Product Development Process

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• Examples
Howard Stolz - Bio

2005  **Sun Microsystems**, *Network Systems Group*
- Engineering Program Manager
- X86 Workstations

2004  **Apple Computer**, *PowerMac Group*
- Engineering Program Manager
- High Performance Graphics Card

2003  **Sun Microsystems**, *Netra Group*
- Project Program Manager
- Telco Blade Servers

2003-1987  **Sun Microsystems**, *Thin Client Group*
- Project Program Manager
- Mechanical Engineer
- Workstations, Servers, and Thin Clients
Product Development Phases

Product Development Process

Howard W. Stolz
Concept Phase

**Input:** Marketing, Engineering, H/W or S/W Architects, Company Roadmap

**Action:** Investigate and evaluate concepts, market opportunities, customer survey, Define & Measure (6 σ)

**Output:** Concept sketches, block diagrams, functional spec, marketing requirements doc, product concept doc, estimates for product cost, sales volume, resources available, schedule, ROI, Voice Of Customer, Critical To Quality, Statement Of Work, Request For Quote

**Team:** Marketing Product Mgr, H/W & S/W Mgrs, Operations PM, Engineering PM, Customer Service

**Y/N:** Approval to proceed through next phase
Planning Phase

**Input:** MRD, PCD, PRD, PBS

**Action:** Functional plans, project plan, risk analysis & mitigation planning, test plans, detailed P & L, detailed schedule, Architectural Committee review

**Output:** Product Spec, Functional Spec, Schedule, Program Budget, Program Boundaries

**Team:** Cross-Functional Leads or Managers, Eng PM, Project PM

**Y/N:** Approval to commit human resources and spend $'s on prototypes

**Functional Plans:**
- Hardware
- Software
- System Test
- S/W QA
- Mechanical
- Compliance
- Compatibility
- Reliability
- Serviceability
- Documentation
- Marketing
- Sales
- Packaging
- ASIC Design
- Diagnostics
- Manufacturing
- Legal
- Firmware
- Eng Release Mgmt
Execution Phase - EVT

**Purpose:** Validate all H/W & S/W features exist and function

**H/W:** Prototypes, Power-on, Functional Testing

**S/W:** Feature Complete, Pre-Integration Testing

**Maturity:** “Soft Tooled” Enclosure, Prototype Printed Circuit Boards, System Assembled in Eng lab, Lower CPU and Graphics speeds, Lower Clock Speeds, H/W, S/W, and Mechanical Bugs

**Action:** Initial EMC (FCC) scans, Thermal Testing, Safety (UL, CSA) Review, Signal Integrity, OS & S/W App Testing, Mechanical Fit, Design of Experiments, Bug fixing, Alpha testing

**Y/N:** Phase Exit Review approval to begin next prototype build
Execution Phase - DVT

**Purpose:** Validate features perform within specifications; Systems built in factory environment

**H/W:** Electrical margin testing (four corner, HALT, etc.), Mechanical testing (shock, vibration, etc.)

**S/W:** Software Quality Assurance testing of OS & Apps

**Maturity:** Production quality - “Hard Tooled” Enclosure, Production quality Printed Circuit Boards, System assembly in the factory, Full speed CPU and Graphics, Full clock speeds

**Action:** Complete all validation and certification testing: EMC, Safety, Mechanical, Reliability (MTBF demo), Beta testing

**Y/N:** Phase Exit Review approval to begin Pilot Build & Mass Production (pending resolution of specific performance or quality issues)
Execution Phase - Pilot & PVT

**Purpose:** Validate manufacturing processes assure quality goals are met; “Ownership” of the product transfers from Engineering to Operations

**Action:** Pilot production build (FRU's & warehouses); Extended “burn-in” testing, Post Pack Audits; Test of order placement to shop floor Configure-To-Order processes

**Y/N:** Approval to go live with on-line ordering and begin mass production
Proto > Design > Test

Concept

Design

Test

Planning

Hard Tooling

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Examples