Case study

Sony PlayStation
The 500K ASIC

How a single-customer focus and the first cross-functional core team delivered the chip that defined a console generation in 24 months.

In 1993 the home gaming market belonged to Nintendo and Sega, and every challenger that had tried to break in — Atari, 3DO, Philips, Commodore — had failed. Sony was the next challenger. The chip at the heart of their plan had not yet been built. LSI Logic took the design. lateralworks helped frame the program, stood up the first cross-functional core team in LSI's history, and ran the planning cadence that pulled silicon out the door in 24 months.

Case study series.

LSI Logic Corporation — Sony Computer Entertainment first PlayStation (Sony CXD8530 / LSI CW33300). 1993 – 1995. 500,000-gate single-die ASIC. 5× leap in gate count on a new manufacturing process. First cross-functional core team in LSI history.

Prepared by
lateralworks
FTTM methodology

Engagement window
1993 – 1995
24-month delivery

Online
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Case study series

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Core thesis. When a program demands more than the organization can deliver, the response must be structural. Pick one driving customer, integrate hardware and software workstreams under one empowered core team, and run the planning cadence at a frequency that surfaces gaps before they ossify. On the LSI 500K program, that combination delivered a 5× technology leap in 24 months against a hostile internal sponsor — and roughly doubled the company in a single year.

Overview

Executive abstract

In 1993, Sony Computer Entertainment was attempting to enter a home video game console market dominated by Nintendo and Sega and littered with failed alternatives — Panasonic's 3DO, the Atari Jaguar, the Philips CD-i. Sony's plan rested on a single chip: a custom 500,000-gate, single-die ASIC integrating a 32-bit RISC CPU, a 3D geometry engine, a motion decoder, DMA controllers, and bus interfaces on one piece of silicon. No semiconductor partner had attempted this scale of consumer-product integration. Competing offers required two chips [1, 2].

LSI Logic, then a sub-$500M ASIC company recovering from a multi-year financial downturn, won the design [1, 3]. The catch: LSI had only recently completed a 100K-gate ASIC. Sony's 500K was a 5× leap in gate count plus a new process, new design tools, a new cell library, and a new packaging approach — all to be delivered to volume production in 24 months. The LSI marketing organization initially defined a "super-product" combining requirements from seven vertical segments, estimated at five-plus years to build [4].

lateralworks advised the LSI executive team to abandon the super-product strategy. Pick one driving customer whose requirements cover ~80% of general market need, focus the program on that customer's success, expand to the remaining segments after launch. After internal debate, the team settled on Sony — over the initial objections of a marketing organization that dismissed gaming as a "toy" market [4]. lateralworks structured the program, stood up the first cross-functional core team in LSI history, established high-frequency refresh planning across hardware and software, ran weekly Voice-of-Customer with Sony, and coached the executive layer for the full two-year engagement.

Engineering samples shipped to Sony 12 months ahead of the original system schedule. Volume production began 24 months after kickoff. The first PlayStation reached Japan on December 3, 1994 [5, 6]. The Sony engagement roughly doubled LSI Logic in a single year [4]. The 500K platform served as the foundation for seven years of LSI products. Every member of the core team — including John Daane, Brian Halla, Jean-Louis Bories, and Joe Zelayeta — went on to a senior executive or CEO role in Silicon Valley [7, 8, 9, 10].

24 mo	~2×	12 mo	7 yrs
kickoff to volume production	LSI Logic's size after one Sony year	Sony system development accelerated	500K platform life in market

Core thesis. When a program demands more than the organization can deliver, the response must be structural: narrow the customer set to a single driving customer, integrate hardware and software workstreams under one empowered core team, and run a planning cadence frequent enough to confront reality before it ossifies. The 500K program proved this works on a 5× technology jump, with a new process node and a hostile internal sponsor.

The context

01 The gaming market on the cusp of the 3D era

By 1993, the home video game market was on the cusp of a generational change. The 16-bit era — Nintendo's Super NES and Sega's Genesis / Mega Drive — was at its peak in installed base but already aging in capability. Together those two platforms held over 80% of the market [11, 12]. Behind them, a new cohort of 32-bit and 64-bit challengers was queuing up for the next generation.

Failed challengers

Several of those challengers had already launched and were failing in public. Panasonic's 3DO arrived in 1993 at a launch price of $699 — prohibitive for a mass-market console — and sold only about 2M lifetime units before being eclipsed [13]. The Atari Jaguar, marketed as the first "64-bit" console, launched in November 1993 to a thin software library and persistent developer complaints about its programming model; lifetime sales were under 250,000 units [14]. Philips' CD-i, Commodore's Amiga CD32, and a handful of others fared no better. None of them found a software ecosystem that could compete with the cartridge libraries of Nintendo and Sega.

Sega had read this and was preparing the Saturn for a 1994 launch with a complicated dual-CPU architecture aimed at 2D sprite work [15]. Nintendo, in parallel, was working with Silicon Graphics on what would become the Nintendo 64, but their console would not ship until late 1996 — eighteen months after Sony [16].

Sony's entry

Sony had taken a circuitous path into the gaming business. An earlier collaboration with Nintendo to build a CD-ROM peripheral for the Super NES had collapsed in 1991 [5]. Rather than abandon the work, Ken Kutaragi at Sony pushed internally for an independent console aimed squarely at 3D polygon rendering on CD-ROM media. The console he envisioned would require a system-on-a-chip integrating a 32-bit RISC CPU, a dedicated 3D geometry processor, a motion decoder for full-screen video, DMA controllers, and bus interfaces — all on a single die [1, 17]. Kutaragi met with most major semiconductor vendors in 1992 to find a partner. Some declined. Others said it could not be built on a single chip in the available time. LSI Logic's answer was different.

The strategic frame. The home gaming market was about to shift from cartridge-based 2D platforms to CD-based 3D platforms. The shift was a single-generation window. Whoever arrived first with capable hardware and a strong third-party software ecosystem would set the standard for the next decade. Sony, the new entrant, had no margin for slip.

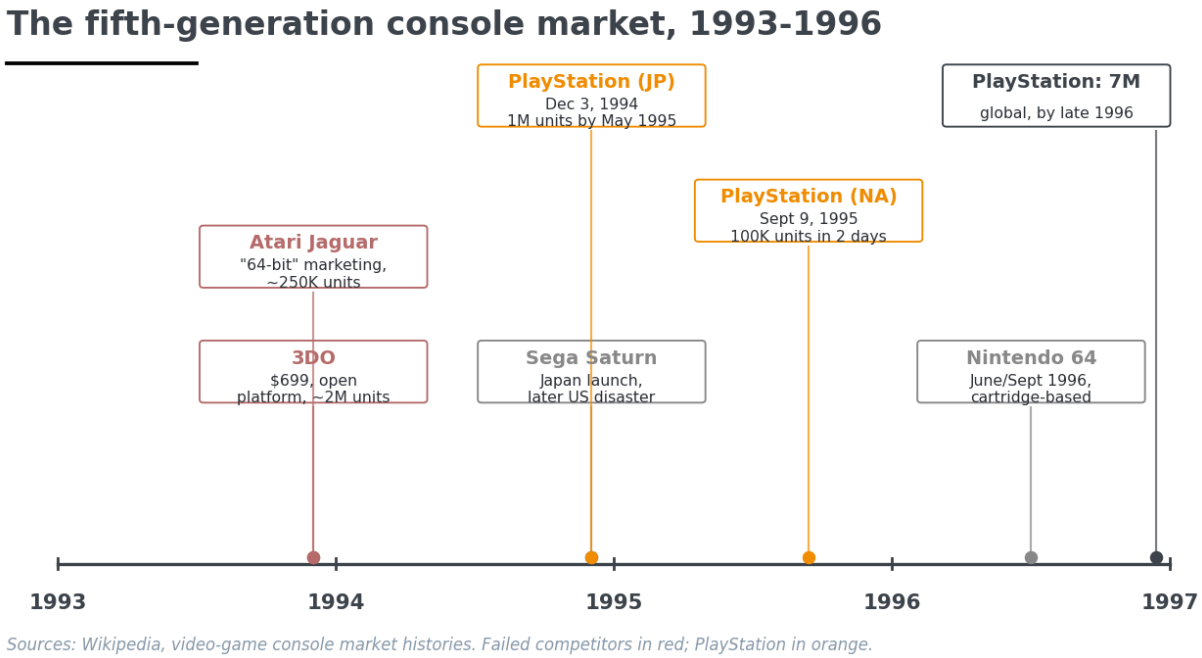


Figure 1. The fifth-generation console market, 1993–1996. Failed challengers (3DO, Atari Jaguar) in red; PlayStation launch milestones in orange. The Saturn launched in Japan one week ahead of PlayStation but lost the format war within 18 months; the Nintendo 64 arrived a full year after PlayStation and chose cartridges. Sources: Wikipedia, console market histories [11–16].

Figure 2. The original PlayStation (SCPH-1000), launched in Japan on December 3, 1994. The unit shipped with the SCPH-1010 controller (shown). The chip at the heart of this console — the LSI Logic CW33300-based Sony CXD8530 — was the subject of the lateralworks engagement.

LSI Logic in 1992-1993

LSI Logic Corporation, founded in 1981 by Wilf Corrigan as a pure-play ASIC company, was working through the toughest financial stretch of its history. Three of the previous four years had ended in red ink, with a one-time charge in 1992 driving a $110M loss [3, 18]. In response, Corrigan launched the CoreWare program in July 1992 — a library of pre-validated system-level building blocks (including a MIPS-derived RISC core, the CW33000) that customers could assemble into custom ASICs. CoreWare promised faster time-to-market and higher margins, and the program needed a landmark customer to prove the model [1, 3].

At the same time, Brian Halla, then running the LSI consumer products division, was working the Sony account. Halla later said of Kutaragi, "He's had more impact on my career than any other customer I've ever known" [1]. The Sony opportunity was the proof point CoreWare needed. The internal challenge was getting the LSI organization to agree.

The challenge

02 A 5× technology leap on a 24-month clock

The 500K ASIC was named for its gate count — five times the largest ASIC LSI Logic had previously brought to production [4]. Every layer of the engineering stack had to be rebuilt at the same time. The team faced four compounding problems.

A 5× gate-count leap

LSI's prior generation topped out at approximately 100K gates. The Sony design called for 500K gates on a single die — roughly one million transistors at the 0.5-micron node [2]. The leap demanded new place-and-route tools, new timing-closure methodology, new cell libraries, and a new manufacturing process to be qualified in LSI's proto fab before volume production could begin. The integration target was unprecedented in consumer electronics: CPU, geometry engine, motion decoder, DMA, instruction cache, scratchpad cache, and bus controllers — all on one die [1, 2, 17].

A "super-product" definition that could not ship

The LSI marketing organization had defined a product specification two years out that combined the requirements of seven distinct vertical markets: low-power mobile, networking, PC graphics, workstations, telecom, set-top boxes, and high-end EDP / supercomputing [4]. The intent was sound — get a single platform that could serve every important segment LSI cared about. The result was a product that could not be built. Internal estimates pegged the schedule at five-plus years, best case. Wilf Corrigan, the LSI CEO, was asking for two [4].

A hostile internal sponsor

The marketing organization in Milpitas considered gaming a "toy" market unworthy of LSI's most advanced process. Its preferred driving customer was Cray Computer, the obvious choice for a workstation flagship. LSI's Design Center in Japan and the consumer products group both pushed for Sony because the gaming application would pull the chip through the company faster. The internal politics consumed weeks of executive attention before the decision was made [4].

No second-source safety net

Sony told LSI that PlayStation's competitive position depended on shipping samples in time for system integration ahead of the Sega Saturn. A late chip meant a late console; a late console meant losing the 32-bit format war by default. LSI was the sole supplier.

The initial assessment. The program as defined could not ship. The technology stack was unbuilt, the customer scope was too broad, the internal sponsor was conflicted, and the schedule was set by an external partner over whom LSI had no leverage. The first job was to change how the program itself was structured before any chip work could matter.

The solution

03 The FTTM driving-customer model

lateralworks restructured the LSI 500K program around three reinforcing moves: a single-customer focus, an empowered cross-functional core team, and a high-frequency refresh-planning cadence. Together they formed the operating system for the program.

Pick one driving customer

The first FTTM principle applied to the 500K program was the driving-customer rule: identify the one customer whose requirements cover ~80% of general market need, focus the entire program on that customer's success, and expand to the remaining segments only after launch. The marketing organization's seven-segment super-product was the canonical failure mode: trying to satisfy every customer's wants in a constrained time window with constrained resources, and missing the market window for all of them [19].

Two candidates were evaluated. Cray Computer represented the high-end EDP requirement set, the most demanding technical specification but a thin volume base. Sony represented the consumer gaming requirement set, a larger volume opportunity with requirements that — once dissected — covered approximately 80% of the same general market need. Sony was also actively pushing for first-customer status and willing to commit to a Joint Development Agreement, which gave LSI a co-developed program with the depth of customer engagement the 500K design required. The decision went to Sony [4].

Stand up the first cross-functional core team

LSI Logic had never run a program with a cross-functional core team. Engineering, design, marketing, libraries, CAD, fab process, and manufacturing each operated within their own functional reporting line. lateralworks worked with the LSI executive team to assemble the first such team in the company's history — seven members, each a senior subject-matter expert in their domain, each empowered to make commitments on behalf of their function. The team included names that would later run or help build other Silicon Valley semiconductor companies:

- **John Daane** — then managing IP, CAD, and libraries at LSI; later CEO and Chairman of Altera (2000-2015) [7].
- **Brian Halla** — then EVP of LSI Logic Products and the program's customer lead and senior accountable executive; later CEO of National Semiconductor (1996-2009) and Cisco board director [8, 9].
- **Jean-Louis Bories** — the program's Project Monarch and a senior LSI engineering leader; later an active early-stage technology investor through the Band of Angels [10].
- **Joe Zelayeta** — then leading process technology and U.S. wafer fab operations; later EVP of Worldwide Operations at LSI Logic, and the architect of LSI's Gresham, Oregon fab [20, 21].

The team was co-located in Milpitas and operated under a single Project Monarch — Jean-Louis Bories — with authority over technical, schedule, and customer-facing decisions. Brian Halla served as the program's customer lead and senior accountable executive, working the Sony account and providing executive cover for the structural shifts the program required. Every team member treated the 500K as their primary job.

Section 03 (continued)

Refresh planning and lateral integration

High-frequency refresh planning

The macro plan was reprogrammed end-to-end and updated weekly. The micro plans — at the workstream level — were refreshed at a high frequency across hardware and software. This cadence pushed the visibility of gaps and slips far enough forward in the program that the team could act on them before they cascaded. It also forced lateral integration across hardware, software, fab process, and libraries: the schedule data itself became the integration point, not a downstream report.

Lateral integration across hardware and software

The 500K chip was useless without the software stack Sony was building around it. lateralworks worked with the core team to integrate every aspect of Sony's hardware and software development into the LSI program plan. Real-time operating system milestones, library development, the C compiler and debugger toolchain (delivered with help from Psygnosis and SN Systems on the Sony side), engineering-sample readiness, and fab process qualification all sat on the same integrated schedule [5, 22]. When a software milestone slipped, the silicon team saw it the same day.

Voice of Customer, weekly

A weekly Voice-of-Customer process ran for the duration of the program. Sony's requirements were elicited and re-elicited rather than frozen at kickoff. lateralworks coached the LSI executive layer through the discipline of separating Sony's wants from the *how* of solving them — a distinction that, when collapsed, produces products that hit specifications nobody asked for. Where Sony's wants exceeded what 0.5-micron silicon could deliver in 24 months, the gaps were negotiated back to Sony as explicit trade-offs rather than absorbed silently as overruns.

Outcome: a single chip where competitors needed two

LSI's CoreWare architecture — supplemented by Sony-specific blocks for the Geometry Transformation Engine, the Motion Decoder, and the on-die scratchpad — delivered the entire PlayStation main processor on a single die. Competing offers to Sony had required two chips; LSI's single-chip integration was decisive in the 1993 selection [1]. The Sony CXD8530 / LSI CW33300 ASIC ran at 33.87 MHz, delivered 30 MIPS sustained performance, and integrated the components detailed in the figures that follow [2, 17].

Section 03 (continued)

Voice of customer — what does Sony want?

The question every product team has to answer is the question LSI had to answer for the 500K program: *what does the customer want, and when do they want it?* Sony was targeting a 1994 console launch into a market window that would close within eighteen months. If the PlayStation was a ~1995 product, what made the LSI 500K ASIC a competitive product at that moment? That answer drove every architectural and process choice that followed, and it was the question lateralworks ran with the LSI core team for two years.

The difference between a want and a how.

Wants are the customer's. Hows are the supplier's. Sony told LSI what the console had to do: 3D polygon rendering on CD-ROM media, motion-decoded full-screen video, a programming model third-party developers could ship against, and a price point Sony could put on the shelf next to Saturn. How to deliver each of those — a 32-bit RISC core, a dedicated Geometry Transformation Engine, the MDEC, the 0.5-micron process, the cell library, the packaging — was LSI's problem to solve.

Teams often collapse the two and jump straight to the *how*. The product gets built around what the technology can do today, not around what the customer needs when the product ships. When the product reaches the market it fails — wrong product at the right time, or worse, wrong product late. Customers tell you what they want; it is the supplier's job to figure out how to deliver it.

Top-down wants, bottom-up hows.

The discipline is to define the wants top-down, then determine the hows that close them, then assess the gaps. The trap is to do the product definition bottom-up, based on what is possible and known today. Products defined that way miss what the customer wants because the technology speaks louder than the requirement. Starting top-down with the wants — and explicitly identifying the gaps — gave LSI the basis to go back to Sony and negotiate trade-offs, or to ask Sony to assume some of the risk. Then the wants and the hows balance.

The challenge for the team was to predict what the requirements would be two years out, when Sony's console reached the market. This is why a driving customer like Sony was critical — to share that forecasting risk with someone who actually knew where the market was going. The weekly Voice-of-Customer process kept the wants alive and the gaps honest for the duration of the program.

Section 03 (continued)

Pick the driving customer

LSI did not develop the 500K only for Sony. The 500K platform had to serve a broader market — and ultimately did, across seven vertical segments over seven years. But the platform shipped first to one driving customer, on one schedule, with one set of requirements. The second failure teams make, after jumping straight to the how, is the inverse failure of scope: trying to design a product for many customers with many requirements at once, then expanding the timeline until the market window closes. They miss every segment because they couldn't deliver any of them in the constrained time with the constrained resources available.

Pick a market leader as the driving customer.

The FTTM principle is to find a *driving* customer. As long as that customer is a market leader in their segment, you can rely on them to drive the market's requirements. The followers in their segment will go the way the leader goes — they will follow, so the leader sets the requirements for everyone. Sony was that leader for the CD-based 3D console market that did not yet exist; the PlayStation defined the category, and the rest of the segment followed Sony into it.

Pat Brockett, then at National Semiconductor, put it to lateralworks once in plain English [27]:

> *"Focus on the market leader and the rats and dogs will follow."*
> — Pat Brockett, National Semiconductor [27]

The order matters: focus first, expand second.

The 500K platform shipped to Sony first. After volume production, the same platform expanded to networking, PC graphics, workstations, telecom, set-top boxes, mobile, and high-end EDP — the seven segments the original super-product specification had tried to address simultaneously. The order had been inverted: focus first, expand second. The expansion succeeded because the first customer was already a market winner, creating pull through the platform.

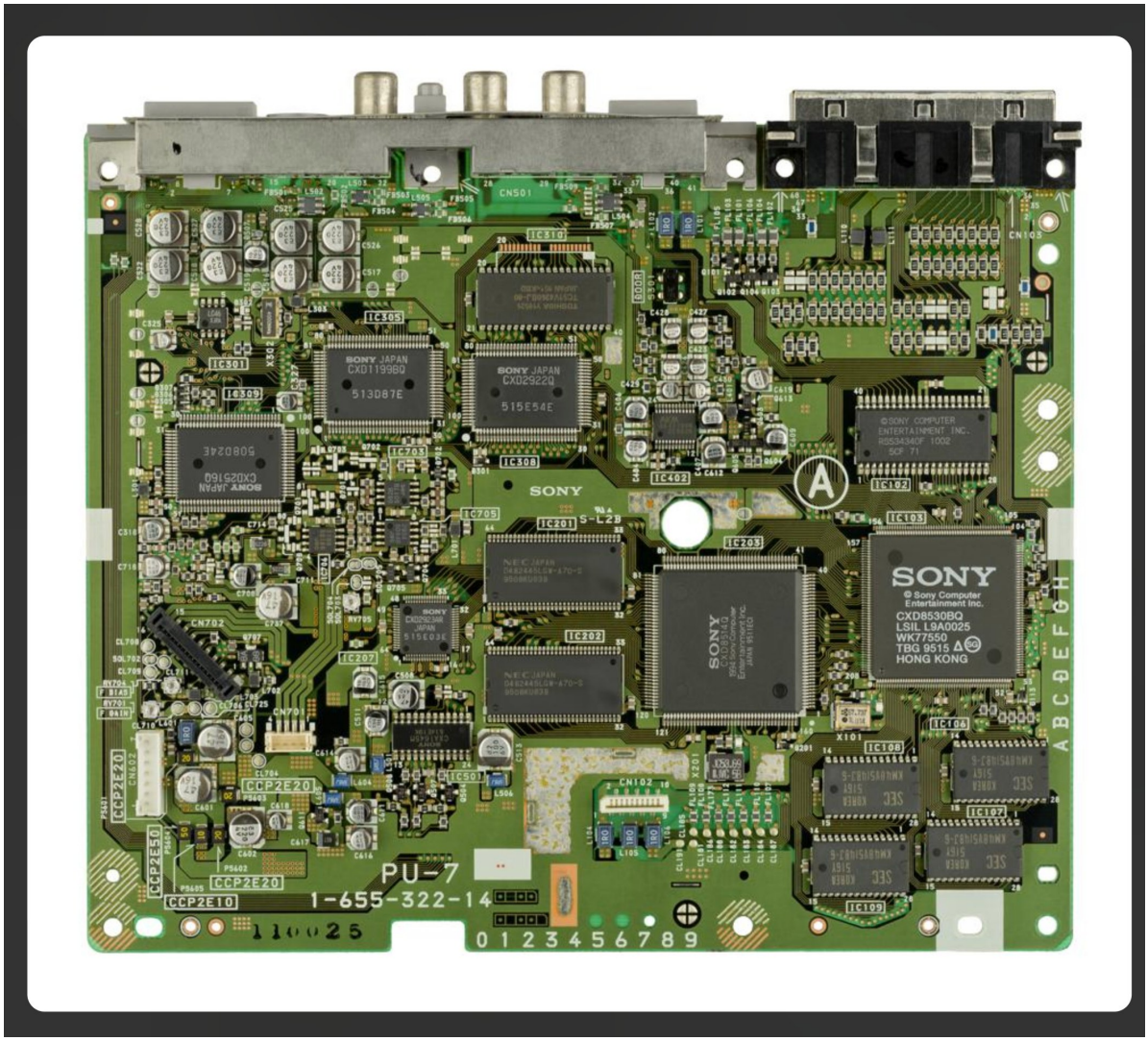
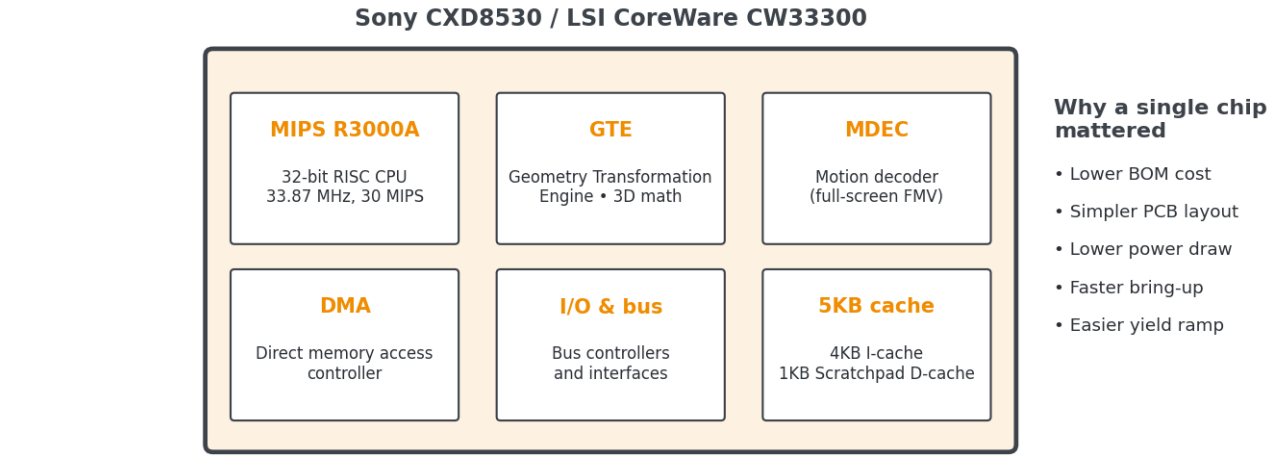


Figure 3. PlayStation SCPH-1000 motherboard — the PU-7 board, first-generation PlayStation hardware. The large chip at center-right is the Sony CXD8530BQ, the LSI Logic CW33300-based main processor; the "LSIL L9A0025" marking visible on the chip identifies LSI Logic as the manufacturer. This single ~1M-transistor die integrates the 32-bit MIPS R3000A CPU, the Geometry Transformation Engine, the Motion Decoder, and DMA controllers — work that competing offers had required two chips to perform. Surrounding chips include the CXD8514Q GPU, CXD2922Q sound processor, NEC system DRAM, and Samsung VRAM.

The 500K ASIC: one chip, where others needed two

LSI Logic CW33300-based ASIC (Sony CXD8530), 0.5-micron process, ~1 million transistors.



Sources: PlayStation technical specifications (Wikipedia); LSI Logic history (FundingUniverse); Copetti, "PlayStation Architecture."

Figure 4. The 500K ASIC at a glance. LSI Logic CW33300-based core (Sony CXD8530), 0.5-micron CMOS, ~1 million transistors. The chip integrated the CPU, geometry math engine, motion decoder, DMA controller, bus controllers, and on-die cache on a single die — a level of consumer-product integration that no other vendor had committed to deliver in the available time. Sources: PlayStation technical specifications (Wikipedia); Copetti, "PlayStation Architecture"; LSI Logic history [1, 2, 17].

Strategic pivot

Seven segments collapsed to one driving customer

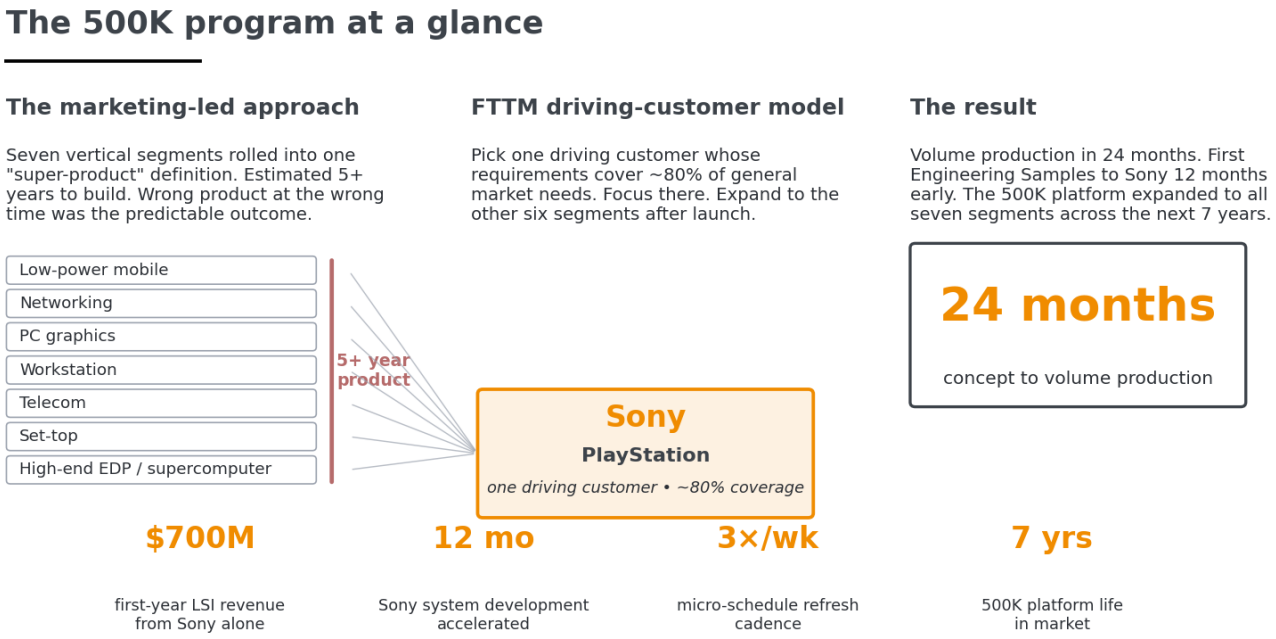


Figure 5. The 500K program at a glance. The marketing-defined super-product combined requirements from seven vertical segments into a single specification that would have taken five-plus years to build. The FTTM intervention replaced it with a single-customer program for Sony, whose requirements covered ~80% of the general market need. Volume production arrived in 24 months. Sony's system development was accelerated by 12 months because engineering samples arrived a year ahead of schedule. The 500K platform subsequently expanded to all seven segments and powered LSI's product line for seven years.

Why this structure outperforms

04 Super-product vs. driving-customer team

The marketing-led "super-product" approach and the FTTM driving-customer model differ in kind, not in degree. Below is the structural comparison as it played out on the 500K program.

#	Dimension	Super-product approach	FTTM driving-customer team
1	**Scope**	Combined requirements from 7 segments into one super-product specification.	One driving customer (Sony) covering ~80% of general market need; expand later.
2	**Schedule**	5+ years to build, by internal engineering estimate.	24 months from kickoff to volume production. Engineering samples 12 months ahead of Sony's system schedule.
3	**Team structure**	Functional reporting lines. Engineering, design, CAD, fab process, marketing — each separate.	First cross-functional core team in LSI history. Seven senior members, co-located, single Project Monarch.
4	**Sponsorship**	Marketing-defined; consumer gaming dismissed as "toy" unworthy of leading-edge silicon.	CEO-sponsored after escalation. Japan design center and consumer products group pushed for Sony.
5	**Customer engagement**	Specification handed to engineering as frozen requirement; little ongoing dialogue.	Weekly VOC with Sony for two years. Gaps negotiated back as explicit trade-offs.
6	**Integration**	Hardware and software treated as separate workstreams; sequential handoffs.	Lateral integration. HW, SW, tools, libraries, fab process, and packaging on the same schedule.
7	**Planning cadence**	Monthly status with quarterly executive reviews.	Macro plan refreshed weekly; high-frequency refresh planning across hardware and software workstreams.
8	**Risk posture**	Optimized for stability that never came. New process, tools, libraries, packaging all assumed to work.	Designed for instability. Schedule simulates alternative paths whenever a workstream shifts.
9	**Outcome on launch**	Would have missed Sony's system schedule by 12+ months. Likely missed the 32-bit console generation entirely.	24 months to volume production. PlayStation launched Dec 3, 1994 — and won the format war by 1996.
10	**Outcome on platform**	Super-product as defined would have served all 7 segments — if it had shipped.	500K platform shipped to Sony first, expanded to all 7 segments over the next 7 years.

The structural pattern. The FTTM model is faster because the system surfaces gaps early, forces lateral integration across functions, and concentrates the team's attention on one customer rather than seven theoretical segments — not because the people on the team are smarter than anyone else.

Results and impact

05 A market created, a company transformed

Schedule performance

Engineering samples shipped to Sony approximately 12 months ahead of the system schedule Sony had built around them, enabling Sony to compress its own development cycle by a full year. Volume production began 24 months after program kickoff. The original LSI marketing super-product, had it been pursued, would have taken five-plus years by internal engineering estimate [4].

Financial impact

At the time of the Sony win, LSI Logic was a sub-$500M company. The Sony engagement roughly doubled the company in a single year [4]. The market reaction was decisive: LSI's stock price moved from $4 7/8 to $126 over the period bracketing the design win and ramp [1]. By the first quarter of 1995, LSI had recorded its tenth consecutive quarter of revenue growth and posted $45.3M in quarterly net income — twice the annual profit of any year before CoreWare [3, 18].

Market impact

The first PlayStation reached the Japanese market on December 3, 1994, one week after the Sega Saturn [5]. Initial Japanese shipments of 100,000 units sold out the day they reached stores [5]. Sony shipped its one-millionth PlayStation by May 1995. The North American launch on September 9, 1995 sold over 100,000 units in two days, with 17 launch titles available — against the Saturn's six [6, 23]. By November 1995, PlayStation was outselling Saturn in the United Kingdom three to one [5]. By the end of 1995, PlayStation held 20% of the American video game market [24].

Sega never recovered. Saturn sold 9.26M units worldwide before being discontinued, while Sega exited the console hardware business after the Dreamcast in 2001 [15]. The Nintendo 64, arriving in late 1996, chose cartridges over CD-ROM and ceded the cinematic-game ecosystem to PlayStation; Final Fantasy VII, originally planned for Nintendo, moved to PlayStation and became the title that brought RPGs to the mass market [13, 16]. The original PlayStation went on to ship 102M units lifetime — the first console ever to reach that threshold [5, 25].

~2×
LSI Logic doubled in a single year

$4.875 → $126
LSI stock price over the engagement window

102M
Lifetime PlayStation units shipped

20%
U.S. console market share by end of 1995

Section 05 (continued)

Platform leverage and lasting influence

Seven years of platform leverage

The 500K technology stack — the CoreWare integration model, the 0.5-micron process, the cell library, the design methodology, the packaging approach — served as the foundation for LSI's product line for the next seven years. Once Sony was in volume, the same platform was adapted to all seven of the vertical segments the original marketing super-product had tried to address in a single specification. The order had been inverted: focus first, expand second. The expansion succeeded because the first customer was already a market winner creating pull through the platform [1, 3].

Career outcomes for the core team

Every member of the 500K core team went on to a senior executive or CEO role in Silicon Valley. John Daane became CEO and Chairman of Altera in November 2000 and ran the company through its $16.7B acquisition by Intel in December 2015; he received the Robert N. Noyce Award from the Semiconductor Industry Association in 2014 [7, 26]. Brian Halla became Chairman, President, and CEO of National Semiconductor in May 1996 and ran it until 2009, joining the Cisco board of directors in 2007 [8, 9]. Joe Zelayeta rose to EVP of Worldwide Operations at LSI Logic and remained at LSI until 2006, including responsibility for the joint TSMC 0.13-micron process development [20, 21]. Jean-Louis Bories continued as a senior engineering leader at LSI and is today an active early-stage technology investor through the Band of Angels [10].

LSI Logic at the end of the decade

LSI Logic's revenue crossed $1B in 1995 — the same year as PlayStation's North American and European launches [3]. CoreWare became the company's flagship methodology, and the Sony engagement was the proof point that anchored every subsequent sales conversation. The 500K program transformed LSI from a gate-array vendor into a system-on-chip company and set the template the industry would follow for the next decade [1, 3, 18].

Outcome. A program initially specified as a five-year, seven-segment super-product shipped to a single driving customer in 24 months — and went on to serve all seven original segments anyway, with seven years of platform leverage and a transformed sponsor company.

The lateralworks role

06 Program architect and core-team coach

lateralworks served as the program's external planning and acceleration partner for the full two-year engagement, embedded as a member of the cross-functional core team. The role covered six functions.

Reframed the strategic question. Reset the program around a single driving customer (Sony) whose requirements covered ~80% of the general market need, replacing the seven-segment super-product specification that could not have shipped in time.

Structured the program. Programmed the initial macro plan end-to-end. Built the integrated master schedule covering hardware, software, fab process, CAD, libraries, packaging, and Sony system integration as a single dependency graph.

Stood up the first cross-functional core team in LSI history. Seven senior subject-matter experts, co-located, with a single Project Monarch. Each member spoke for and committed on behalf of their function.

Established the refresh-planning cadence. Macro plan refreshed weekly, with high-frequency micro-plan refresh across hardware and software workstreams. The schedule data itself became the integration point.

Ran Voice of Customer with Sony, weekly. Distinguished Sony's *wants* from the *hows* of solving them. Negotiated gaps back as explicit trade-offs instead of absorbing them as overruns. Sustained the dialogue for the full two years.

Coached the executive layer. Worked with Wilf Corrigan, Brian Halla, and the LSI executive team through the strategic choice of Sony over Cray, and through the structural shift from functional reporting to cross-functional core-team execution.

Special expertise. lateralworks works on programs that are hard to plan — where the requirements shift, the process is unproven, and the schedule has to surface trouble early so the team can act on it.

Key takeaways

07 The reusable pattern

The 500K program demonstrates a set of principles that apply directly to any complex, time-critical product development program — semiconductor, software, hardware, or integrated systems — where schedule compression, technical uncertainty, and a hostile internal sponsor converge.

Find the driving customer. Identify the one customer whose requirements cover ~80% of the general market need. Focus the entire program on that customer's success. Expand to other segments after launch. *"Focus on the market leader and the rats and dogs will follow."* — Pat Brockett, National Semiconductor [27].

Refuse the super-product trap. Combining requirements from many customers in a single specification feels safe and inclusive. It produces products that miss the market window for every segment they were meant to serve. Time-to-market beats feature-coverage.

Separate wants from hows. Customers tell you what they want. The supplier figures out how to deliver it. Teams that jump straight to the how miss the want, and the product fails on launch. Top-down wants first, bottom-up hows second, gaps negotiated explicitly.

Stand up one cross-functional core team. Senior subject-matter experts, co-located, single Project Monarch, 100% dedicated. No functional hierarchy inside the team. The program is the team's primary job, not an allocation against their day job.

Run the schedule as the operating system. The integrated master schedule is the organizational framework, the simulation engine, the early-warning system, and the interface-management tool — not a status report. Refresh it at the cadence the program demands.

Integrate laterally across hardware, software, tools, and process. Silicon, system software, design tools, cell libraries, fab process, and packaging belong on the same dependency graph. Sequential handoffs are how late chips ship.

Sustain Voice of Customer for the duration. A specification frozen at kickoff is obsolete by the third month of a two-year program. Run weekly VOC and renegotiate trade-offs as constraints clarify.

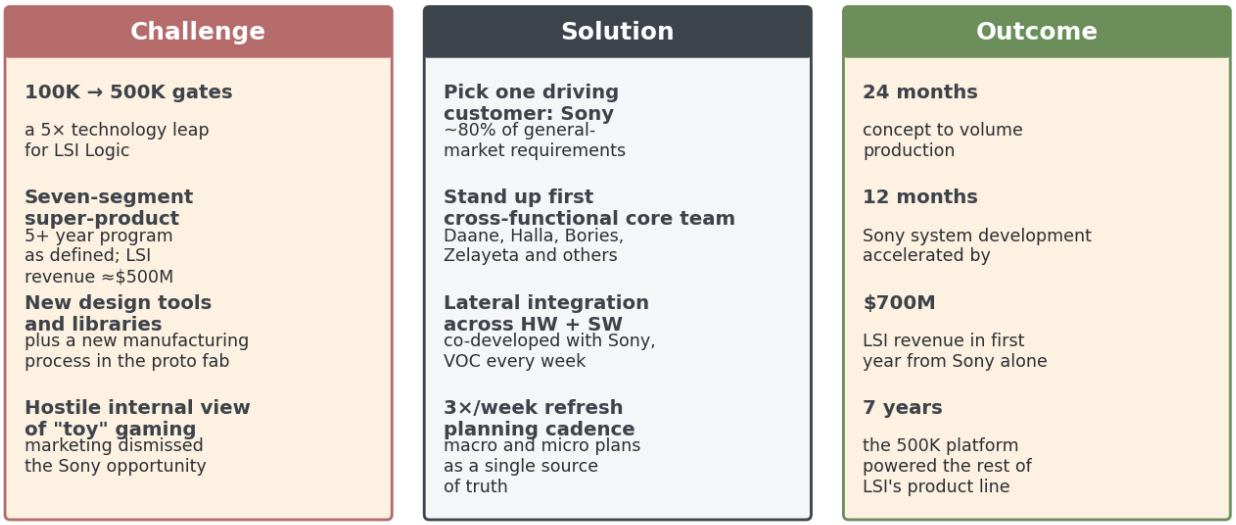
Expect the host organization to resist. A program that breaks the prevailing functional model will generate internal resistance proportional to its strategic importance. Plan for the escalation. Get the CEO's sponsorship in writing.

The pattern is reusable. A single driving customer, an empowered cross-functional core team, an integrated master schedule, and a high-frequency planning cadence consistently beat siloed execution on time-critical programs. The 500K work proved it against a 5× technology jump on a 24-month clock with a hostile internal sponsor.

Challenge, solution, and outcome

Program summary

Challenge, solution, and outcome



The FTTM principle: find a driving customer whose requirements cover ~80% of the general market, then expand.

Figure 6. Detailed program summary. The challenge column captures the four compounding problems the 500K program faced at kickoff: a 5× gate-count leap, a seven-segment super-product specification, new design tools and libraries, and a hostile internal sponsor. The solution column captures the FTTM intervention: a single driving customer, the first cross-functional core team in LSI history, lateral integration across hardware and software workstreams, and high-frequency refresh planning. The outcome column captures the results: 24 months to volume production, 12 months of acceleration for Sony's system development, LSI Logic roughly doubled in a single year, and a platform that powered LSI's product line for the next seven years.

Engagement summary

08 Project, scope, role, and outcomes

Project	LSI Logic 500K-gate ASIC (CW33300 / Sony CXD8530) for Sony Computer Entertainment's first PlayStation
Client	LSI Logic Corporation
End customer	Sony Computer Entertainment
Type	New product development — single-die system-on-chip ASIC
Duration	2 years (1993–1995)
Problem	Deliver an unprecedented 500,000-gate, single-die ASIC (MIPS R3000A core + GTE + MDEC + DMA + I/O on one die) to volume production in 24 months — a 5× leap in gate count on a new manufacturing process, new design tools, new cell library, and new packaging, against an LSI marketing organization initially advocating a five-year, seven-segment "super-product" specification.
Solution	Replace the super-product strategy with the FTTM driving-customer model: focus the entire program on Sony as the single driving customer (~80% of general market requirement coverage). Stand up the first cross-functional core team in LSI's history. Run high-frequency refresh planning across hardware, software, tools, libraries, and fab process. Maintain weekly Voice-of-Customer with Sony for the full two-year engagement.
lateralworks role	Programmed the initial macro plan end-to-end. Stood up the cross-functional core team. Established the high-frequency refresh-planning cadence across hardware and software. Coached the LSI executive layer through the Cray-vs-Sony strategic choice and through the structural shift to cross-functional execution. Ran Voice of Customer with Sony for two years. Trained the internal program management capability that LSI would carry into subsequent programs.
Outcomes	Engineering samples to Sony 12 months ahead of the original system schedule. Volume production in 24 months. PlayStation launched December 3, 1994. The Sony engagement roughly doubled LSI Logic in a single year. LSI stock $4 7/8 → $126 over the engagement window. The 500K platform served as the foundation for LSI's product line across seven years and hundreds of customer applications. Every core-team member went on to a senior Silicon Valley executive or CEO role.

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