



26th Software Engineering Workshop



November 29, 2001

Improving Software Investments Through Requirements Validation

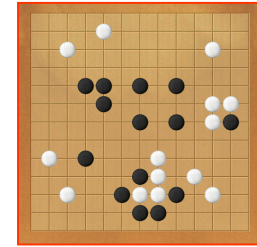
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sente 先手
Corporation 株式会社

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**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™** - deploy better software
 - **Business Knowledge Development** - deploy better/faster products/services (used successfully in 8 startups)
 - **Requirements Validation** - deploy better investments
- **Given the Talent and the Resources Invested, We Must Be Using the Wrong Success Criteria**
 - Requirements creep, Cost of Removing Defect
 - Are We Prisoners Trapped in Our Technical Paradigm?

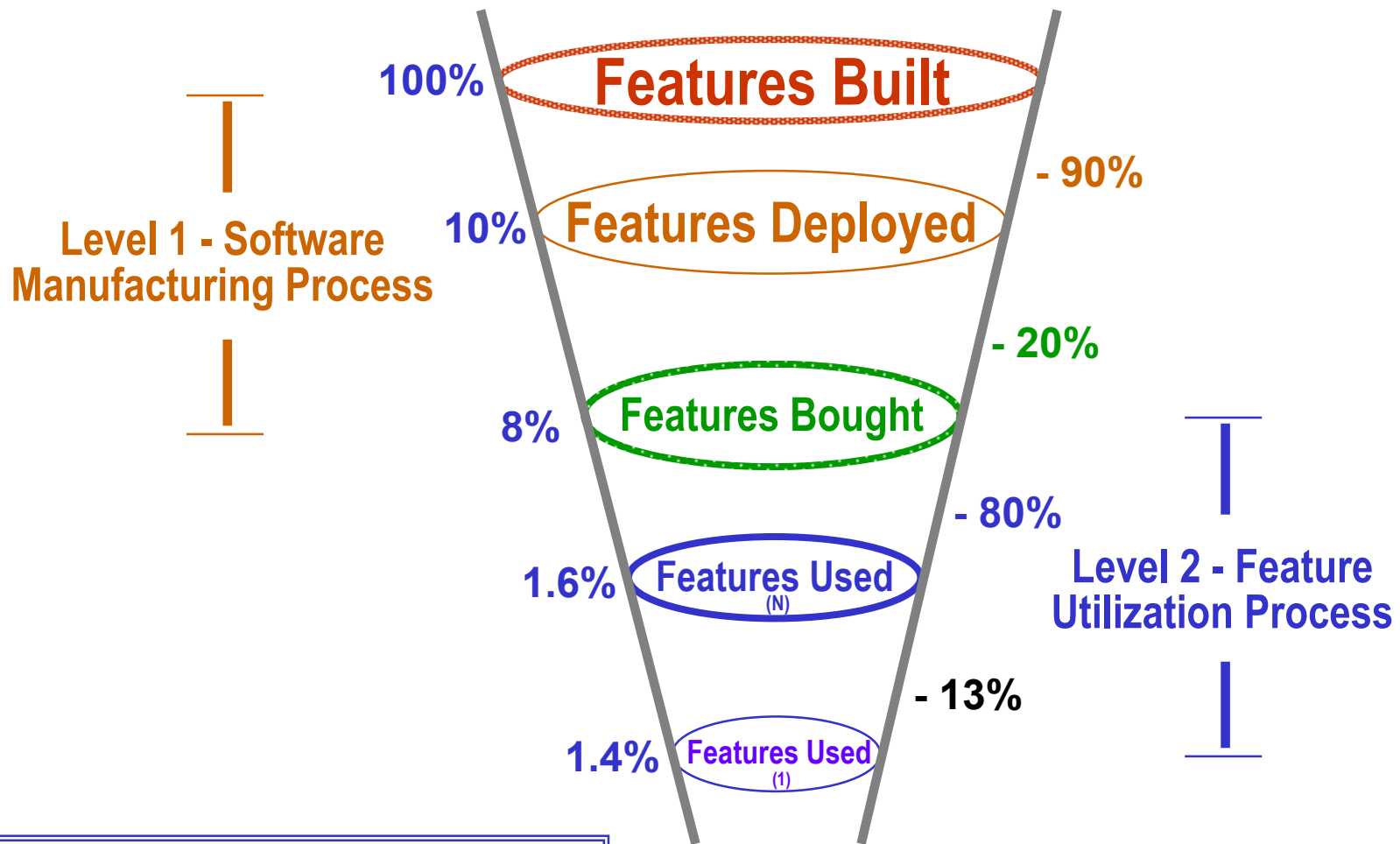
2. The *eccm* toolkit capabilities for Requirements Validation

- **Architecture**
- **Configuration Management**
 - User Interface, Business Rules (BRs)
 - Operational Processes
- **(Center) Productivity Management**

3. Summary

Software Pollution™ (1/2)

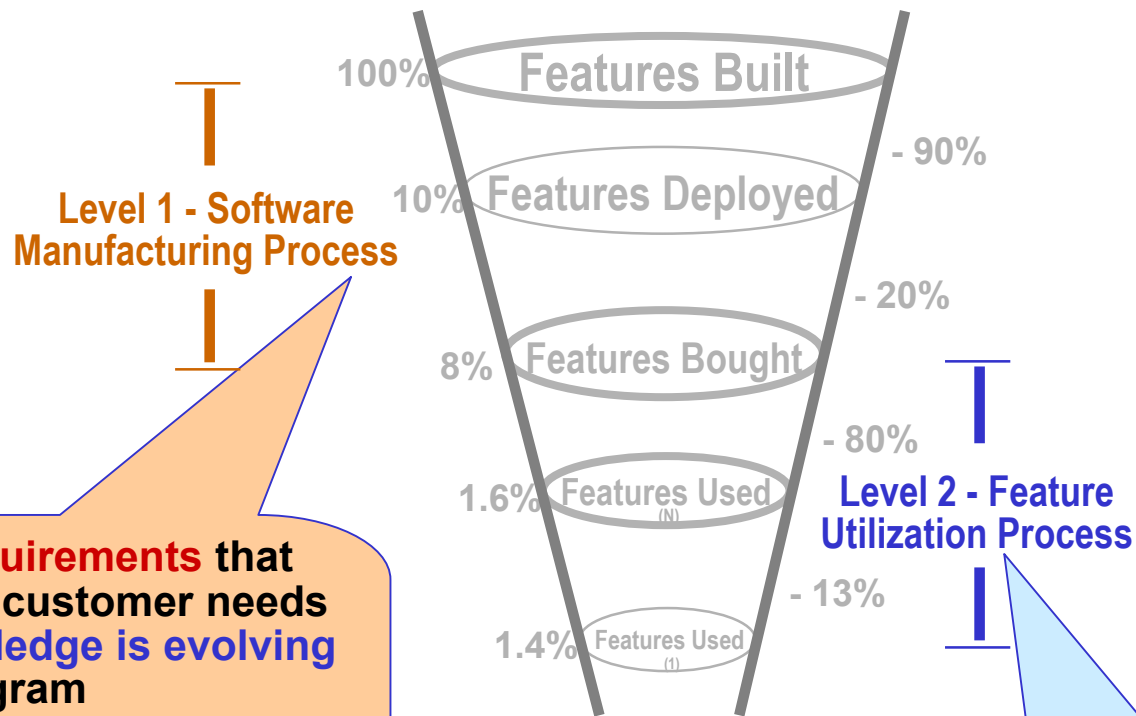
Feature Manufacturing and Utilization Analysis



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**

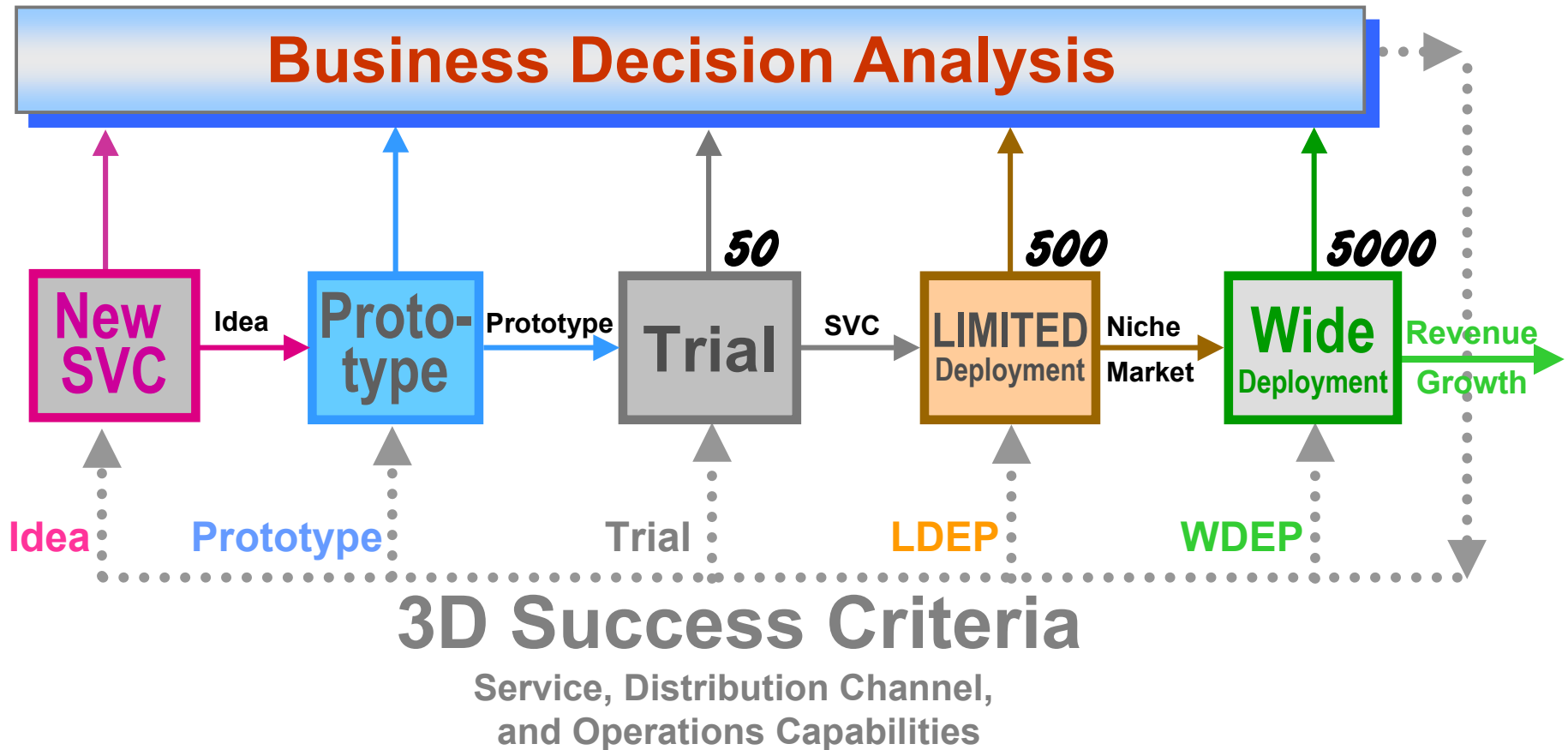
Requirements Pollution Levels
 Aspec 100:1 Bspec 60:1 B1Spec 25:1

The DEAL That Worked Well for Over Half a Century

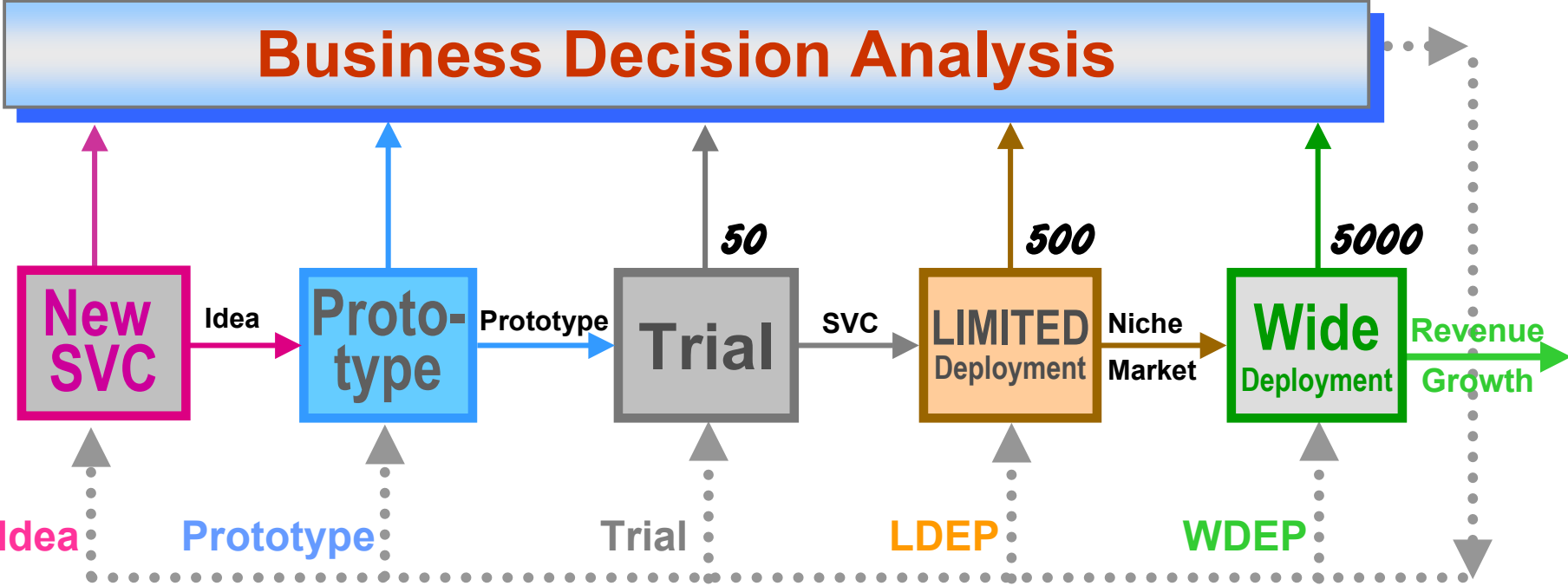


- **The Business Invests in Software Solutions Based on *Incomplete and Inaccurate* Requirements**
 - the business unit produces the requirements; therefore, **it is its own fault** when the solution is unsatisfactory
 - the development team sticks to the “feature coding assignment”
- **The Business 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)

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



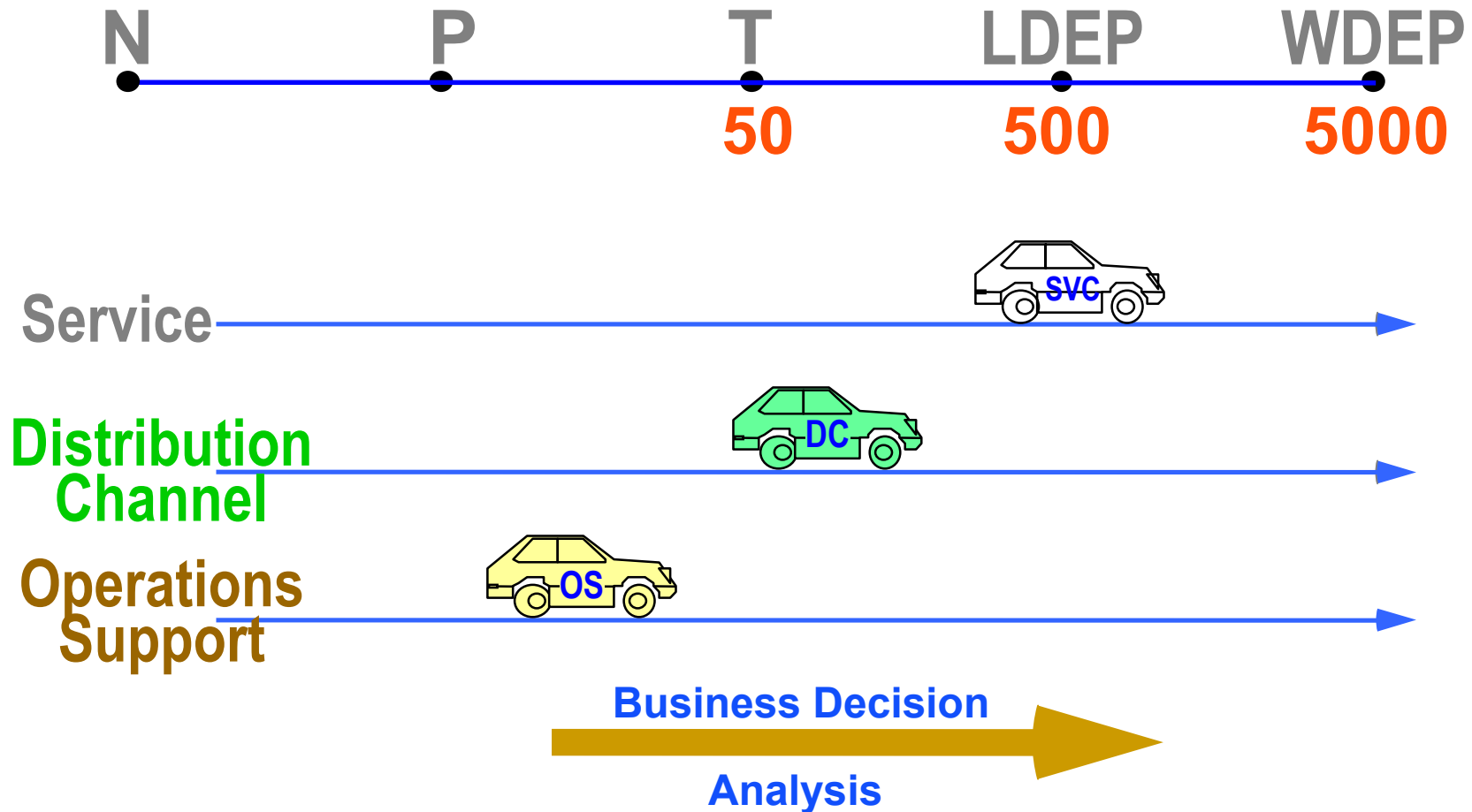
Business Knowledge Development Success Criteria Key Areas



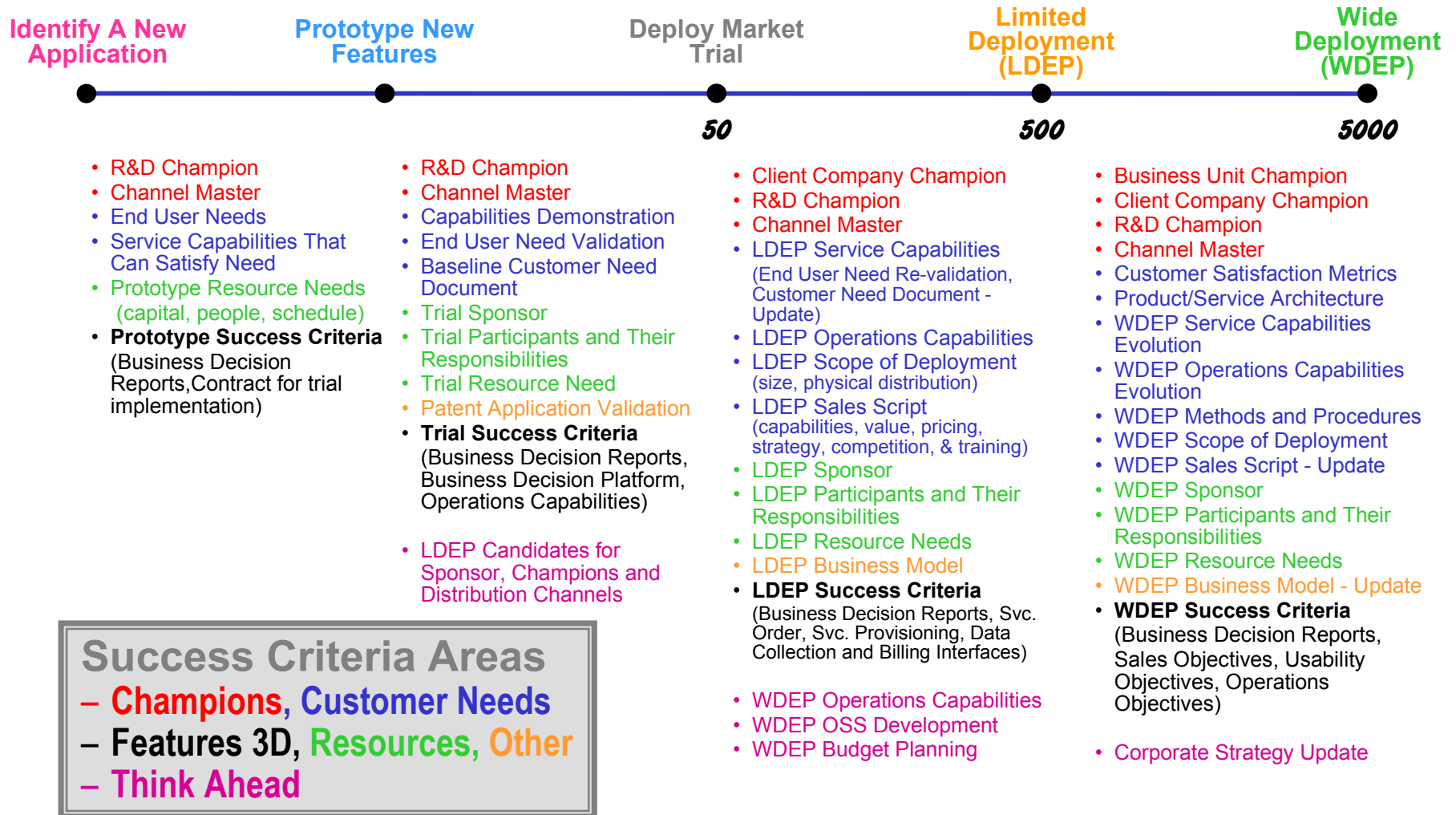
- Success Criteria Areas**
- **Champions**
 - **Customer Needs**
 - **Features** (Service, Operations and Distribution Channels)
 - **Resources** (Sponsors, \$, Staff, Platforms, etc.)

Concurrent Evolution of Capabilities

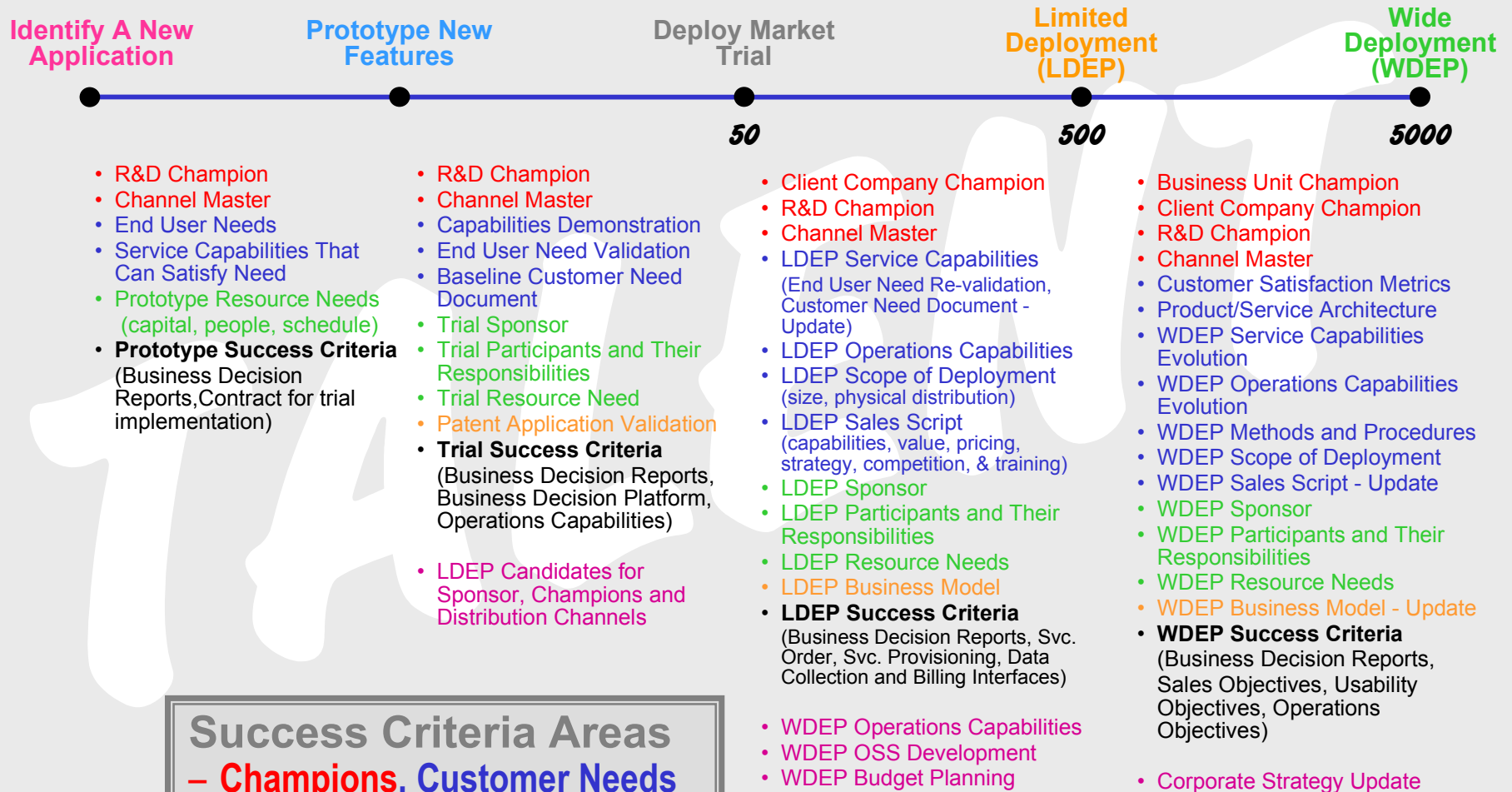
Service, Distribution Channel and Operations



Business Knowledge Development Success Criteria



Business Knowledge Development Success Criteria



Success Criteria Areas

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

- **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 (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

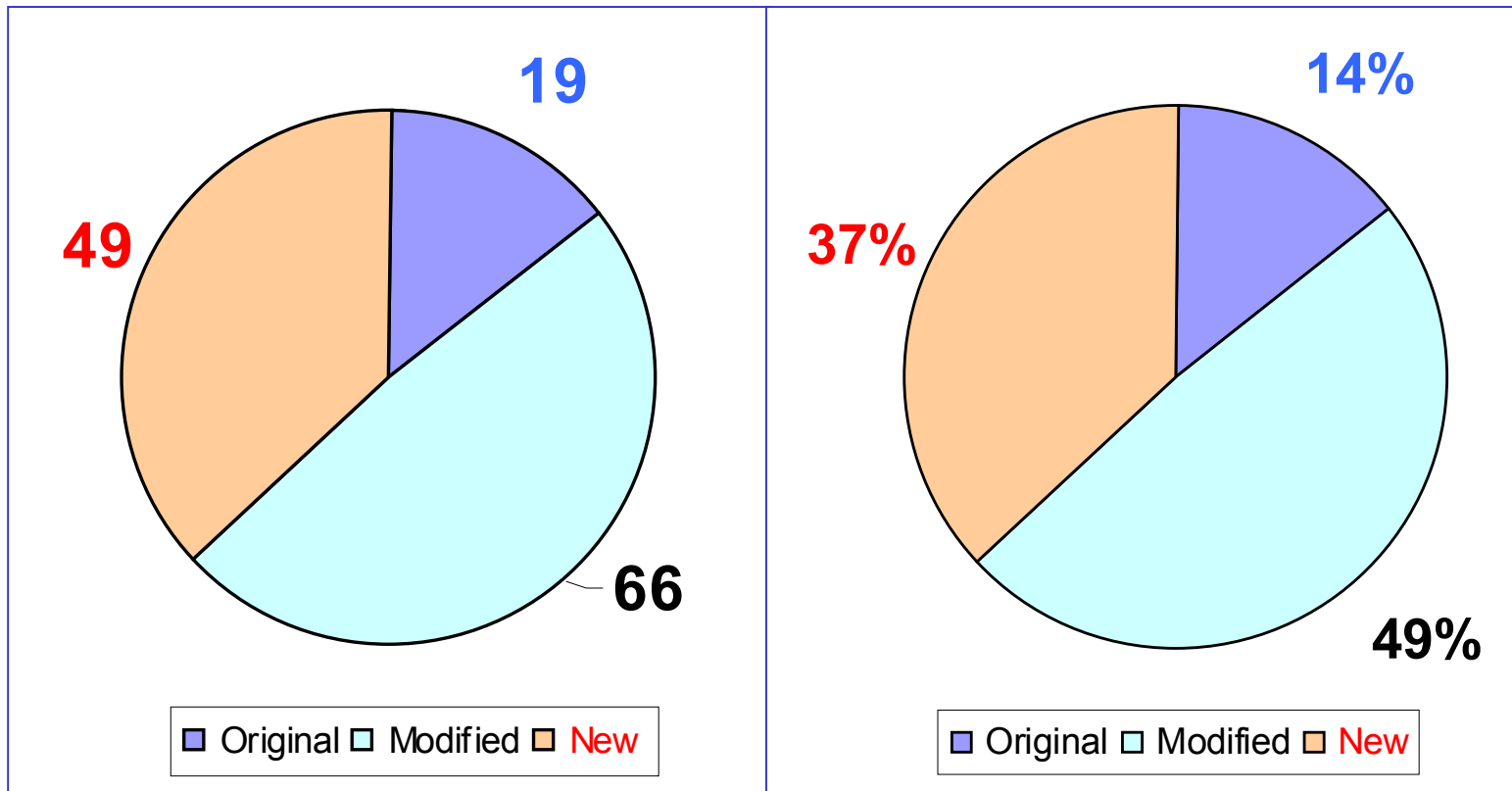
- More Releases (e.g., 6months; \$5M)
 - Architecture, User Interface, BRs, Processes, Reports, Flow-Through, and Training
 - Unstable Operations
- More Time and Investments
 - Never Meets Objectives 1st Time
 - Over 90% of Investment

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”

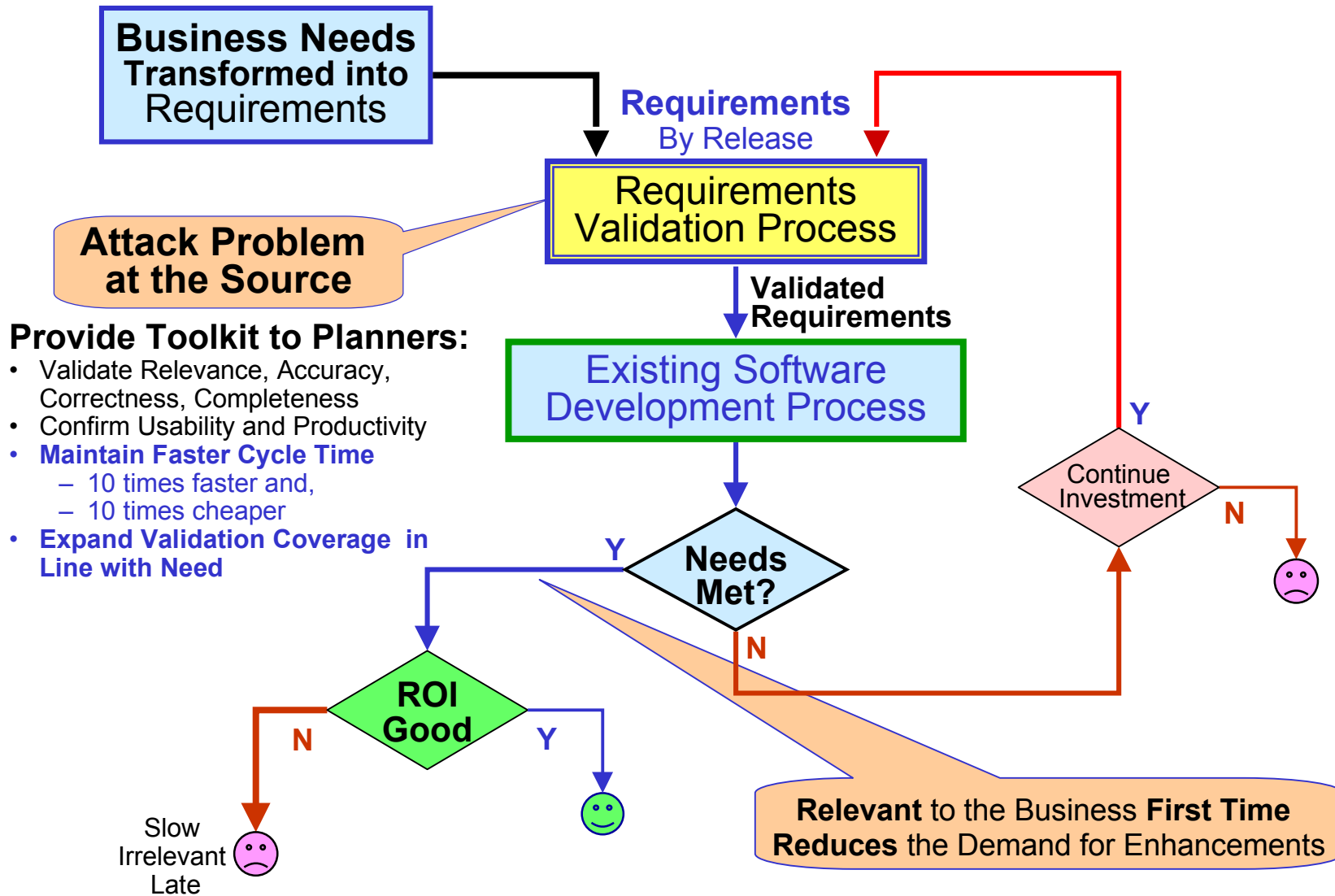
Business Rule - Validation Results



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

Software Investment (2/4)

Improve Requirements Quality through Validation

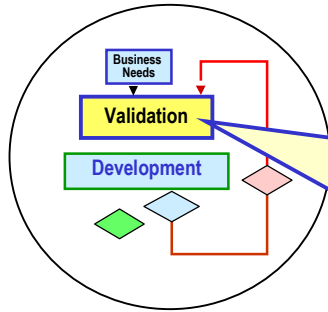


Provide Toolkit to Planners:

- 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**

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)

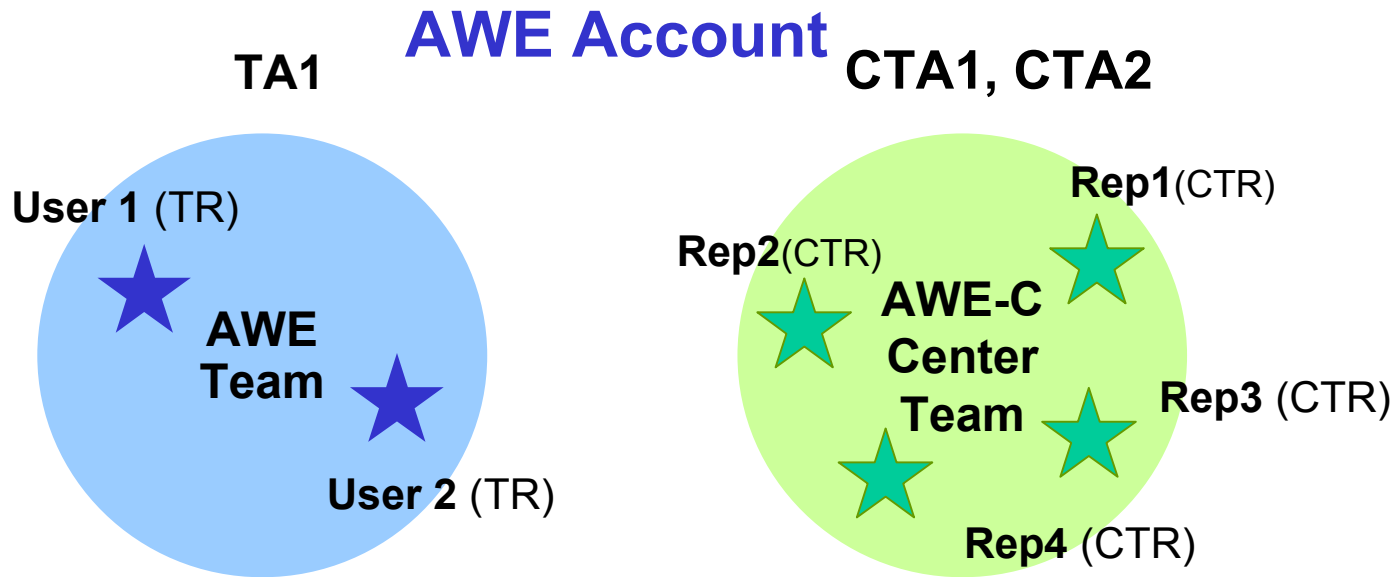
• Operational Processes

- 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

Account Configuration



SA - SA1, SA2, SA3

TA - team administrator

TR - team Rep

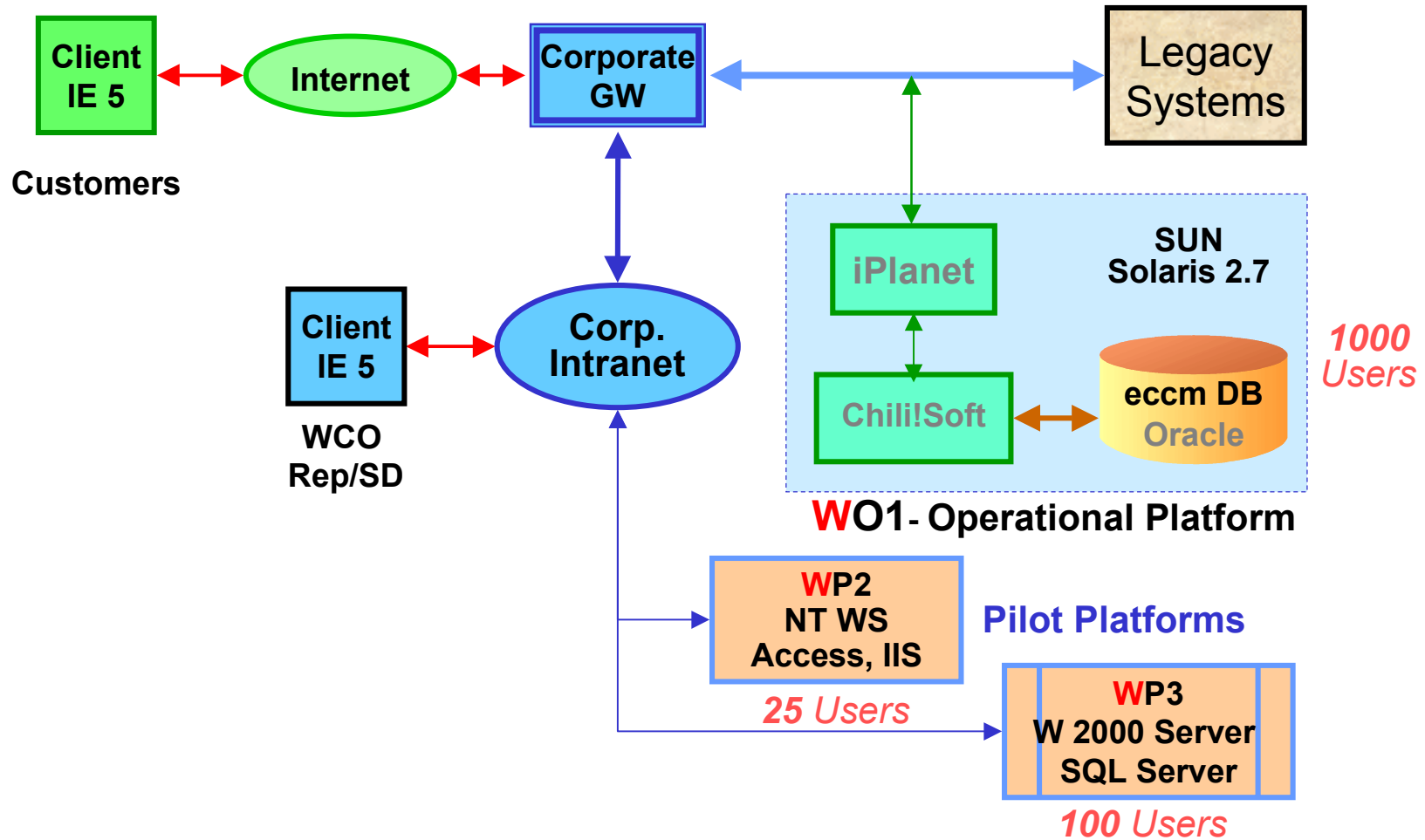
CTA - center team administrator

CTR - center team Rep

SA - system administrator

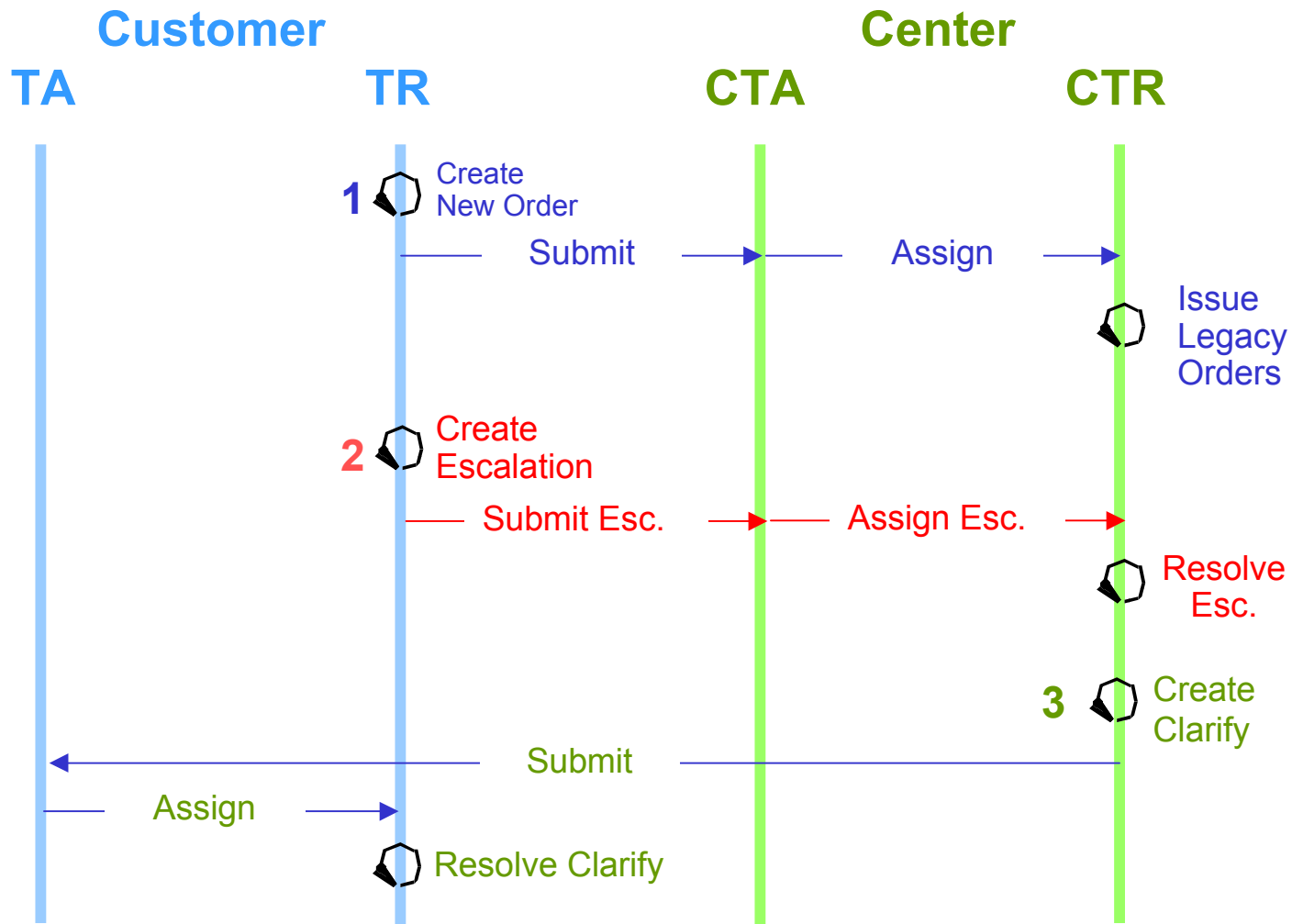
Wide Deployment Architecture

Managing Change Management



Operational Processes Validation

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



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] Megalink R

0c. Originator [240] Sales O

0d. Pre-assigned Order Number [241]

0e. FOC Order Number [242] ← 1

1. State [243] Georgia R

2. [244]

3. PON [245] 4567893 O

4. Related PON [246] 4567894 O

5. From [247] Bill Ware R

6a. TN [248] 972 267-7555 R

6b. Fax No. [249] 972 267-7444 C ← 6

6c. E-mail [250] C
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.

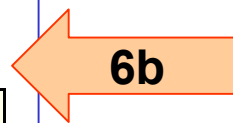
7a. FOC Case Name [251] David Cohen O

Save Exit ← 4 Verify Submit Copy Delete

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](#)

2

8 Order forms meet the search criteria:

ID	V A C T I O N #	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 S L -	# C A A R	Product Type	Order Type	State	PON
9	1	Y	Work	SubmitAsg 11/15/2001 1:53:52 PM	2.1	11/16/2001 11:59:00 PM			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	11/16/2001 11:59:00 PM			AW	CEN	Nelson, Jason	Green, Bryant	0	0	0	PtoP MgLnk	New	Georgia	312-4567893
20	1	Y	Work	SubmitAsg 11/16/2001 3:54:34 PM	1	11/20/2001 11:59:00 PM			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	11/20/2001 11:59:00 PM			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	11/20/2001 11:59:00 PM			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	12/3/2001 11:59:00 PM			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	12/3/2001 11:59:00 PM			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	4567893

3

S - Submitted

R - Resolved

Default Search Templates By Rep

Urgency, Submitted Date, All Active Orders

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

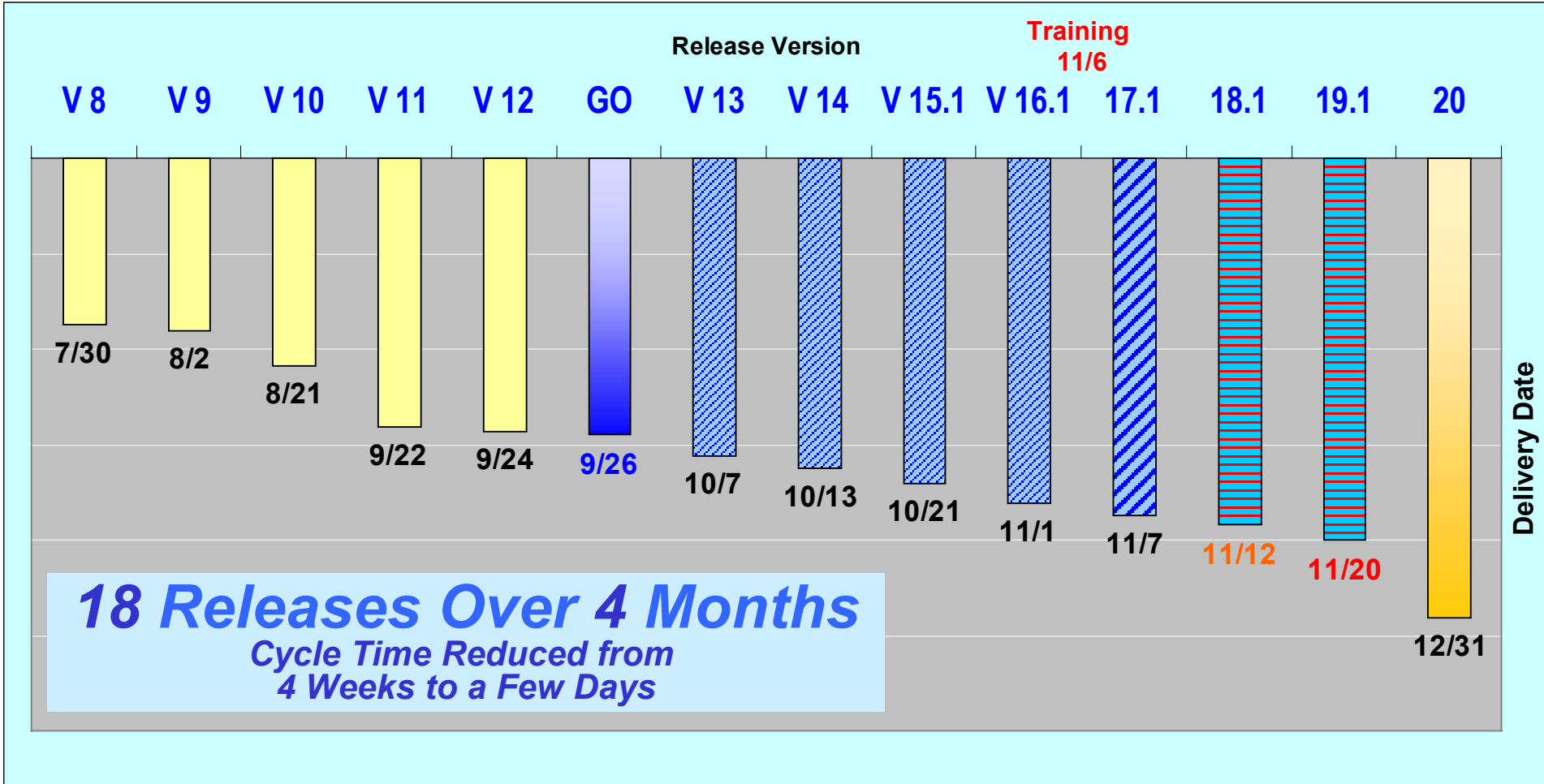
Overview [0 - 8]

0a. Rate Quote Requested	No ▾ O
0b. Service Type	<input type="text"/> ▾ R ← 1
0c. Originator	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	10/21/2000 R
3. PON	3245678 O
4. Related PON	<input type="text"/> O
5. From	Sprint PCS R
6a. TN	512-234-6666 R
6b. Fax No.	512-234-7777 C
6c. E-mail	<input type="text"/> C ← 4

Save Exit **Verify** Submit Escalate Copy Delete

← 3

eccm Software Releases



Summary CM Capabilities

Fields, Forms and System Parameters



Administer Users and Teams

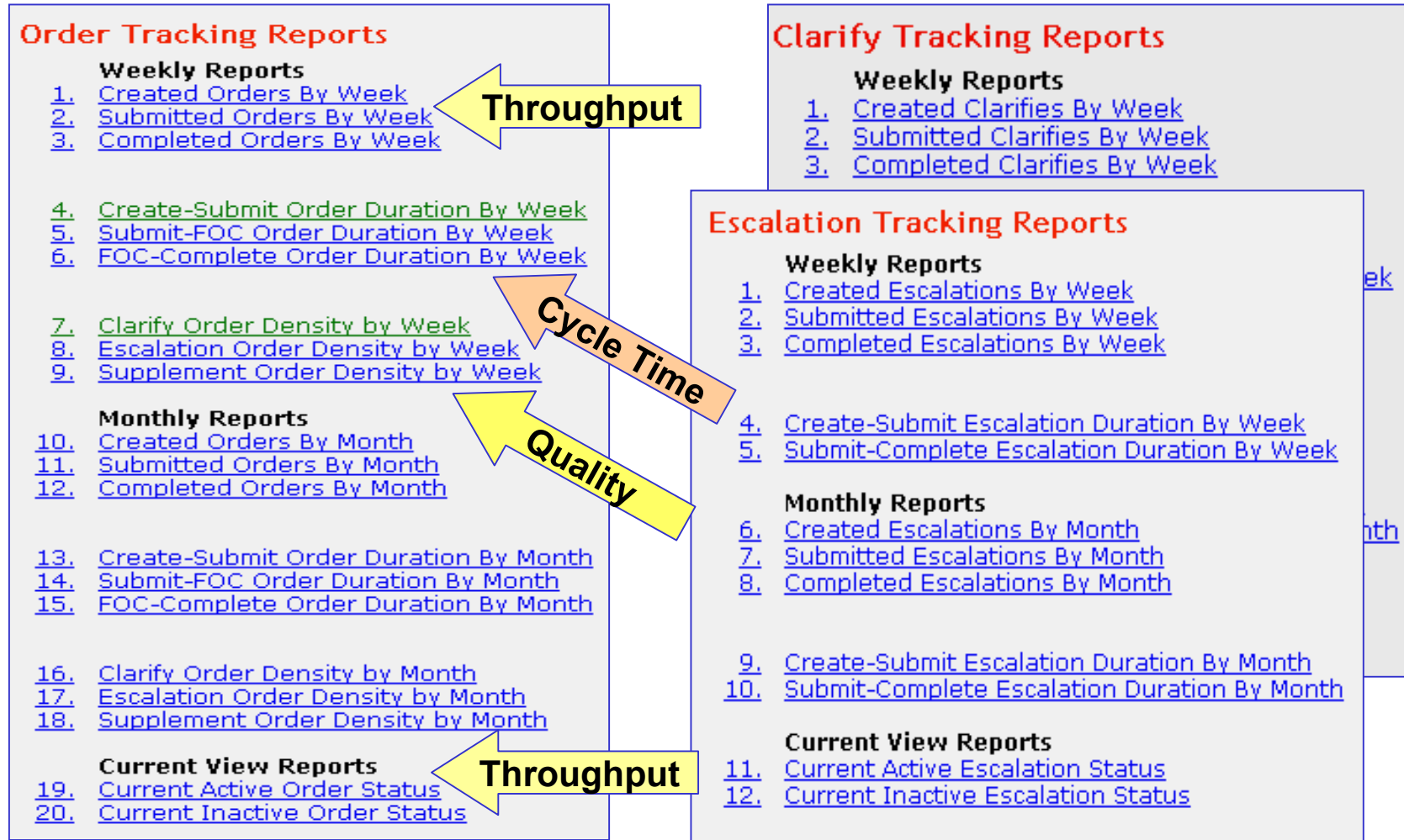
1. Administer Passwords
2. Administer Users
3. Administer Active User Sessions
4. Administer Backup
5. Administer Teams
6. Administer Organizations
7. Administer Fields ← 2
8. Administer Forms ← 1
9. Administer Parameters ← 3

How the Steak is Cooked

FASTER

Center Management Processes

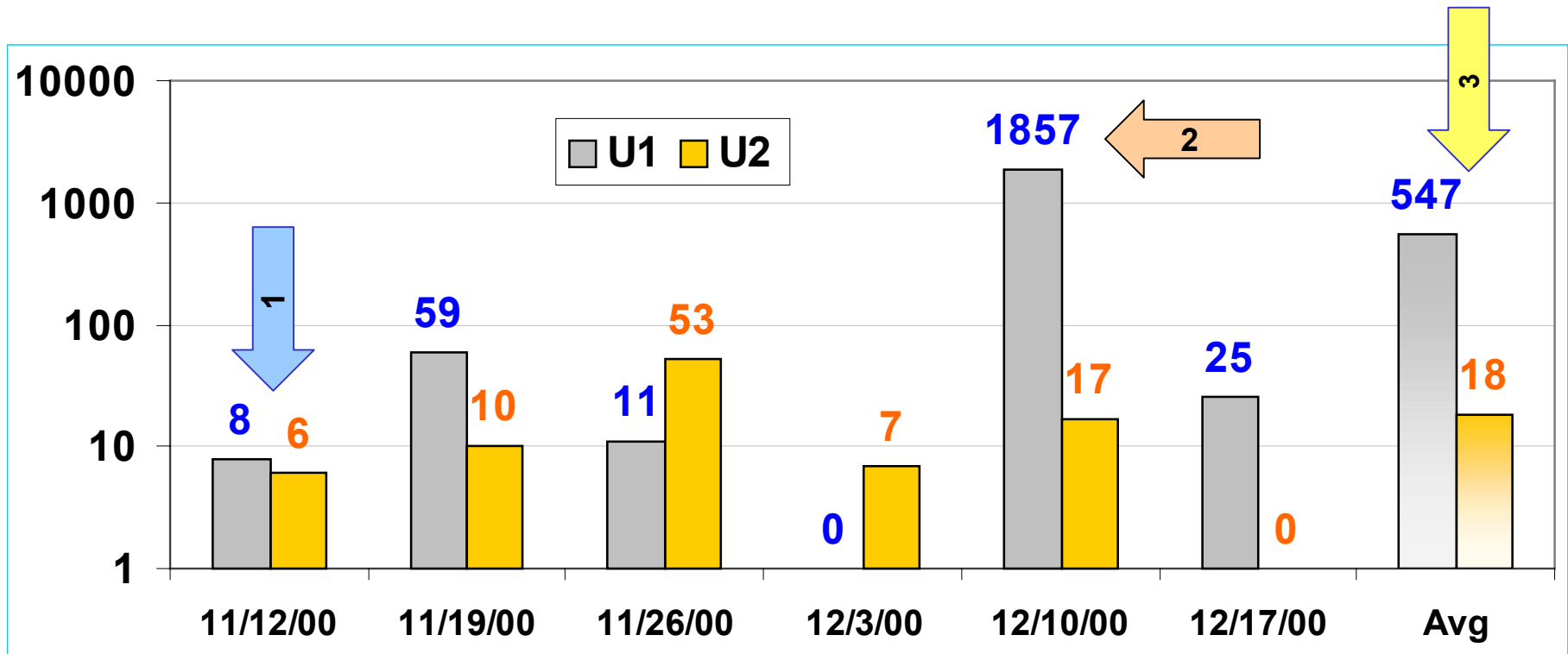
Interval Analysis: Orders, Escalations and Clarifies



Cycle Time, Throughput and Quality

Order Tracking (1/3)

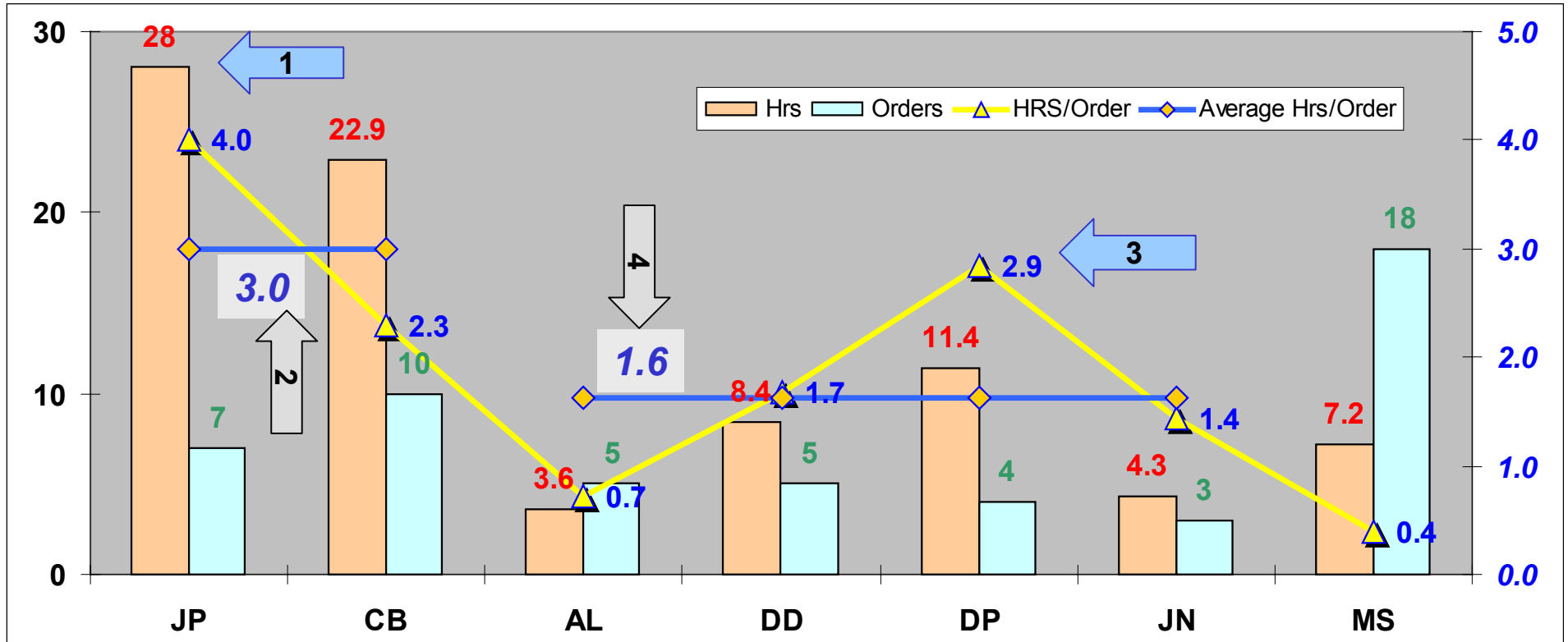
Average [Create - Submit] Interval (minutes)



Invention of the Copy Command

eccm System Utilization (2/3)

Activity Period, # Orders, Avg. Duration per Order, Team Avg. (hours)



Effective Analysis of Individual Engagement
References Established for both Sales and Center Teams

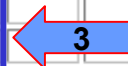
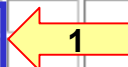
Integrated Historical Analysis (3/3)

Session ID, Action, Form Type and State Change Information





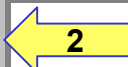
User Session Details
 (1/30/2001 11:48:47 AM)
 Customer: Sprint

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			



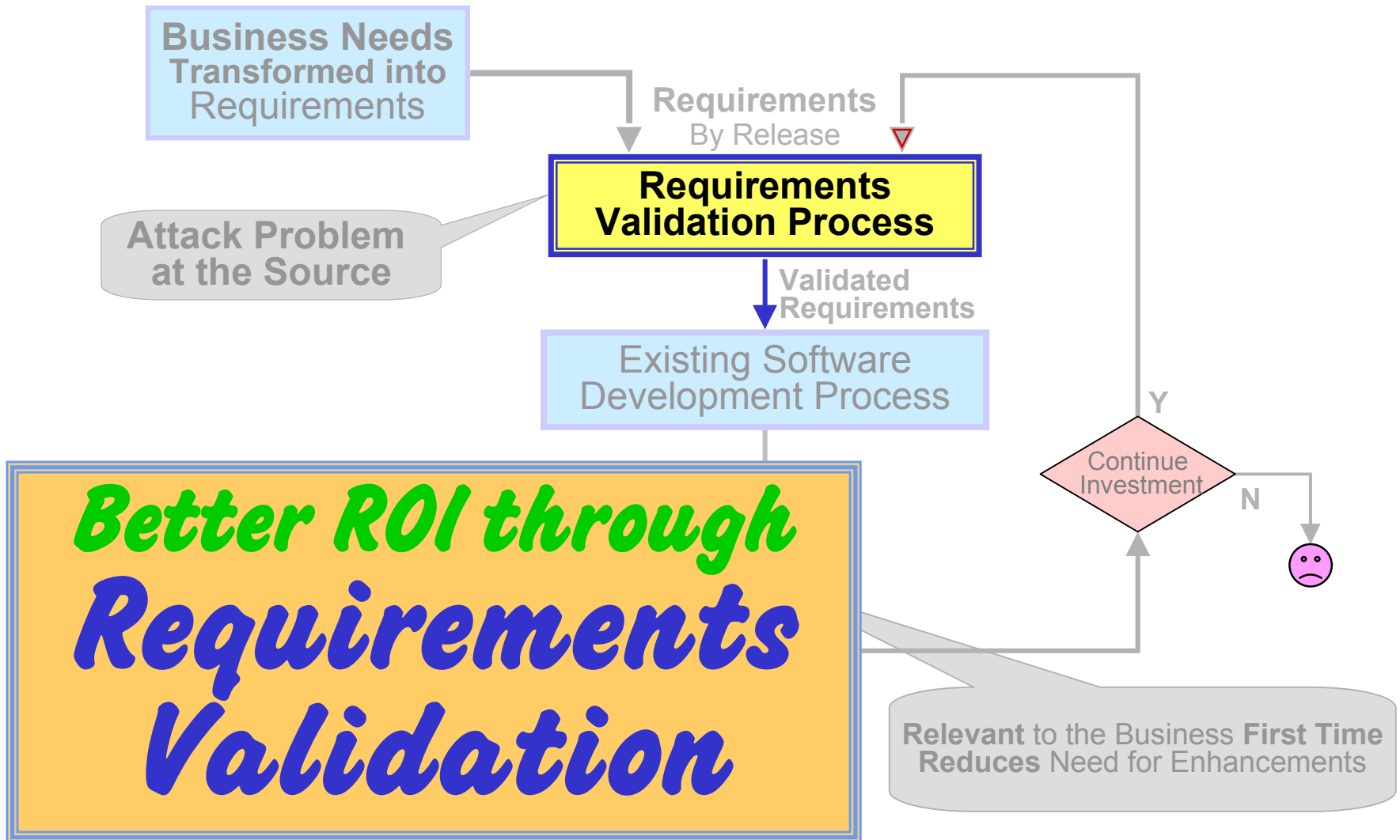
Order Entry/Project Management

1. Orders (Rep View)

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

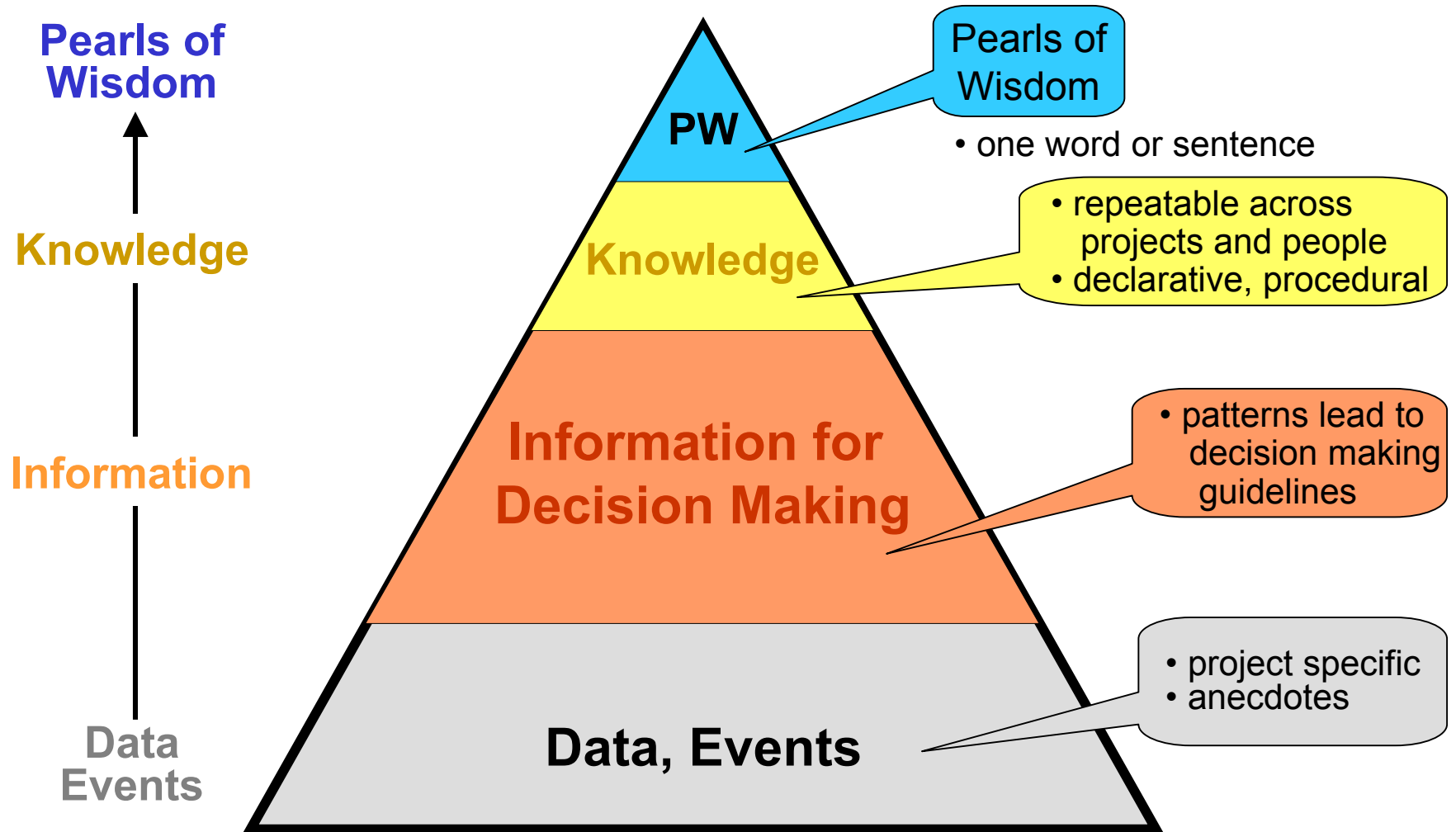
Summary

Improve Solution Quality and ROI through Validation



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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)