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# CODE REVIEWS

## Process & High Level Guidelines

This document provides a high level review of OSR's code reviewing process, gleaned from dozens of code reviews completed for clients.

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## OSR CODE REVIEW SERVICES

A standard and popular service that OSR has provided over the years, is a review of kernel mode code (typically kernel drivers) provided by our clients. The purpose of this review may be to “tighten up” code prior to an important “beta” cycle with customers. It may be code that has been developed by a 3<sup>rd</sup> party, for which our client is seeking an expert opinion as to quality, stability, adherence to standard programming practices, etc. Or perhaps the client is debating a product redesign as a means to resolve undetermined stability issues in the field. All these, and others no doubt, are excellent reason to bring on a team of experts to evaluate the state of the codebase.

### What’s A Code Review?

When a client engages OSR to perform a “code review” they ask “what will I be getting?” Unfortunately, the end product isn’t necessarily easy to quantify at the beginning of the process since we don’t know what we will find while engaging in the review.

Thus, rather than explain precisely what will be delivered, we will describe what we do and how we do it with respect to a code review.

### Initial Review

First, when we say “code review” this encompasses multiple possible activities, depending upon what is provided to OSR by our client. For example, if all that is delivered is strictly code, one of the first things that we will do (usually during our initial pass over the code) is attempt to describe the overall function of the code – in essence, to develop a de facto design and architectural reference. This then allows us to review this basic design and architecture since one of our goals is to identify potential issues or flaws within the code, which certainly includes design level flaws.

If, on the other hand, the client delivers design documents, our first review will be over the design itself to ensure that we are comfortable with the scope of the design itself. Alternatively, if design documents aren’t available, an engineer that is knowledgeable in the code’s design and architecture can travel to OSR to meet with the reviewers. In either of these cases, OSR’s first pass through the code will be to ascertain how closely the code adheres to the design (as either written or described) and to extract a unified design from the whole, again with an eye towards identifying potential areas for concern.

When clients are in a position to offer detailed information about code history and any problems that are known to exhibit themselves in the code, this can help retain maximum benefit from the engagement. For example, was the code developed in-house or by 3<sup>rd</sup> party. Are crashes or hangs experienced in certain situations? Is the code already shipping or still in some stage of development? It’s not always possible to collect/provide this information, but this truly is a case of, “the more we get, the better you are served”.

### Detailed Analysis

The second pass through the code is typically a more detailed analysis, where we begin to focus on the specific of the implementation and attempt to identify issues within the implementation. For example, a failure to handle cases of which we are aware will be highlighted during this phase. The result from

this process then is usually a list of specific details. If necessary, a third pass through the code will be made again using this list of issues to identify other places where these issues might also appear.

## The Report

Our work at this point normally turns to writing up our results. Based upon the information we have compiled at this point we try to extract general comments and issues to highlight first. Thus, we want to identify those issues that are endemic or systematic within the code base. For example, we might note a lack of appropriate error checking as a general concern throughout a code base, citing specific examples, without citing every single case. To the extent possible, we would also describe or demonstrate the appropriate implementation technique as a reference. Finally, we will summarize our findings, typically in a module-by-module fashion (although there have been times when we have done this analysis on an operation-by-operation basis because it made more sense). Thus, the final report will identify both general issues as well as specific issues that we have identified.

In addition, we should note that a code review does *not* attempt to comment on the stylistics of the code. While we might abhor use of the *goto* statement, our code review would not normally comment on its use unless it was being inappropriately used. Similarly, the scoping and declaration of variables, naming conventions, coding styles, or other issues that are not germane to the function of the code are not normally addressed within the scope of our code review.

Our final work product is thus a written report. The size of this report is typically inversely proportional with the overall quality of the code base – that is, if the code base is very high quality the report is short and succinct. If the code base has some issues the report will be longer, and if the code base is truly deficient the report can be lengthy. This report can be reviewed and discussed via phone conference, email or in-person visit. On request, a sample of such a report (client and product names removed) can be provided to prospective clients.

Further questions on OSR's code review service can be directed to OSR's sales department via email ([sales@osr.com](mailto:sales@osr.com)) or phone, +1.603.595.6500.