Gartner Research

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# How the Waterfall Methodology Adapted and Whistled Past the Graveyard

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Reports of the "death" of the waterfall approach to application development projects have been greatly exaggerated. Instead, traditional, structured methodology has adapted to overcome its shortcomings and continues to attract adherents.

## Key Findings

- Multiple surveys show that the waterfall approach continues to be used on a majority of application development projects.
- A range of issues have limited adoption of agile approaches, from its difficulty scaling, to its applicability mainly to open-ended projects, to cultural challenges to usage.

## Recommendations

- Don't plan on agile phasing out more-traditional approaches to system delivery.
- Adapt your waterfall approach to address shortcomings, and adopt beneficial techniques of other approaches.

## STRATEGIC PLANNING ASSUMPTION

Through 2014, an adapted waterfall methodology will continue to be used on most information system projects.

## ANALYSIS

A recent Gartner client inquiry reflects a steady stream of related inquiries received in recent years. The client asked, "I've been hearing a lot about the growing use of various agile methods for system development, with some of our developers saying, 'Waterfall is dead.' Will agile project management overtake waterfall as the No. 1 method by 2014?"

This reminds one of how a journalist investigating the rumored death of the humorist Mark Twain found him alive and well at home. The journalist reported Twain's famous quip, "The reports of my death are greatly exaggerated."

This is how it is with rumors of the demise of the traditional, waterfall approach to information system projects. Gartner benchmark analytics data (see Note 1) and surveys at our recent Gartner Symposium agree: Traditional, structured methods are still used on a majority of development projects, and far more than any other approach.

# The Waterfall Approach's Resilience

One reason for the dominance of the waterfall approach is simple inertia. It has been used on so many projects during the past few decades and is familiar to most system developers. Another reason for the waterfall approach's dominance is the logic of its structure. Projects proceed logically from feasibility through requirements analysis, a design phase, an implement-and-test (often involving programming) phase, through acceptance and after delivery into the maintenance phase of the life cycle. This sequential model is simple, and the sequence of steps is easy to grasp.

However, attempts to fully complete all the work at each phase before proceeding — and not revise or refine work from previous phases — have often delayed and undermined waterfall projects, leading to some very large project failures, and predictions of the methodology's demise. But something strange seems to have happened on the way to the graveyard: Pragmatic practitioners have adapted the waterfall approach to address its shortcomings, extending its dominance for the near future, particularly as agile has proven to need more, not less, discipline and sophistication to succeed, particularly on midsize to large projects.

# Outsourcing and Packages

The waterfall model dovetails with two other major trends in IT overall: more outsourced development and more use of packaged applications. For packaged applications, the need for agile requirements exploration via rapid iterations is obviated by the preference for a package. Outsourcing a project only affects the waterfall model slightly by adding an initial step for cost estimation and contract negotiation and a final step of system acceptance and payment. With that adaptation, the waterfall approach is more suitable for projects (for example, fixed-bid contracts) in which a substantial majority of requirements must be defined early.

For outsourcers, once the requirements have been discovered and documented, the development team theoretically can work on its own until the system has been built — although practitioners have adapted it with enhanced add/change procedures for scope and requirements additions and changes. The use of traditional, structured waterfall methods on outsourced

contract projects with fixed bids has driven contractors to rigid resistance to changes in scope or requirements. Disputes over this have created the impression that waterfall projects are inherently inflexible — and indeed, internal projects can stumble into the same syndrome, when project managers are held strictly accountable to fixed-delivery dates, but some requirements were loosely or not defined.

More often, though, practitioners have learned to recognize that internal requirements processes are not fully mature, which has led management to support effective scope change management processes and allowed for rebaselining of projects. In such practical settings, the waterfall approach has generally been "good enough" to deliver many successful projects.

## Not Niagara — Smaller Waterfalls

IT management has also shed the misconception that waterfall methods are mainly for large projects, narrowing scope to avoid "analysis paralysis," and pushing some scope into subsequent versions and the enhancement phase. In this way, waterfall methods are, in effect, made somewhat more iterative — although with a more complete design phase, so that iterations may proceed concurrently with a guiding architecture.

## Adapting by Adopting Good Practices

Because "test" is a discrete phase in the waterfall approach, another common misperception is that the waterfall approach addresses software quality only toward the end. Unfortunately, this misperception is sometimes self-fulfilling, so that development teams do not adopt accepted quality management practices, such as inspections and peer review throughout the life cycle. Certainly, late-phase testing does, and should, occur — but most waterfall practitioners today recognize quality management practices as an important part of any effective development effort. Although many organizations had neglected them, many have adapted their waterfall-style projects to restore such practices.

Waterfall projects have also benefited from some measures that have boosted the other development styles' efficiency. Colocation of small teams on internal projects can boost productivity because it enables better communication and problem solving among developers, and quicker resolution of questions to business users through having them dedicated to the project. Although not a traditional tenet of waterfall development, colocation is often the case by default. When distributed development is assumed, project managers have challenged and pushed for greater colocation, but short of that, added collaborative measures and more attention to frequent communication via multiple channels can help. Regularly scheduled sessions with designated user "product managers" who are also "on call" can help.

### RECOMMENDED READING

"Waterfalls, Products and Projects: A Primer to Software Development"

### Note 1
### Gartner Benchmark Analytics

Seventy-five percent of respondents to a Gartner survey of key application practices report that they perform a waterfall-style prelaunch approval of time, budget and risk assumptions (see "IT Key Metrics Data 2009: Key Applications Measures: Development Practices: Current Year").

Since 2002, an average of 62% of respondents state that the waterfall approach is their most common development methodology (see "IT Key Metrics Data 2009: Key Applications Measures: Development Practices: Multi Year").

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