

# Risks of Internally Developed Diagnostics



## White Paper

**“I have bought a wonderful machine — a computer. Now I am rather an authority on gods, so I identified the machine — it seems to me to be an Old Testament god with a lot of rules and no mercy.”**

Mythologist Joseph Campbell with Bill Moyers  
The Power of Myth  
1988

### Overview

Any user who has stumbled into the odd error message or struggled to comprehend why a function just won't work can sympathize with Joseph Campbell and his encounter with a personal computer. Certainly, at times, it seems that the stars or gods are aligned against the user.

The truth, however, is that computers are complex devices — combinations of microprocessors, memory chips, power supplies, audio chips, video chips, operating software, applications software and other bits of technology. When PCs work, they are electronic marvels. When they do not, they are sources of great frustration for any user.

For years, PC designers and manufacturers have invested in diagnostics to help certify that a PC will work as advertised, as well as to speed service and support if something malfunctions. Both on the manufacturing floor and in the service aftermarket, diagnostics can identify bad components, badly behaving software, and other malfunctions.

The reasons are both altruistic and economic: Not only do manufacturers gain in reputation (and potential sales) when higher quality improves customer satisfaction, but they improve their bottom lines in four significant ways:

1. Manufacturing quality improvement through better component selection
2. Warranty cost savings through reduced unnecessary returns
3. Time savings during technical support sessions
4. Service cost savings through reduced service calls.

Through the early days of the PC industry in the 1980s, manufacturers typically developed PC diagnostics internally as a cost of doing business.

With the shrinking margins and growing complexity of the 1990s, many leading manufacturers abandoned internally developed diagnostics in favor of third-party products from PC-Doctor and others. The rationale was simple: given that most parts in an industry-standard PC are common across all PCs, it made little sense for multiple companies to duplicate investments of time and resources on the development of internally developed diagnostics.

Today, most leading companies have opted to use third-party diagnostics from PC-Doctor and others to test some, if not all, of their product lines — using special developer kits to create diagnostics specifically for unique components and subsystems that add value.

Some companies, however, cling to internally developed diagnostics despite the advancing standardization of PC components and software. While acknowledging the necessity of diagnostics, this paper illuminates the key risks associated with internally developed diagnostics.

### Understanding the Risks of Internal Development

In the early history of PCs, manufacturers focused on reaping the many economic and reputation-building benefits of rigorous diagnostics had little choice but to invest in internal development of diagnostic software. As the industry matured in the 1990s, however, increasing standardization of PC components led to entrepreneurial third-party solutions such as those developed by PC-Doctor.

Today, 75 percent of all PC manufacturers — of servers, desktops, and notebooks running Windows and Linux — rely on third-party diagnostics to assure a quality PC experience to their customers and to gain an economic advantage by reducing warranty costs. The remaining companies who adhere to internal development face several risks.

#### Economic Redundancy

In a world where the lion's share of PC architecture adheres to standards, internally developed diagnostics are more expensive than third-party solutions. The former bears the entire cost of development while the latter spreads development costs across many manufacturers

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The result: PC manufacturers with internal development programs have less flexibility in a highly competitive, low-margin business.

Additionally, the shared development cost of a third-party model permits greater investment in usability enhancements that make the diagnostic software more appealing to less-technical users. This provides higher overall return than is possible with internally developed products.

### **Incorporating Departmental Custom Diagnostics**

Different groups with very distinct requirements typically deploy diagnostic software. For example, a command line or remote interface suitable on the manufacturing floor may be inadequate for service technicians, who are best served by a complex but powerful user interface. Neither interface may be suited to end-users who need a simple, easy-to-use front end.

Despite these differences in interface requirements, the underlying diagnostics must remain consistent, so that malfunctions can be identified and eliminated across the PC lifecycle. This is difficult to achieve with internal programs where, typically, each department develops its own diagnostics with little or no collaboration with others. By contrast, well-established third-party providers such as PC-Doctor have fewer obstacles to collaborative development — indeed, such collaboration becomes a strategic competitive advantage.

### **Incorporating Vendor-Supplied Diagnostics**

PC manufacturers use components supplied by many different companies. Many component vendors use internally developed diagnostic software, and such diagnostics are often very good at detecting failures of components from that vendor. However, component vendors may lack the vision and understanding of OEM support challenges and end-user usability. It can be very lucrative and beneficial for a component vendor to include its diagnostics in well-established diagnostic software that is used by many PC manufacturers which address the support and usability requirements unique to that OEM. Software development kits, such as those provided by PC-Doctor, make it easy to integrate vendor-specific diagnostics into a product customized for the OEM with usability unique to that OEM's users.

### **Vendor Certification**

The best diagnostic software packages are tested by as many parties as possible. However, testing of multiple internal diagnostics by multiple vendors is economically impractical. A third-party provider, on the other hand, has the advantage of creating diagnostics for multiple manufacturers, thus creating an economic advantage. For example, PC-Doctor has a program to bring together all the parties to the diagnostic testing process: PC manufacturers, component vendors, and the diagnostic software vendor.

### **Core Competency**

A PC manufacturer needs to determine if it is a hardware or a software company. If software development is an auxiliary function only, further funding of software development may not be the best investment of company capital.

### **Quality Assurance**

A diagnostic software product tested on the hardware of a dozen PC manufacturers is inherently more reliable than software tested on the hardware of a single PC manufacturer. Outsourced diagnostic software providers such as PC-Doctor, with a well-developed quality assurance lab, can quickly cross-reference error conditions to determine if a problem is a malfunction in the diagnostic software or a genuine hardware defect.

### **Conclusion**

While internally developed diagnostics are specific to the OEM, they have not shown to provide the appropriate acceptance and return on investment to make that a logical, cost-effective option for the majority of OEMs. Investigating third-party diagnostic options such as PC-Doctor should be part of strategic planning and investigation for all OEMs.



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