

Thoughts on a Private Equity Playbook for Software Design Automation Companies

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Executive Summary:

Because of their core business characteristics, software design automation companies have the potential to offer an intriguing opportunity for a private equity investment, and become more valuable in a private setting as opposed to public capital markets. The key characteristics which drive this opportunity are:

1. These companies provide the core software infrastructure (“middleware”) for the design process. The markets themselves are actually relatively small (micro-markets of \$50-200M in size), and contain significant barriers to entry for competitors. In addition, the core business naturally operates at very high margins and produces significant cash flow.
2. In the public capital markets, revenue growth is valued, but the markets for software design automation tools are naturally low growth. Significant issues have been generated by the desire to unnaturally drive growth.
3. In the public capital markets, market size leadership serves as another key asset for stock multiples. However, when the “market” is ill-defined, this market leadership has little value, yet some decisions to more fully utilize assets have not become actionable because of a desire for market size leadership.

Because of the above reasons, it is the thesis of this report that at the right valuation point, the companies in the area of software design automation are good targets for private equity. This report will frame the general case for this model by looking very specifically at a company in the electronic design automation (EDA) marketplace, Cadence Design Systems (CDNS). Similar deeper analysis can be performed in other markets such as mechanical design as well as software design automation.

Introduction:

Design automation consists of providing the key pieces of infrastructure for design engineers to perform their tasks in an efficient manner. In the case of electronics, the Electronic Design Automation (EDA) industry (CDNS, SNPS, MENT..etc) provides the tools to design, build, manufacture semi-conductor chips, printed circuit boards, and whole systems. The key characteristics of the market are:

1. The customers for software design automation tools are design engineers, and this forms the first limitation for growth to design automation companies. The number of design engineers is a small population and the rate of growth of this population is limited.

2. The capability required for a whole design flow is quite varied between the various design disciplines (circuit design, logic design, architects, software, etc). Thus, the market consists of a collection of smaller *micro-markets*...typically \$50-\$150M/year. The customer buying behavior is much more focused at the micro market level because that is the problem which the customer is trying to solve.
3. The development, design-in, proliferation, and end-of-life cycle is very long (15-20 years). For successful products, typically rollout is:
 - Year 1-2: R&D development
 - Year 3: ramp the field Application Engineering force, and get 3-4 customers to be successful.. \$2-3M revenue
 - Year 4: start ramping sales force... get up to \$10-12M in revenue
 - Year 5: reach margin neutrality.. \$20-30M
 - Year 5-12: Cash Cow stage...excellent margins..
 - Year 13-15: time for rearchitecture..otherwise you are vulnerable to competitors
4. The barriers to displace are very high. Once a product has gained significant marketshare, it is almost impossible to displace it, because the switching costs are much higher than the incremental licensing costs.

Public Market Dynamics:

Founded in 1988, Cadence Design Systems grew rapidly through M&A activity to become the leader in the EDA marketplace by 2000. Cadence design systems splits its capability into six broad segments:

1. Analog/Custom (Virtuoso) (environment and simulation)
2. Digital Place and Route (Encounter)
3. Systems and Functional Verification (Incisive, Palladium)
4. Printed Circuit Board (Allegro, Orcad)
5. Signoff and Manufacturing (Dracula, PVS..etc)
6. System Level Design

Beneath these segments are further micro-markets (example: RF simulation within the Custom environment) which form the critical customer decision-making point. In these categories, Cadence owns strong marketshare positions in:

1. Mixed-Signal IP creation (market leader)
2. Mixed-Signal IP integration (market leader)
3. Mixed-Signal IP verification
4. Digital IP verification
5. SoC verification and system validation
6. Physical Floorplanning of SoCs
7. Physical Routing and Extraction
8. SIP and IC Packaging
9. Printed-Circuit Board creation/integration

During the period up to 2000 the stock split three times, and the company reached a revenue level above \$1Billion dollars and a stock price of (\$30). However, since 2000, from an external investor point-of-view, the company has seen

- 1) A large degree of volatility on top-line revenue despite the introduction of a significantly subscription based revenue recognition model.
- 2) Averaged over multiple years, the top-line product revenue has stagnated a little north of \$1Billion/year. Product and Maintenance Revenue in 2000 was \$943M vs \$904M for 2008.
- 3) Over \$1Billion dollars spent on M&A, but largely in the core design automation space.
- 4) Two major shifts in revenue recognition models for the software products (2001,2008).

Overall, the following processes generated the above behavior:

1. The core software platforms generated a very high margin business, but with very limited growth. In order to drive growth, the organization:
 - a. Pursued sales compensation and processes which rewarded bringing in revenue without regard for down-stream revenue holes. This had consequences on cost-of-sales, pricing/discounting, and revenue volatility.
 - b. Pursued R&D projects in areas where competitor's brands were very strong (ex DFM).
 - c. M&A was often used for filling revenue holes
2. The market size of the company as the leader of the self-defined EDA market prevented some inventive joint-venture or partnership capabilities with adjacent markets.

All of the above was done in the context of some very capable CEOs, but the box painted in the public markets was very tight.

Private Equity Play:

Given these public market characteristics, the key question is what actions one would take in the business in a private market setting to appropriately optimize the business? There are three aspects to this decision:

1. Optimizing the core business
2. Timing of a transition from public to private markets
3. Broader Strategic Plays

Optimizing the Core business:

With a shift from public to private markets, the operational focus of the organization would shift from a focus on market size and revenue growth towards cash-flow optimization. Specific changes enabled by this change in focus are:

- 1) Restructure sales compensation away from "rainmakers," who accelerate renewal of contracts towards a focus on customer support and "in-time" renewal of contracts. Given the considerable barriers of entry for competitors, closure of renewal contracts (over 90% of the business) does not require extraordinary sales behavior. This shift in focus would

lower the cost of sales considerably. Overall, in steady state basis, the growth of revenue should track the overall growth of R&D spending in customer.. in the range of 3-4%.

- 2) Gracefully exit markets which are lost causes due to competitor design-in. For Cadence, these markets include:
 - a. Logic Synthesis
 - b. Signoff Digital Static Timing Analysis
 - c. Signoff Physical Verification
 - d. Manufacturing test and diagnostics

Note, the exit does not necessarily mean EOL of these products, but look for strategic business relationships which leverage these assets in such a manner as to gain either strategic advantage for Cadence or IP revenue. Examples include:

- a. Use open-source techniques (aka IBM/Linux) to arm a broad set of semi-conductor partners to add their value and thus flatten the marketplace.
 - b. Sell IP assets to interested parties where possible.
- 3) Further leverage successful, but non-strategic assets in partner markets. For Cadence this would include:
 - a. Leveraging PCB organization with Mcad companies. Several models such as JV or linked IP sale are possible. Example IP transaction:
 - i. Mcad company obtains PCB group and has the ability to integrate with PLM and exclusive access to systems customers.
 - ii. Cadence retains distribution rights for semi-conductor customers and limited R&D resources for maintaining the business for semi-conductor companies.
 - b. Leveraging CVA organization with tester companies. Example transaction:
 - i. CDN/Tester company build JV for the R&D organization, and build design/prototype/tester product for the manufacturing marketplace. This creates value and there are many revenue and expense synergies.
 - ii. CDN retains the rights to sell product into semi-conductor design
 - iii. Tester company gets rights to sell products into manufacturing

Overall, with a combination of these actions the company would be of smaller size, the volatility around revenue can be greatly reduced, and the cash flow from operations would be optimized. Today, without these measures, Cadence is publicly stating that 25% operating margin is sustainable..with these actions, 35% operating margins should be sustainable. An objection to this model has been the desire to become a “full-service supplier” and an argument that will lead to unfair share gain. However, as we have stated, for the customer, the cost of the R&D and product outweigh any costs in EDA licensing, so low-marketshare products cannot be typically defended.

Timing of the Transaction:

While one can make an argument that in a vacuum a company such as Cadence can be run more efficiently in a private setting as opposed to the public markets, the transition process is certainly not straightforward. All the questions center around valuation, timing, and openness of BOD to transaction. On valuation, if one believes that at least 30% operating margin on a base of approx \$1B is reasonable, in normal financial conditions, a 8X multiple would lead to a maximum valuation around: \$2.4 Billion (Stock price of \$9). As of June 1st, Cadence's market capitalization was \$1.5B(\$6 stock price), so with 30% premium, \$1.95Billion (7.8 stock price).

It would seem that a transaction would be possible at this point. However, if one uses the 52-week trailing price as the BOD physiology for valuation, the 52-week high was \$11.72, and two large corrections occurred in the meantime beyond the overall deflation in the stock market. The first correction occurred in Aug08 with a restatement of forward looking forecast, and the second correction occurred in Nov08 with the termination of the management team. The BOD likely feel they have addressed the issues behind the broad corrections, and the open question is what is the intrinsic price. If the public market price goes above \$7, the transaction will be very difficult to execute.

Broader Strategic Plays:

After a transition to a private model, what are the other broader strategic plays possible?

1. Do Nothing: After servicing initial debt, the core company is very valuable as simply a cash generation machine.
2. Sector Consolidation: The same processes which worked for Cadence can be applied to other major suppliers in the industry. In addition, the combination can create very high cost synergies around sales distribution. A prime target would be the merger with Mentor Graphics.
3. Expansion: Today, the entire EDA sector focuses on the R&D function. However, if the capability can be linked to the broader enterprise, the valuation multiples can be shifted as well. An example of this thinking would be the merger of Rational with IBM where IBM was able to use the Rational "middleware" as a great leverage for a broader services business. The key to such a shift would be aggressively pushing the software in the joint venture methods mentioned with strategic partners.

Conclusions:

In conclusion, using Cadence Design Systems as an example, one can make a strong case for a move to the private markets for a more efficient utilization of assets and capital. In addition, this move may well enable further sector consolidation as well as linkages to larger more valuable

capabilities for the end-customer. However, to make this process actionable, the timing and valuation have to match.

Appendix:

	1999	2000	2001	2002	2003
Revenue					
Product:	\$ 505,400.00	\$ 627,400.00	\$ 835,500.00	\$ 806,786.00	\$ 663,513.00
Services:	\$ 294,900.00	\$ 336,000.00	\$ 263,300.00	\$ 149,810.00	\$ 131,149.00
Maintenance	\$ 293,000.00	\$ 316,200.00	\$ 336,600.00	\$ 331,347.00	\$ 324,822.00
Total R	\$ 1,093,300.00	\$ 1,279,600.00	\$ 1,435,400.00	\$ 1,287,943.00	\$ 1,119,484.00
P+M: 5 year					\$ 687,719.80
Costs and Revenue					
Cost of Product				\$ 98,291.00	\$ 67,036.00
Cost of Services				\$ 114,688.00	\$ 93,153.00
Cost of Maintenance				\$ 65,089.00	\$ 56,460.00
M&S				\$ 402,148.00	\$ 326,579.00
R&D				\$ 326,414.00	\$ 340,121.00
G&A				\$ 115,767.00	\$ 87,589.00
				\$ 1,122,397.00	\$ 970,938.00

	2004	2005	2006	2007	2008
Revenue					
Product:	\$ 729,783.00	\$ 851,496.00	\$ 982,673.00	\$ 1,103,970.00	\$ 516,603.00
Services:	\$ 137,046.00	\$ 126,129.00	\$ 134,895.00	\$ 125,838.00	\$ 133,498.00
Maintenance:	\$ 330,651.00	\$ 351,527.00	\$ 366,327.00	\$ 385,205.00	\$ 388,513.00
Total	\$ 1,197,480.00	\$ 1,329,190.00	\$ 1,483,890.00	\$ 1,615,010.00	\$ 1,038,610.00
P+M: 5 year average	\$ 732,596.40	\$ 777,415.60	\$ 806,850.20	\$ 866,287.00	\$ 836,905.00
Costs and Revenue					
Cost of Product	\$ 82,011.00	\$ 79,649.00	\$ 66,769.00	\$ 60,069.00	\$ 50,303.00
Cost of Services	\$ 90,993.00	\$ 90,335.00	\$ 96,497.00	\$ 93,360.00	\$ 103,337.00
Cost of Maintenance	\$ 53,049.00	\$ 58,769.00	\$ 63,833.00	\$ 61,079.00	\$ 55,840.00
M&S	\$ 325,937.00	\$ 356,000.00	\$ 405,579.00	\$ 407,148.00	\$ 358,409.00
R&D	\$ 351,254.00	\$ 370,100.00	\$ 460,064.00	\$ 494,032.00	\$ 457,913.00
G&A	\$ 85,413.00	\$ 117,600.00	\$ 143,317.00	\$ 168,997.00	\$ 152,032.00
	\$ 988,657.00	\$ 1,072,453.00	\$ 1,236,059.00	\$ 1,284,685.00	\$ 1,177,834.00