

# CS5/7319- Software Architecture and Design

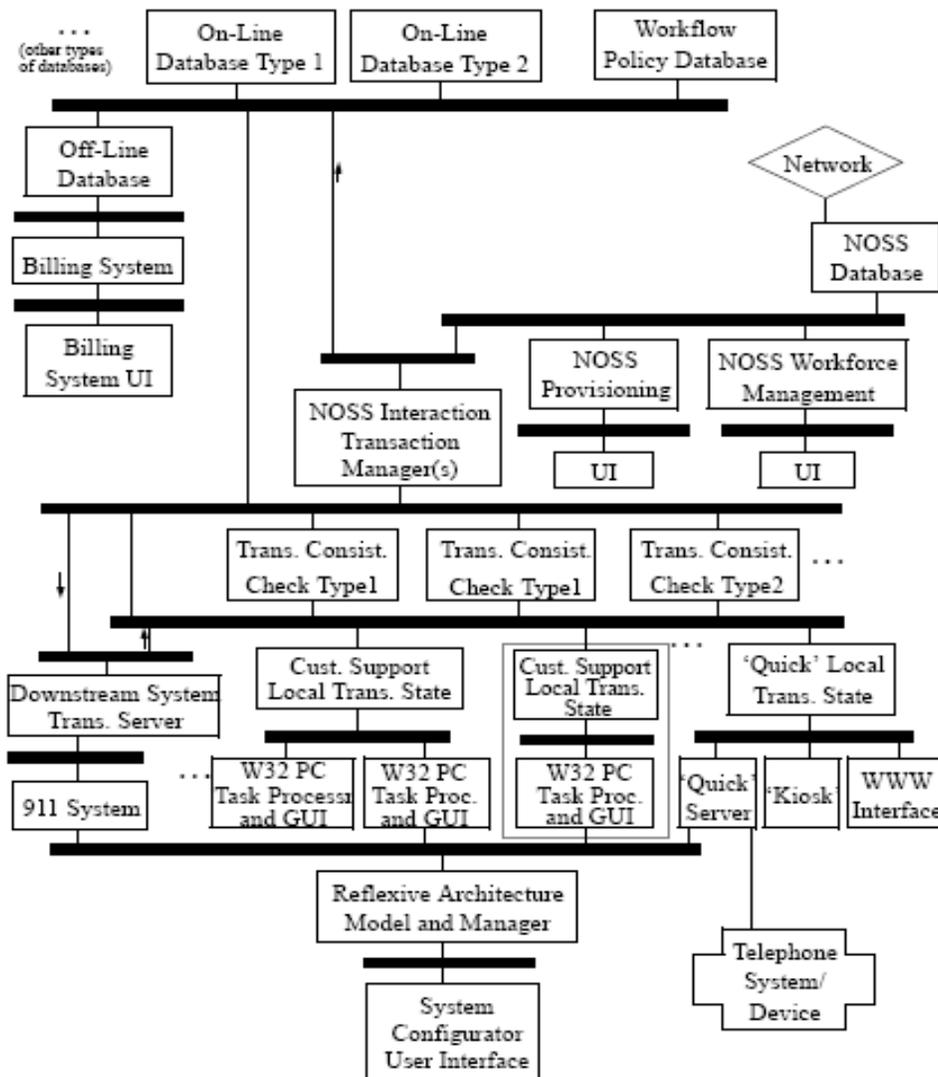
## Homework #2

### (9 Points)

*On Campus Due: 11:59pm on March 2, 2024*

*Off Campus Due: 11:59pm on March 3, 2024*

- The **Call Center Customer Care (C4) Case Study** provided as the supplementary reading for this assignment presents an initial (“Level 1”) architectural breakdown for the system used by a large telecommunications company. This system comprises five major subsystems, as described in the reading. The Level 1 architecture is shown as Fig. 1 in the reading. A Level 2 architecture is included below. In particular, the Level 2 architecture has been criticized as not being able to fulfill all of C4’s requirements. One possible reason for this is that the architectural style used was not well suited for this particular problem. Another is that the architecture focuses on the system’s conceptual structure alone and does not consider its required deployment profile.



Level 2 Architecture

**Your assignment consists of the following steps:**

- 1) Roughly identify the C4 subsystems in the Level 2 diagram on the right. You can do this by annotating the diagram (e.g., by drawing ovals around each subsystem). If a particular subsystem is dispersed across multiple portions of the architecture, you may note that and simply list the components in that subsystem. (1 point)
- 2) The C4 reading describes the requirements and key architectural challenges of C4 system. As a summary of the major requirements and key architectural challenges, C4 must support:
  - multiple concurrent tasks
  - large database (15 million customers) large number of simultaneous transactions (at least 100)
  - resource locking
  - interrupted and long-lasting tasks
  - resolution of conflicting events initiated by multiple authors
  - customer data integrity
  - near-continuous availability
  - addition, removal, and replacement of services
  - monitoring and elimination of processing bottlenecks
  - near-real-time response

Identify two of the above C4 system requirements and/or challenges that the proposed Level 2 architecture may not be well suited to support. Discuss why this is the case. Suggest possible alternatives the architects should have considered. (2 points)

- 3) Identify one of the above C4 requirements that the Level 2 architecture is well suited to support. Discuss why this is the case. (1 point)
- 4) Modify the Level 2 architecture in a manner that satisfies the two requirements identified in step 2). You can add components or merge them together whenever necessary (i.e., your refinement may have more or fewer components than the depicted Level 2 architecture). You should use the techniques discussed in class to arrive at your desired decomposition of C4: “steal” from the example architectures you saw in class; apply methods with which you are familiar and comfortable (e.g., structural design, modularity, separation of concerns, isolation of change, OO, etc.); finally, use your intuition. Discuss how your architecture is better equipped to deal with the requirements you identified in step 2) than the provided Level 2 architecture shown in the diagram above. (4 points)
- 5) Map the different portions of your architecture from step 4) to the required deployment profile shown as Fig.2 in C4 reading: specify which components go on the front-end PCs, middle-tier HP9000s, and the back-end subsystems, respectively. (1 point)

**Please turn in a PDF file named “First name-Last name-hw2.pdf”.**