

CS 578 – Software Architectures
Spring 2012
Homework Assignment #1
Due: Wednesday, February 15, 2012
– see course websites for submission details –

The Call Center Customer Care (C4) Case Study provided as an appendix to this assignment presents an initial high level (“Level 1”) architectural breakdown for the system used by a large telecommunications company. This system comprises several subsystems, one of which is C4 itself.

1. The lectures and readings have begun discussing the architectural design process, including the selection of architectural styles. Not all styles are applicable to all systems and any choice of style will involve making trades on various system attributes. Pick any two styles that you have read about and design two different architectures for the C4 system, one that adheres to each style. In order to apply a style, you will need to create a detailed architectural breakdown (a “Level 2” architectural breakdown) for C4. In other words, “expand” the C4 box shown in the figure present on page 1 in the Case Study into an architecture. It is, of course, difficult to decide on the exact degree of detail to be provided in a “Level 2” architecture, such as the one required for this assignment. Make sure to show all the connectors inside the C4 architecture as well as those which interconnect the C4 to the other parts of the system. Moreover, you should graphically distinguish different types of the connectors used in your design. Also, there is no such thing as the “correct” or “optimal” architecture. However, as a granularity guideline, your decomposition of C4 should consist of no less than 10 distinct components.¹ You are not required to select a style from the course text book, but you must let us know what style you are attempting to apply and provide a reference if the style is not one from the course text. **Submit one diagram for each architecture you design.**
2. Give a brief rationale for your architecture: why did you select the styles that you did? Weigh the pros and cons of each architectural style. We will not grade you based on how accurately you apply each style so much as your rationale for selecting a particular style and understanding its limitations. **Please limit your answer to 2 paragraphs.**
3. Compare each of your architectures: give one example of a system property/requirement described in the Case Study that is addressed in a superior manner by one of your architectures. Be sure to not only name the property/requirement, but explain how each architecture addresses the property/requirement and give rationale for why you think one system is superior to the other. **Please limit your answer to 2 paragraphs.**

¹ This is only a guideline. There is nothing magical about this number, nor do we have a specific solution in mind.

4. Since C4 is a very large system with many different, possibly conflicting, requirements, your architecture may only directly address a subset. To demonstrate this, for one of your architectures, select two of the key architectural challenges and requirements (listed in bulleted items on page 4 of the Case Study) and argue/discuss how your architecture DOES NOT support them in an acceptable fashion. **Please limit your answer to 1 paragraph.**
5. Modify one of your architectures to address the shortcomings discussed in Q4. Can you do so without violating the chosen architectural style? Give the rationale as to whether you think this change is appropriate to make for the system. **Please limit your answer to 1 paragraphs and a new diagram.**
6. Assume that a new feature needs to be added to the C4 architecture and you are not allowed to shutdown and restart the system for any reason. Do any of the styles used in your architectures support run-time software updates? How? Can you modify one of your architectures to allow run-time software updates? **Please limit your answer to 2 paragraphs and a new diagram.**