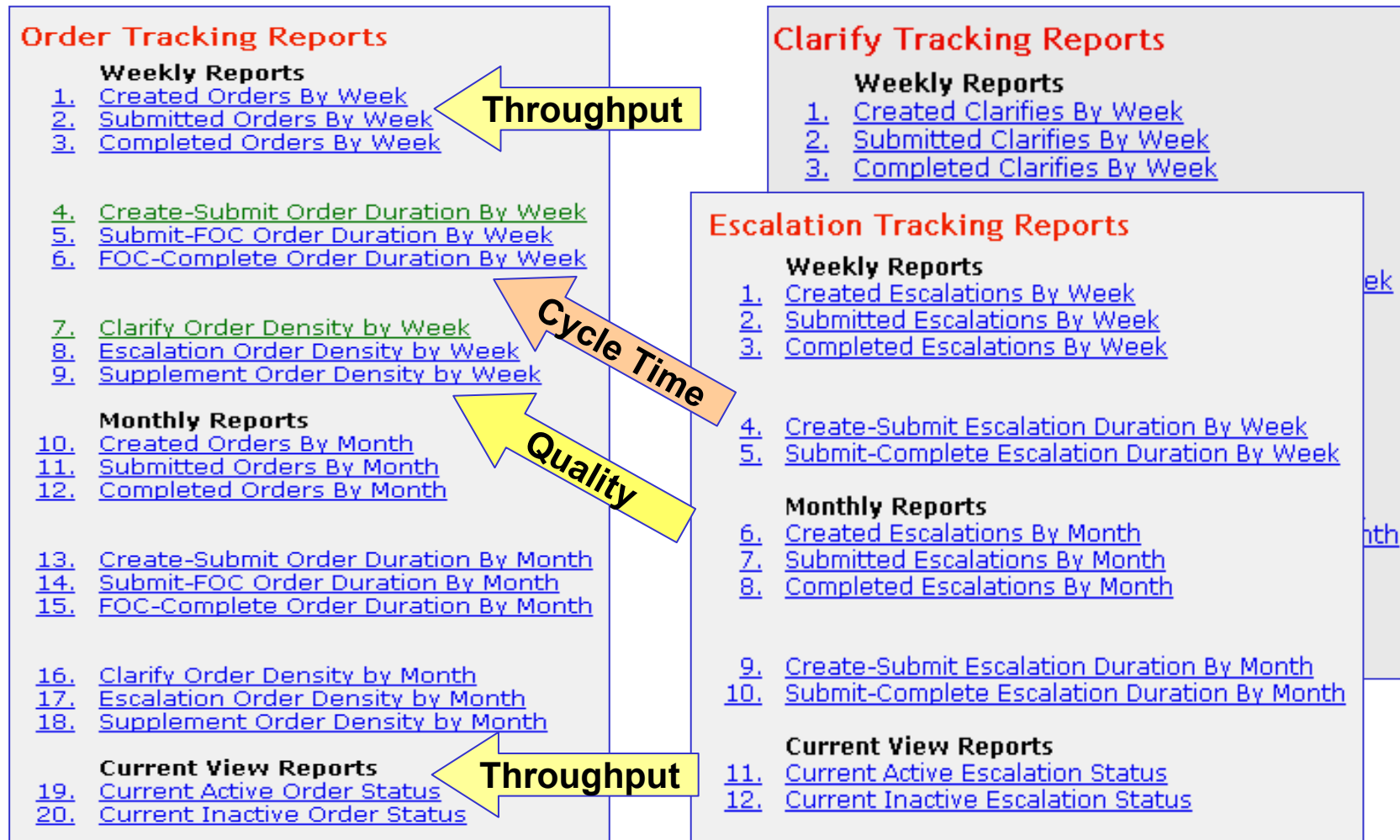
1. Administer Passwords
2. Administer Users
3. Administer Active User Sessions
4. Administer Backup
5. Administer Teams
6. Administer Organizations
7. Administer Fields ← 2
8. Administer Forms ← 1
9. Administer Parameters ← 3

How the Steak is Cooked

FASTER

Center Management Processes

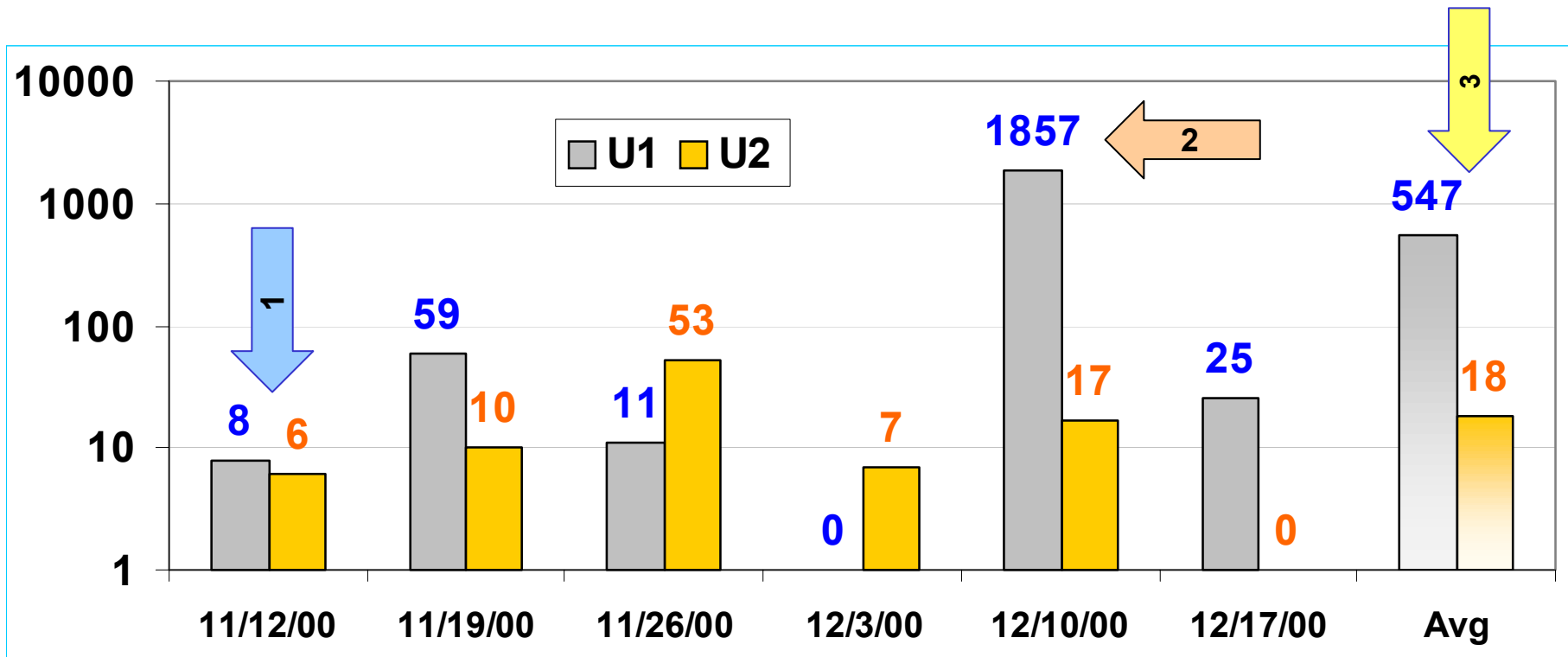
Interval Analysis: Orders, Escalations and Clarifies



Cycle Time, Throughput and Quality

Order Tracking (1/3)

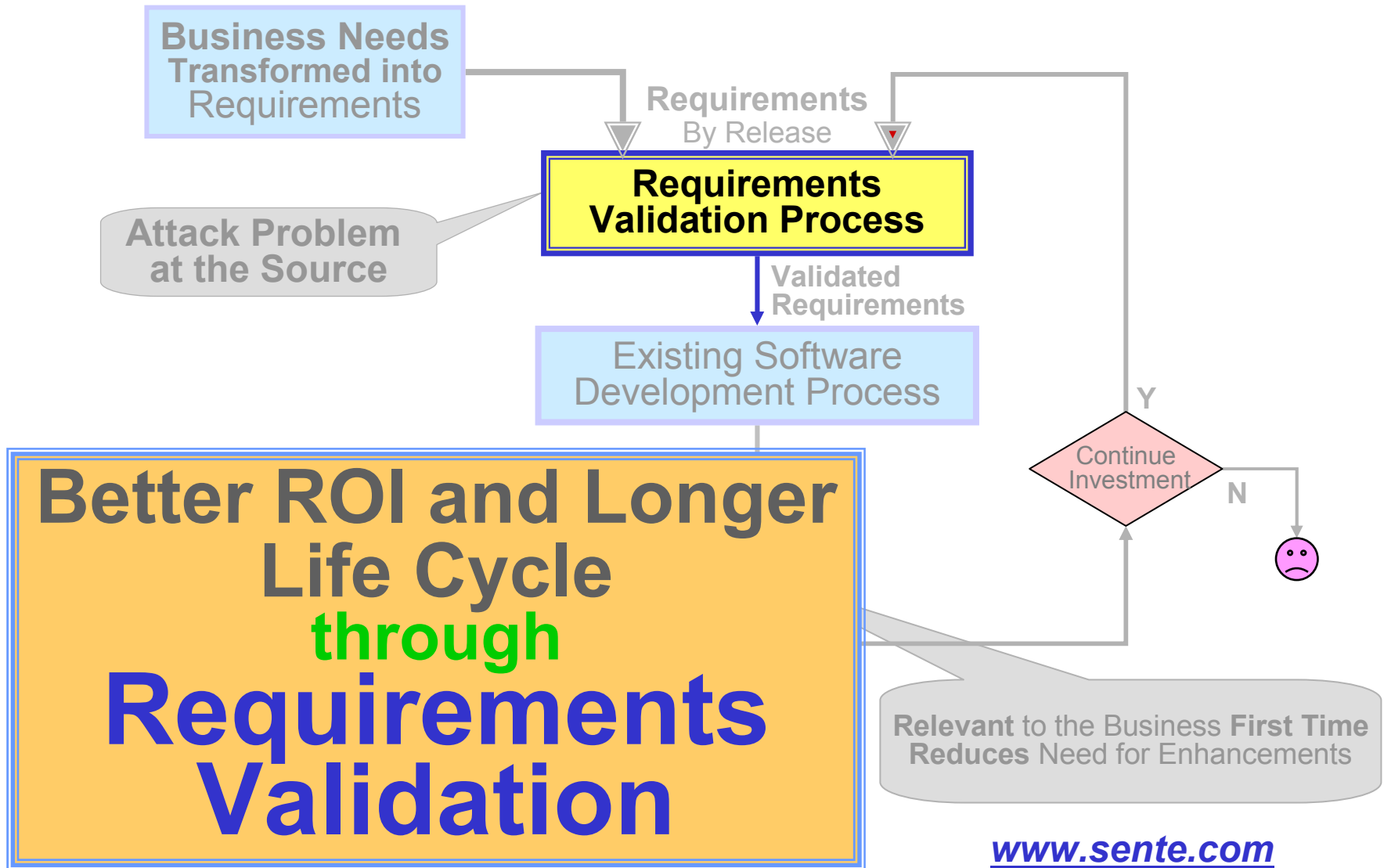
Average [Create - Submit] Interval (minutes)



Invention of the Copy Command

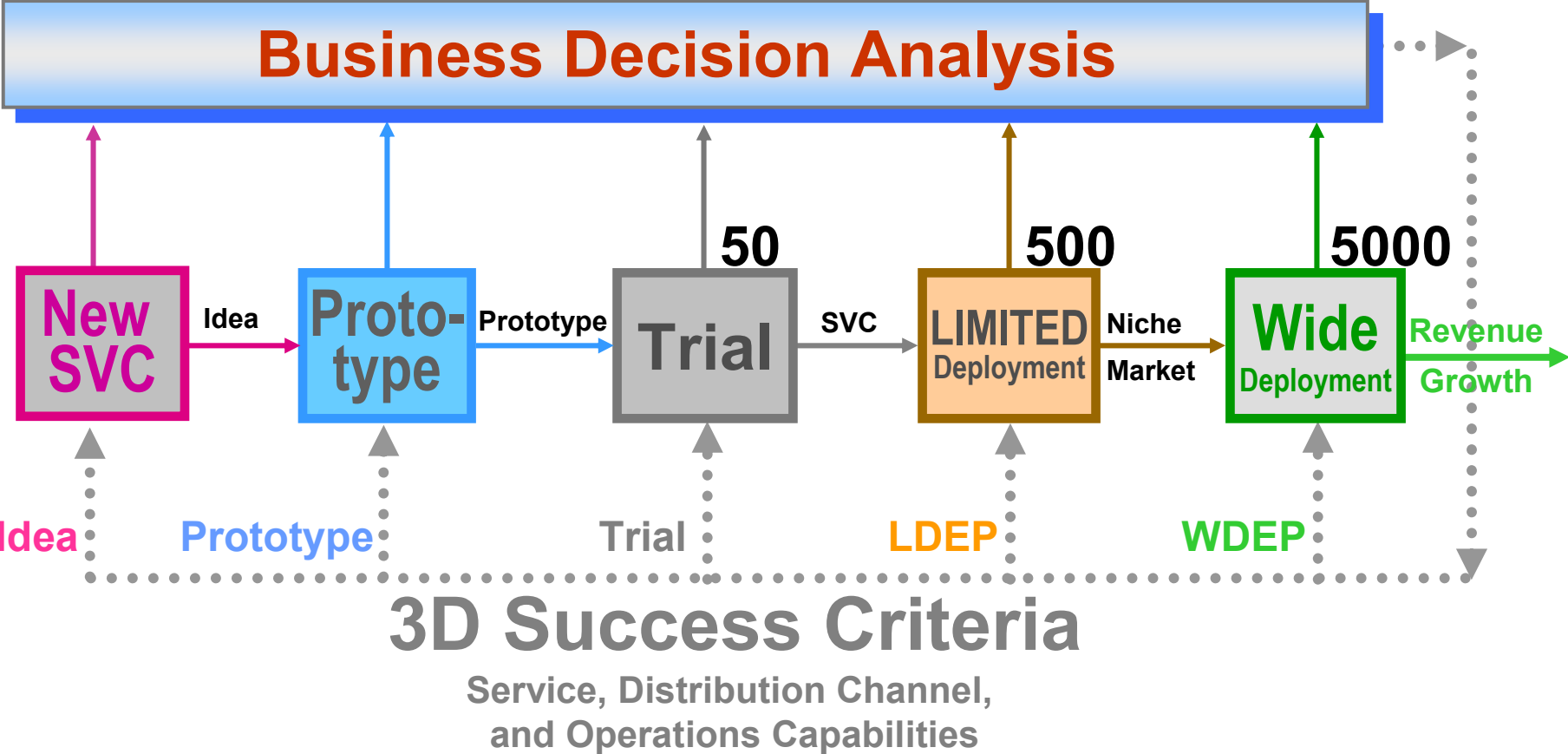
Summary

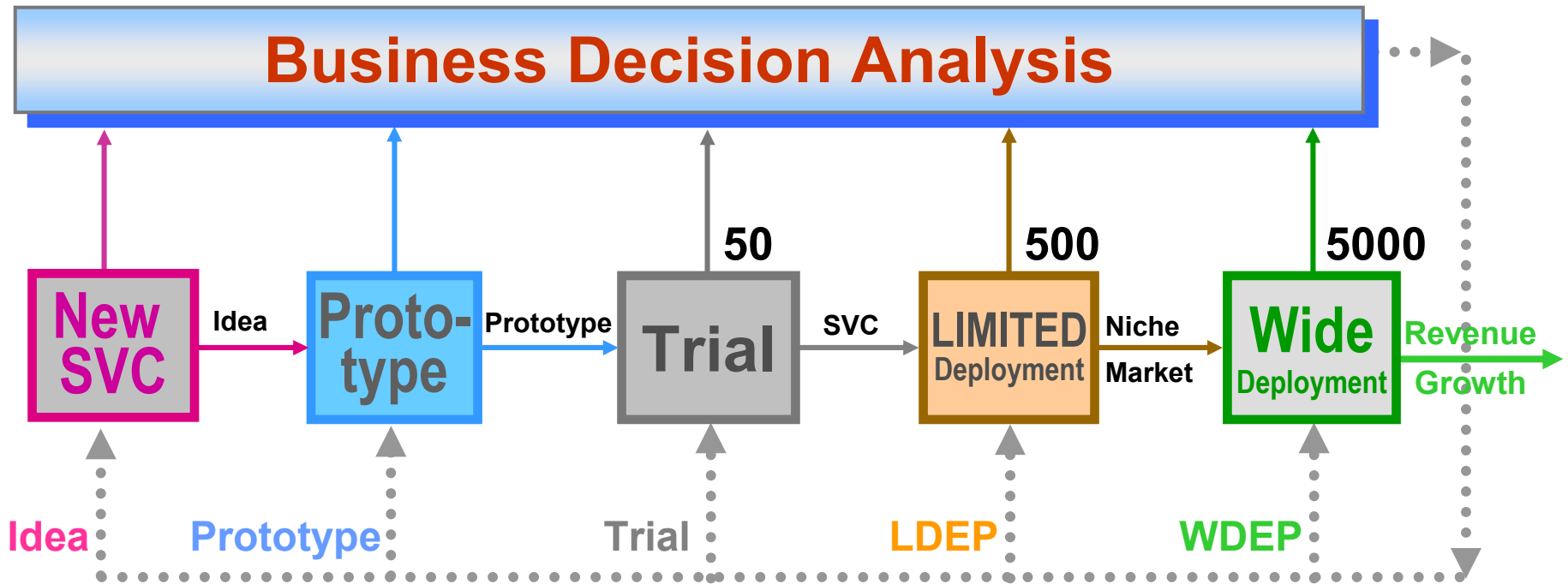
Improve Solution Quality and ROI through Validation



Backup Slides

Define the Test so Everybody Gets an "A" Business Knowledge Development

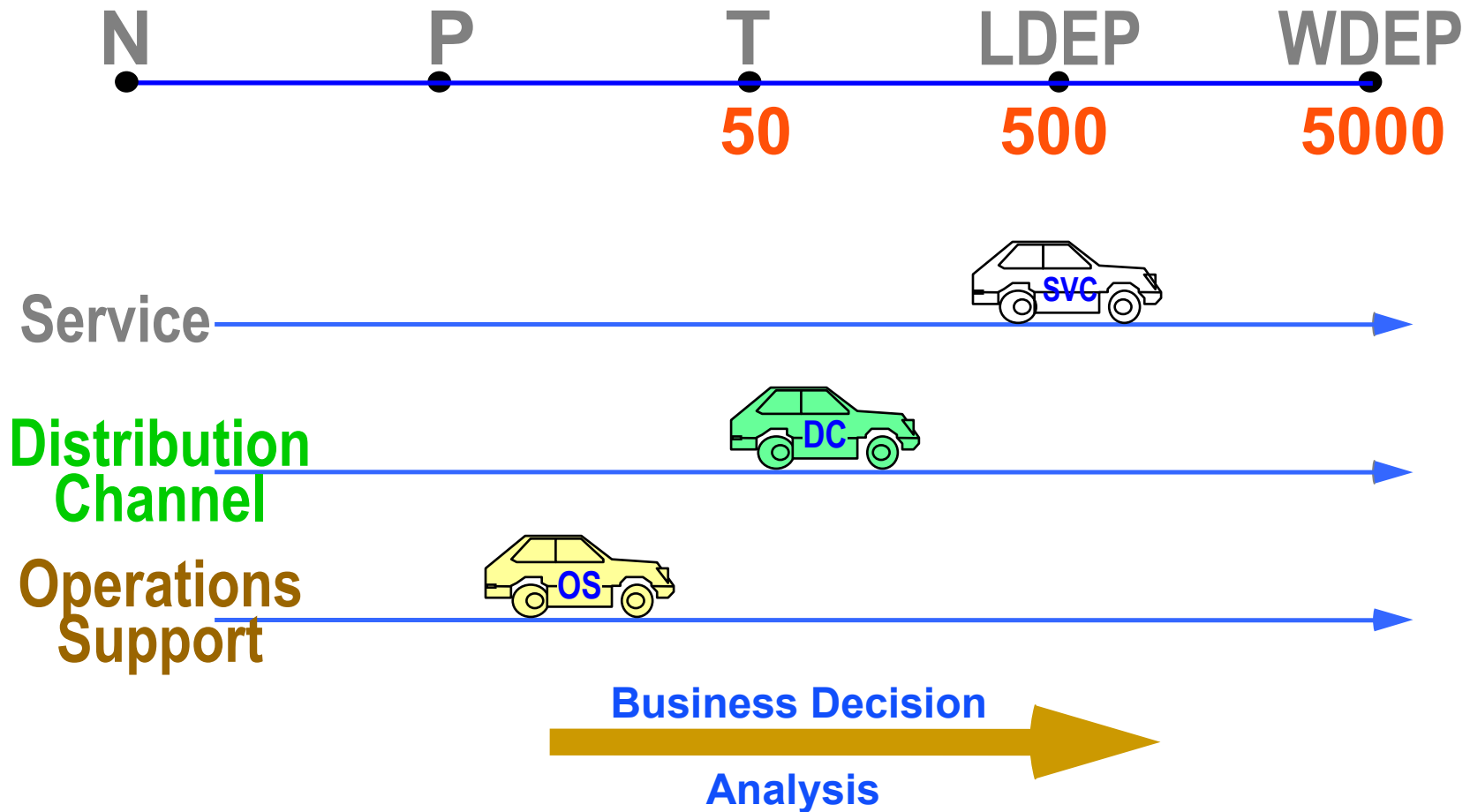




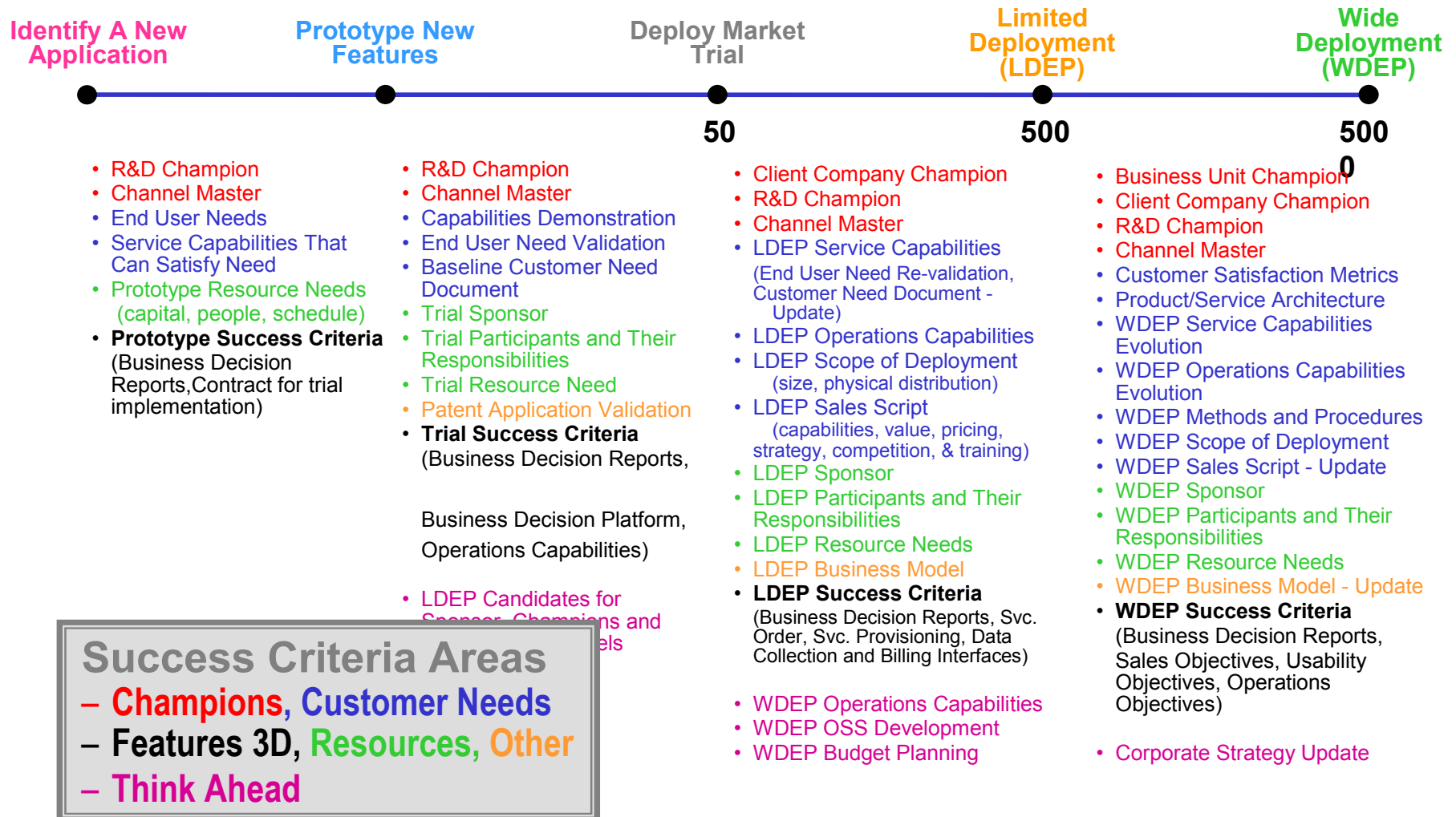
- Success Criteria Areas**
- **Champions**
 - **Customer Needs**
 - **Features** (Service, Operations and Distribution Channels)
 - **Resources** (Sponsors, \$, Staff, Platforms, etc.)

Concurrent Evolution of Capabilities

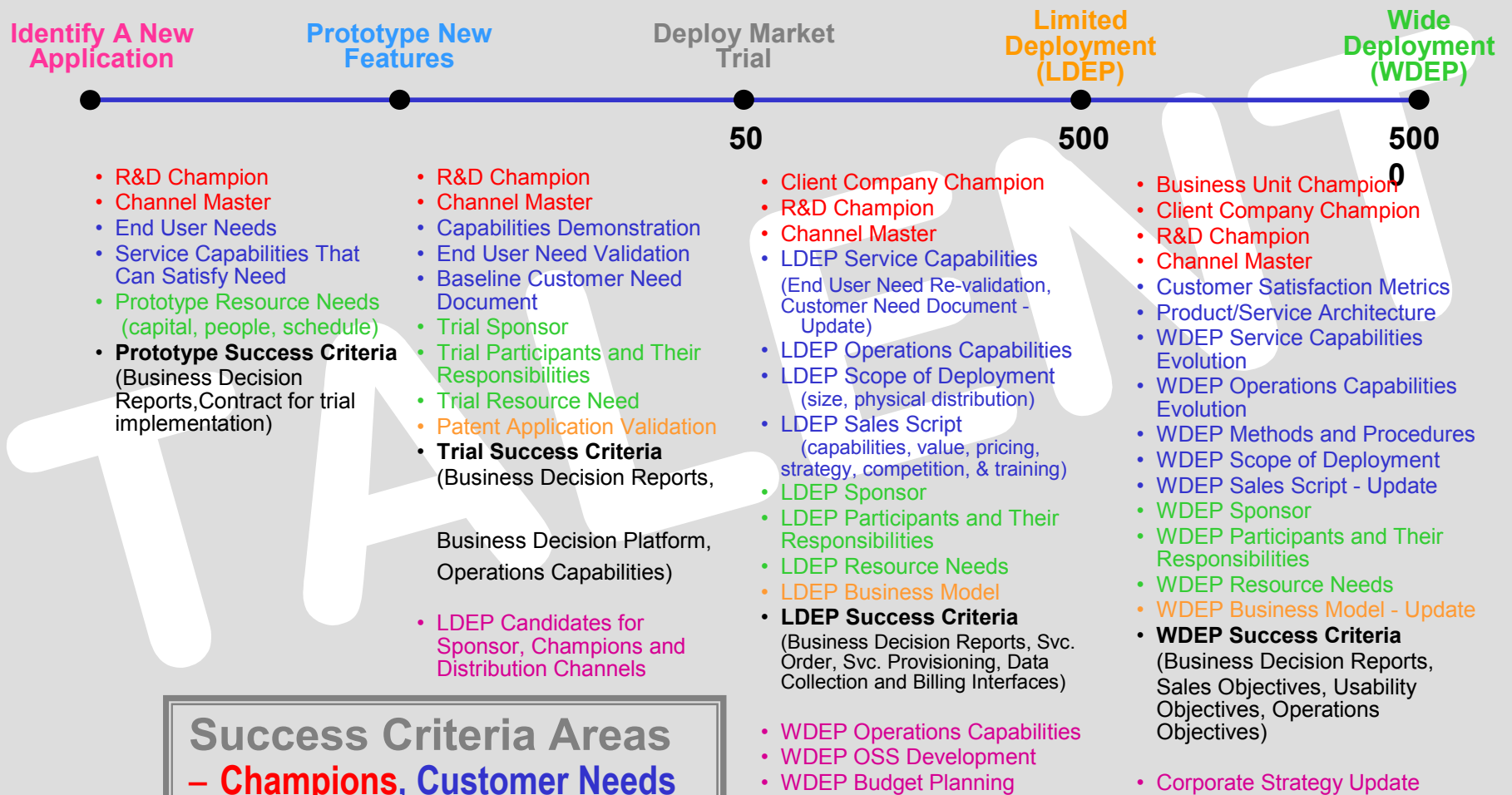
Service, Distribution Channel and Operations



Business Knowledge Development Success Criteria



Business Knowledge Development Success Criteria



Success Criteria Areas

- **Champions, Customer Needs**
- **Features 3D, Resources, Other**
- **Think Ahead**

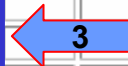
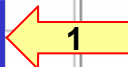
Integrated Historical Analysis (3/3)



Session ID, Action, Form Type and State Change Information



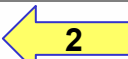
User Session Details
(1/30/2001 11:48:47 AM)
Customer: Sprint

Ref #	Team	Team Rep	Sess Cnt	Sess ID	Action	Time	Form ID	Form Vsn	Form
1	Sprint	Bowers	1	16	Logon	11/16/2000 10:42:53 AM			
2	Sprint	Bowers	1	16	Logoff	11/16/2000 11:26:25 AM			
3	Sprint	Bowers	2	20	Logon	11/16/2000 3:11:59 PM			
4	Sprint	Bowers	2	20	Logoff	11/16/2000 3:21:38 PM			
5	Sprint	Bowers	3	29	Logon	11/17/2000 2:04:27 PM			
6	Sprint	Bowers	3	29	Logoff	11/17/2000 2:07:01 PM			
7	Sprint	Bowers	4	39	Logon	11/20/2000 11:06:07 AM			
9	Sprint	Bowers			Modified	11/20/2000 11:21:18 AM	3	1	Clarify
10	Sprint	Bowers			Modified	11/20/2000 11:30:42 AM	3	1	Clarify
11	Sprint	Bowers			AssignedBy	11/20/2000 11:31:00 AM	3	1	Clarify
12	Sprint	Bowers			AssignedTo	11/20/2000 11:31:00 AM	3	1	Clarify
13	Sprint	Bowers			Completed	11/20/2000 11:31:32 AM	3	1	Clarify
13	Sprint	Bowers	4	39	Logoff	11/20/2000 11:32:08 AM			
14	Sprint	Bowers	5	42	Logon	11/20/2000 1:29:47 PM			
15	Sprint	Bowers	5	42	Logoff	11/20/2000 2:07:31 PM			
16	Sprint	Bowers	6	49	Logon	11/21/2000 12:36:46 PM			
18	Sprint	Bowers			Created	11/21/2000 12:43:30 PM	5	1	Prem to Prem MEGALINK/Light/Plus (New/Supp)
19	Sprint	Bowers			Submitted	11/21/2000 1:00:19 PM	5	1	Prem to Prem MEGALINK/Light/Plus (New/Supp)
19	Sprint	Bowers	6	49	Timeout	11/21/2000 1:00:41 PM			
20	Sprint	Bowers	7	52	Logon	11/21/2000 1:30:14 PM			
21	Sprint	Bowers	7	52	Timeout	11/21/2000 1:59:10 PM			
22	Sprint	Bowers	8	55	Logon	11/21/2000 2:47:18 PM			
23	Sprint	Bowers	8	55	Drop	11/21/2000 2:47:22 PM			

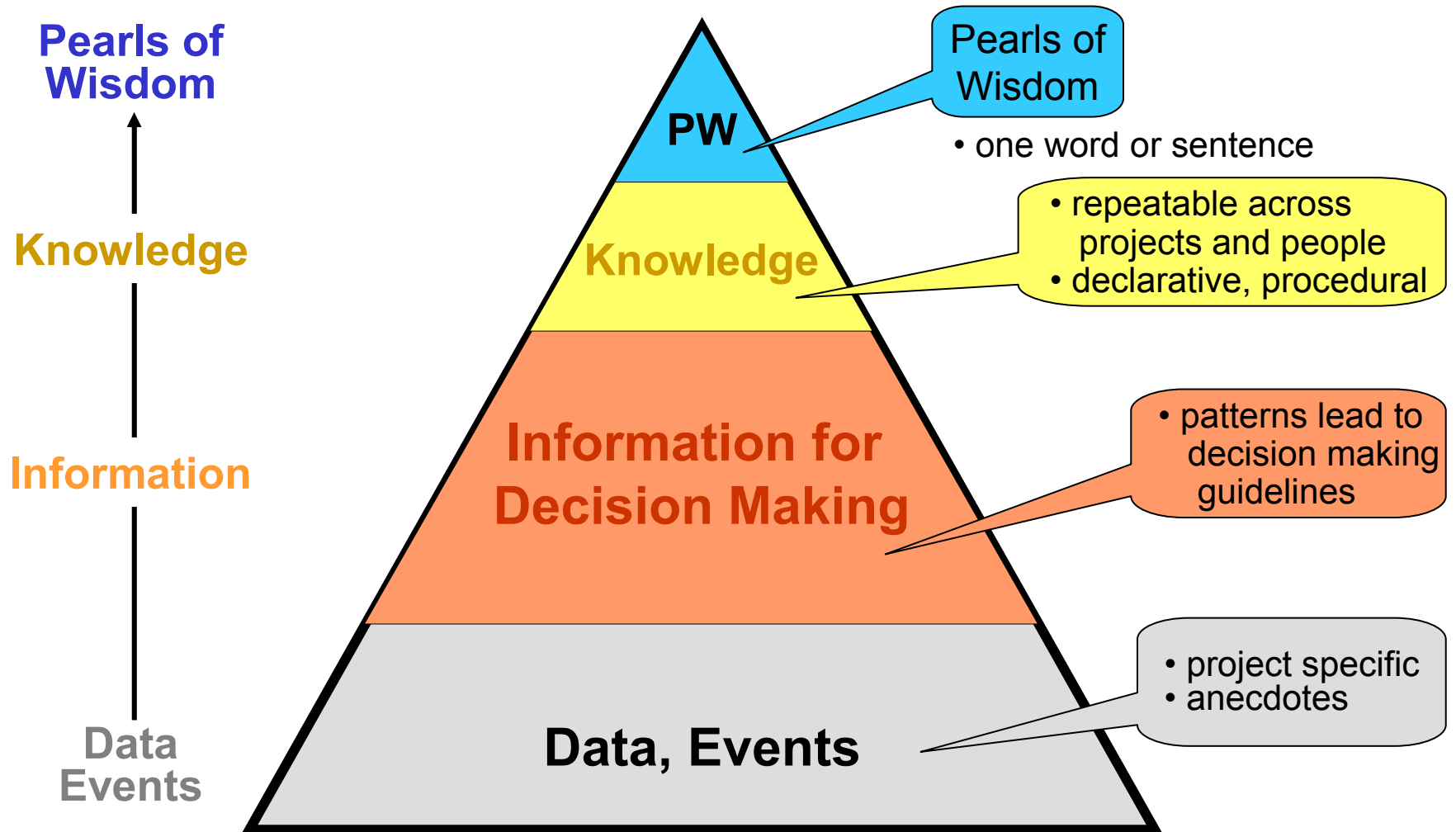


Order Entry/Project Management

1. Orders (Rep View)

Process	<u>Rep View</u>	<u>Admin View</u>	<u>Full View</u>
Assign	0	0	2
Work	5 *	 1	0  11 *
Status	2	0	5 *
Track	0	0	1
Done	1	 2	1
Total	8	0	20

Insight Categories by Knowledge Density



Pearls of Wisdom

Summary



- Do it **Predictably, Incrementally, and Faster**
 - Must Have Success Criteria - Get an “A”
 - Invest Incrementally in Line with Demand (#customers, users)
 - Operate in 3D (service, distribution channel, operations features)
 - Increase Influence of the Individual(s)
- Do **Less**
 - Do not confuse motion with progress
- Do **Less with Software**
 - Give a Child a Hammer and “*everything will look like a nail*” - give an IT organization an opportunity to contribute and “the solution will require software development”; everybody shifts solutions into their domain of expertise.
 - *There are always effective alternatives*
- **All Re-engineering and Large Complex Projects will FAIL to Deliver ROI** (limited/no ROI on the investment)
- **Each Release that is Y months long will be late by X months**
(e.g., Y=12, X=6; Y=6, X=2; Y=3, X=0.5)