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DEFINING THE FUTURE

A Project's Perspective of CMMI Level 5

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Agenda

Why Climb the CMMI Ladder?

Lessons Learned Along the Way

The Substantial Rewards of Operating at CMMI Level 5

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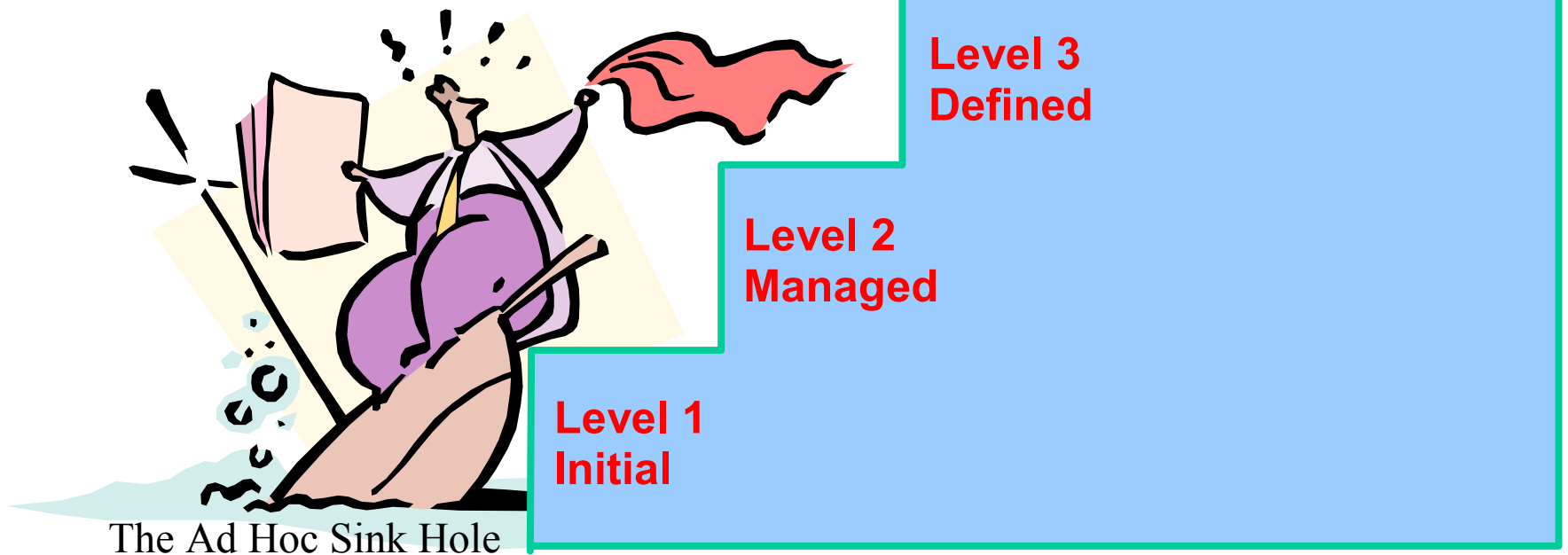# Background

- **In 2003, the Systems Development Operation organization was assessed at CMMI Level 5 in a externally-led SCAMPI-ARC A appraisal**

- **This organization is currently preparing for a re-appraisal next month**

- **This presentation examines some of the lessons learned and benefits associated with that journey**

  - New projects cannot rest on the laurels of past projects but must proactively plan for activities at all levels of the CMMI model

  - It takes time to record what's going on, but the resulting evidence is invaluable to the project

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Climbing the CMMI Level 5 Ladder

- **Each CMMI Level is a step to Project Maturity**
  - Starts with the foundations for a maintainable system
  - Gets your head above water
  - Clears the fog of fighting fires
  - Engage the supercharger

Level 5 Optimizing

Level 4 Quantitatively Managed

Level 3 Defined

Level 2 Managed

Level 1 Initial

The Ad Hoc Sink Hole

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Level 2: Don't Throw Away the Instruction Manuals

- **Know what it is you promised to do**
- **Know what it will take to deliver what you promised**
- **Know what others promised to do**
  - Keep track of expected inputs
  - Remind suppliers of what is due
- **Start collecting data points**
- **Don't forget the past**
  - Configuration Management allows reproduction of deliverables and archives management decisions
- **Ask others for help**
  - Quality Assurance provides a check on progress and credit for accomplishments

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# Level 3: Combine the Islands of Excellence Into a Functioning Team

- **Engage the software development lifecycle**
  - Follow the instructions
  - Be able to prove it works right and well
- **Take advantage of organizational assets**
  - Not invented here is still a bad idea
  - Best practices will save time and money
- **Stop drowning in the past**
  - Risk management
  - Peer reviews
- **Expand beyond your borders**
  - Include suppliers
  - Include Systems Engineering

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# Level 4: Understand Your Processes and Subprocesses

- **Co-ordinate with other projects**

- **Take advantage of organizational knowledge**

    - Identify the implementation of processes which perform best

    - Know that processes are performing within natural bounds that are consistent across teams

    - Six Sigma

- **Level 3 metrics, measurement processes, and goal setting are generally inadequate for Levels 4 and 5**

    - Need better definitions of the measures

    - Lower level metrics of subprocesses

Defect Detection Profile

Expected Process Capability

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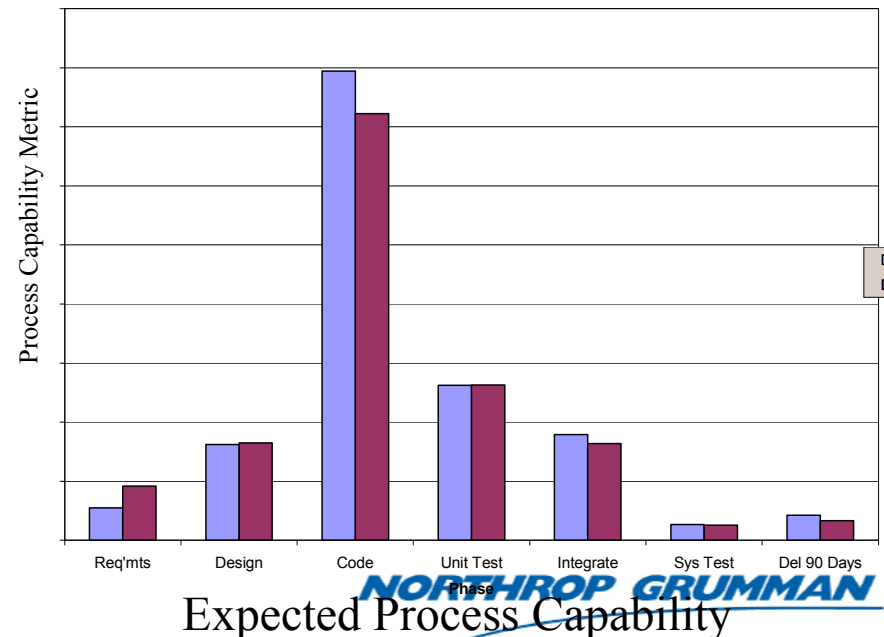
Level 5: Get Ahead of the Curve

- **Catch problems before they attack your project**
- **Level 3 firmly in place**
- **Reduce the variation**
  - Train people on the process
  - Create procedures/checklists
  - Strengthen process audit
- **Increase the effectiveness (increase the mean)**
  - Train people
  - Create checklists
  - Reduce waste and re-work
  - Replicate best practices

UCL=11.17

Mean=7.268

LCL=3.363

Individual Value

Observation Number
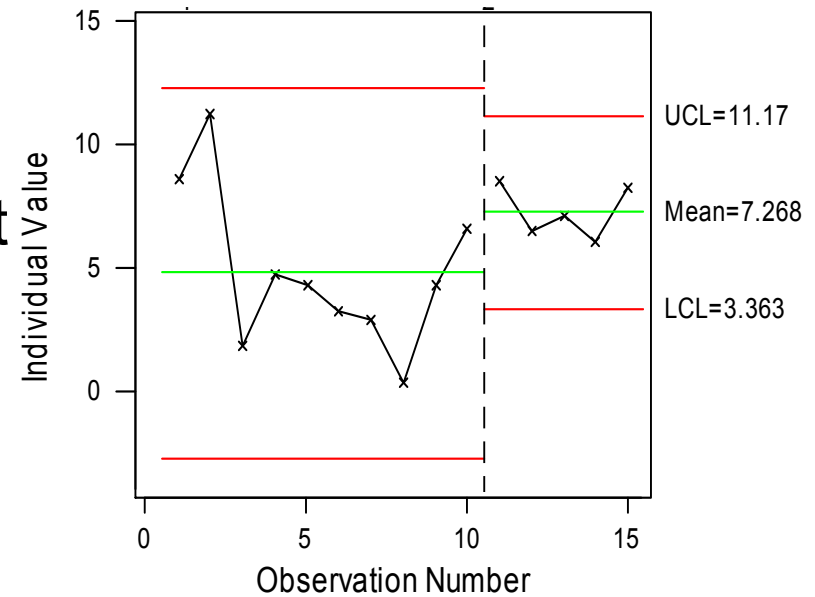
Revolutionary Process Capability Improvement

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Why is Being Appraised so Difficult?

- *"The telephone is the greatest single enemy of scholarship; for what our intellectual forebears used to inscribe in ink now goes once over a wire into permanent oblivion."*

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  Stephen Jay Gould

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- **Finding documented evidence for a CMMI appraisal is often difficult because project performers often do not take the time to write down what they are doing**

- **The lack of written records sometimes leads to arguments about what is supposed to be happening**

- **"Just Do It" gets the job done in the short term, but written records are necessary to reap the long term benefits of operating at CMMI Level 5**

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Undocumented Results Look Great But Fail to Reveal Purpose and Process

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Even When Documents Are Unearthed, They Need to be Understandable
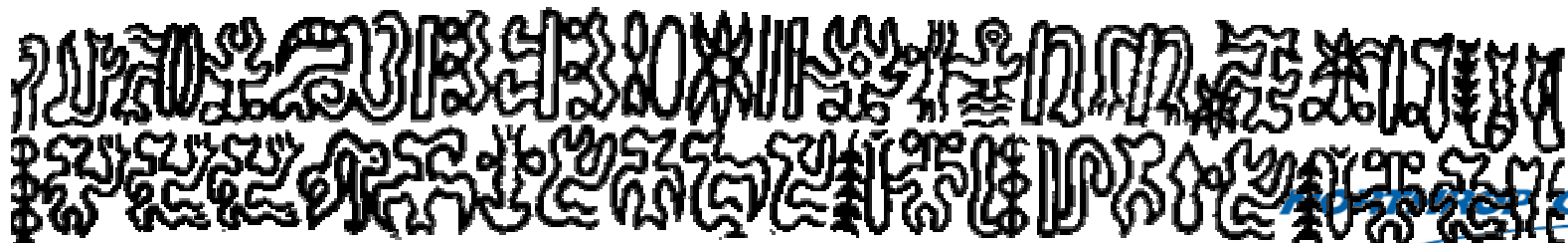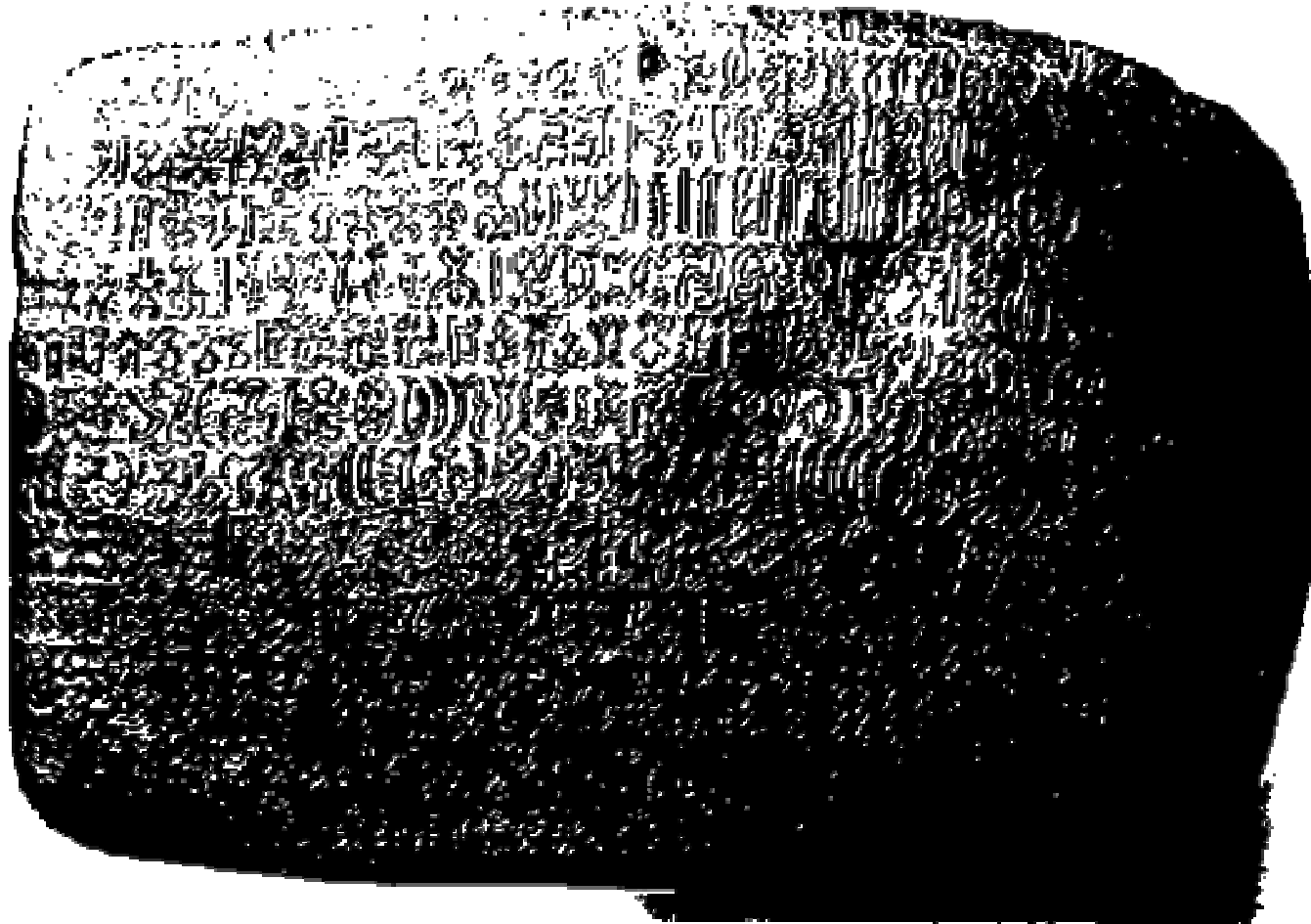
Benefits are There (If You Know Where to Look)

Organizational Dynamics

GP 2.7 Stakeholder Involvement

Cultural dynamics did not encourage communication & collaboration across project organizations

Permitted "stove-piped" responsibilities within software

Project oversight not independent

Project oversight did not recognize when program was in trouble

Did not manage ownership by each employee

Regressed to sell-off criteria vs. delivering a working system

Validation

Fixing bugs took precedence over system stability

Did not manage involvement of end-users

Continue to reinforce Project oversight & responsibility per new policy

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Benefits Materialized During the Climb

- **Instituted Weekly CMMI Coordination Working Group**
    - Collaborating with similar projects a major plus
    - Task list and schedule showed progress and encouraged participation
    - <u>Benefit:</u> Weekly meetings keep the momentum going
- **Took full advantage of upper management resources**
    - Monthly S/W Engineering Process Group (SEPG) meetings provided moral support, training, and planning
    - <u>Benefit:</u> Presentations by Process Assessment Organization lead clarified principles and showed top management commitment
    - <u>Benefit:</u> Project oversight meetings provided conduit for upper management help
    - <u>Benefit:</u> Evidence book reviews by top managers assured timeliness and quality

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To Be Top-Tier is to See With New Eyes

- **Process improvement is built into the system**
    - Evidence Books used as patterns from previous appraisals were not sufficient to meet later expectations
    - Needed to add more evidence as our understanding of what makes a good process has grown
- **The culture has changed**
    - Process improvement is the object of many CAR and Six Sigma projects
    - Process people are not the first to go when budgets are cut
- **It gets easier each time**
    - Familiarity leads to quicker startup
    - Less training needed, less resistance to change

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Projects Gain

- **Produced more value-added products with reduced effort and time**
    - Instead of overrunning budgets and schedules, products are delivered early and on budget
- **Needed less "help" from senior management**
- **Lots of new work began pouring in**
- **Communications with other groups was easier**
- **Meshed well with cost reduction efforts**
- **Easier to understand the role of Systems Engineering in Software Development**

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Project Leaders Gain

- **More up front thinking means less work later**
- **Fewer problems and risks along the way**
- **Improved processes added slack to cost and schedule curves**
  - Fewer replan exercises
  - Easier to give back resources
  - Easier to help other projects
- **Other projects consulted us to find out why things were going so well**

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Individuals Gain

- **Better understanding of how to get job done**
- **Less stress**
- **Less time doing rework**
- **Easier to transfer from project to project**
- **Easier to understand need of Systems Engineering in Software Development**
- **Concerns were escalated more quickly to the proper level of attention**
- **More enthusiastic about looking for improvement opportunities**
- **Down side: SPIN meetings are much less popular**

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Initial Resistance to Something New Faded Over Time

Our project is smaller than 10 people.

Our customer doesn't care about the CMMI.

We didn't bid the extra activities in our contract.

- **Projects must comply with both organizational policies and contract requirements**

- **Even if your customer is not familiar with CMMI, they will appreciate the benefits:** CMMI practices save the customer time and money

- **Adopting the CMMI is a cost of doing business and is included in the services we provide our customer to assure quality products**

- **Other benefits**
  - **Less rework -> nights, weekends and holidays off**
  - **Discussions lead to "Ah Ha's", "I thought…", "Oh, I didn't know…"**
  - **No surprises - the customer becomes your friend**

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Summary – Project's Perspective of CMMI Level 5

- **Much of the hard work in establishing a foundation is past with significant benefits**

- **Level 5 project activities put available information to use in identifying project improvement opportunities**

- **Innovative process improvements are readily available for implementation**

- **The project, management, and individuals realize real benefits from Level 5 operation**

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