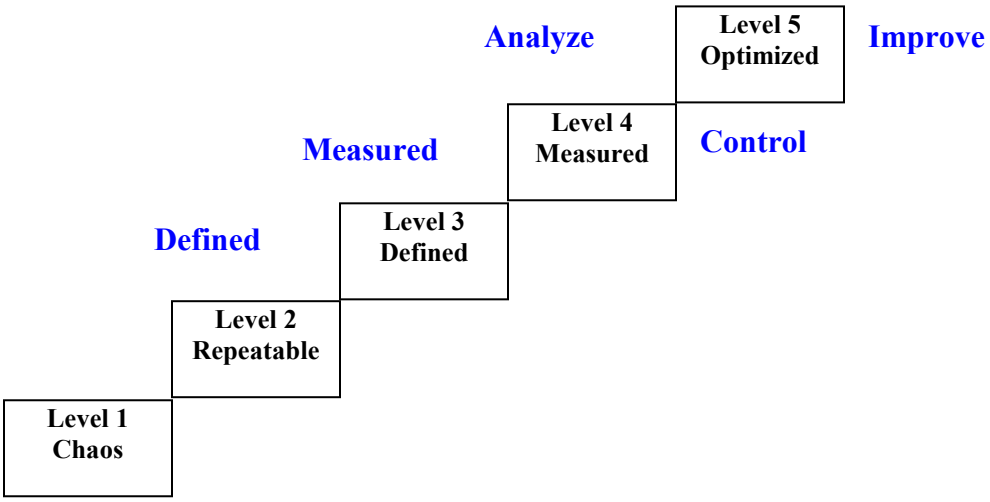
CMMI and Six Sigma

At the recent Software Engineering Process Group (SEPG) conference, one thing became clear: CMMI and Six Sigma are on a collision course: IT using CMMI and the rest of the enterprise embracing Six Sigma. Fortunately, they both have the same objectives: being better, faster, cheaper, and more profitable.

IT departments that want to produce better software more reliably have been following the CMMI model, which finds its roots in ISO9000 and TQM. Six Sigma has the same roots;they just use different acronyms.

Map of CMMI and Six Sigma's DMAIC



As you can see at a high level,

1. CMMI Level 3 and 4 align with Six Sigma's Define, Measure, and Control steps. The only real difference may be that you will want to measure defects per million lines of code (mloc) instead of defects/kloc and quantify the costs/defect.
2. CMMI Level 5 aligns with Analyze and Improve.

Most people hesitate to start using the tools of level 5 until they've achieved level 4, but this is a mistake. Using problem solving tools like the line, pareto, and fishbone diagram can accelerate your climb up the CMMI ladder.

Many years ago I heard Mr. Royce, the originator of the "Waterfall" model of software development speak at a conference. He said that we'd missed his point that every step was *iterative*. I believe the same is true of CMMI: you can cycle forward and bring the learnings back to whatever state you are in.

Transactional Six Sigma

While most quality initiatives have focused on reducing variation in manufacturing, transactional Six Sigma focuses on reducing defects in orders, billing, purchasing, payments, etc. Any IT system can be improved using Six Sigma.

CMMI and Lean Production

Most people have a hard time mapping the concepts of lean production originated at Toyota to software, but the essence is simple:

1. **If you want to be faster, focus on the delays *between* steps** in the software process, not on the steps (i.e., design, code, test).
2. **Reduce the batch size to accelerate productivity.** Toyota focuses on achieving a batch size of one. They can build any of nine different models of car on the same assembly line at the same time.
   Many years ago when I was investigating software metrics for a book I wrote for John Wiley and Sons, I found research that suggested that modules with no more than 10 decisions (regardless of the number of lines of code) were completely testable and, more often than not, reusable. Capers Jones found that modules with more than 50 decision points could never be fully tested.
   Ideal Batch Size: no more than 10 decisions per module
3. What is Agile software development? Nothing more than a way to shorten the cycle time between ideation and implementation. There's still a process, but it uses the concepts of lean production to converge on a solution more quickly.

Why bother with these heretical notions? Because of discoveries from the book *Competing Against Time:*

- **5% rule** – In any process, the product is touched only 5% of the time (meaning that 95% of the time it's idle, slowing your speed, decreasing your quality, and sapping your profits).
- **25-2-20 rule** – A 25% reduction in cycle time will double productivity and increase profits by 20%**.**
- **3X2 Rule** – Accelerating your speed will triple your growth and double your profit margins.

Example: While ranked only third largest of the world's car manufacturers, Toyota has profits greater than GM, Ford, and Chrysler *combined!*

Conclusions

As you can see from this overview, the real difference between CMMI and Six Sigma or Lean is the jargon we use. Don't let the fear of new acronyms slow you down. Embrace the concepts of Six Sigma; they will accelerate your journey to CMMII.

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