Exjobb opposition report

Reviewer name: Charlie Westergren
Date of review: 28 Nov. 2006

Title: Network gaming: performance and traffic modeling
(Version: DRAFT, 11 Nov. 2006)

Author: Mattias Åkervik

Section I. Evaluation

Category:	
Relevance of content:	*3*
Disposition:	*3*
Evaluation of published results:	*3*
Abstract:	*4*
Conclusion:	*4*
Presentation of related work:	*3*
Language:	*4*

Generally a nice report which could have been made shorter by excluding some parts taking focus from the thesis core topic. The disposition was clear, but at times it was hard to distinguish what category was explained, if it was method, background, results or analysis. The language was good with some minor spelling errors and grammatical errors which made some sentences tricky to get through. Nice figures throughout the report. The references seem recent and relevant. In general, the thesis has a good layout, which makes it easy to read.

Section II. Recommendations

- In the very first section, you say that the genre of game has been "carefully chosen", but you don't give any explanation to why it was chosen? I assume that it was because it is the most demanding genre?
- In chapter two, instead of listing all game genres, it would have been sufficient to only list the game categories that are actually mentioned in the thesis. Might have felt more relevant if it was describing what type of information needed to be communicated by each category.
- It is unclear where the definitions of the different types of "gamers" are taken from. Not sure that the information in this chapter is of as big relevance to give it a chapter of its own. Could have been merged with chapter two into a "Background information" part where some section of low relevance to the thesis topic could be removed.
- Section 4.2 is another place where it would be of interest to know where these numbers are originating from. Is it something that you have researched for this thesis, or who has come up with them? And why is there a difference between the acceptable RTT requirement in table 2 for FPS games and in section 4.2.1?
- As this kind of reports generally are printed in gray-scaled copies. Make sure that the colours in figures and diagrams generate easily distinguishable gray-scales or markers, if not possible for one type of diagram, consider using another type of diagram or divide the diagram into two separate diagrams. E.g. fig. 1, 36 & 37.
- Try to use a different size or typeface of the explanation to the figures and tables. Making the type bold makes it look more like head lines.

- The disposition would have been easier to follow with a clearer background -> method -> analysis subdivision. From times to times it feels like you're mixing sections with background and theory with sections of analysis and method.
- Section four feels very long and covering a wide range of areas, would it be possible to divide this chapter into more chapters?
- Make sure that all figures and tables are referenced in the text, it should not be up to the reader to figure out what a table or figure is representing and what its relevance is to the text (e.g. figures 35 and 36).
- It might be of interest to number the figures and tables internally in each chapter (e.g. figure 3.1, 3.2, 4.1, 4.2 et c.) to make it easier for the reader to find them when referenced from a position in the text which is far away from the figure.
- Avoid starting a section with a figure (as in section 5.5.1.1), its clearer in general to put figures and tables after being referenced in the text.
- For diagrams related to each other, such as in figure 11 and 12, it is clearer to use the same scale. Also, for these figures (and figure 9 and 10, 15 and 16, 17 and 18, 19 and 20, 21 and 22), is it necessary to put both the PDF and the CDF? What do you want to illustrate with these figures?
- With figures 19, 20, 21 and 22 you are showing a deviant behavior, but you don't explain why wee see this deviation. My recommendation would be to either keep the figure and explain the behavior or remove the figures.
- Try to indicate a tighter connection between the quality survey in section 5.9 and the results. It is not easy to see that section 5.10 is the results from *your* survey.
- It would have been interesting to see a more detailed description of how the network impairments were introduced in the survey and if the quality-comments had a good correlation to the impairments.
- Is chapter 7 really relevant for the main topic of the thesis?
- Section 8.1 should be in a result-chapter, not in conclusion, also, what does HDTV have to do with anything in section 8.3?

Section III. Detailed comments for the author

- Internet should be spelled with capital i.
- At some places in the text you have mixed up i.e. and e.g. (e.g. section 4.5.5)
- In the overview you say for example that "This thesis **will be** divided into…" which sounds like the report is not completed yet. Might be replaced by "This thesis **is** divided…" instead. It occurs in a couple of places in that section, and also in some places in the entire report. One in section 4.5.
- In my version, there is a broken reference in section 4.2.1.
- In figure 1, section 4.4.1; it would be nice to also be presented the percentages.
- In the same section (4.4.1), you introduce two types of delays that it would be good to give a short explanation to (FEC and interleaving delay).
- In section 4.5.1 you declare that "Latency and delay are often used as synonyms", it feels like a statement that should be followed by something telling the reader if this is a correct synonym or not.

- In section 4.5.2, the second paragraph is kind of tricky to get through and extract the meaning of.
- In the same section (4.5.2) you refer to Tcpdump without explaining what it is or what it dumps. A similar thing goes for the following section where you say that network traces are analyzed. What is a network trace, and how do they specify inter-arrival times?
- Consider moving figure 2 in section 4.6.1, now it breaks the text in a way that feels unnatural.
- In the beginning of chapter 5, you refer to three main parts as (in this order) the first part, next part and the second part. Using terms as "the next" or "the following" while listing references can be ambiguous since its not sure whether you are aiming at the actual following section or the following with respect to the last sentence's reference.
- Table 4 (section 5.1.1) is unreferenced in the text.
- In section 5.4 you refer to probe traffic but give just a vague explanation to the term.
- Page 41, in figure 9 and 9 → in figure 9 and 10?
- In section 5.9 you write "to prepare for the discussion in chapter 5", it is rather unclear to see which discussion you're aiming at.
- In section 5.11 you use the abbreviation PSTN but there is no explanation of that abbreviation.
- In section 6.3.2.1 you say that GPRS is close to the level that Quake 4 requires, but according to the figures, the uplink capacity is less then 50 % of the required bandwidth which is not so close according to me.
- Section 6.3.2.2 UNTS → UMTS?
- In section 6.2.3.4, you write about different simultaneous game sessions and I would assume this meaning several games running at the same time. Whereas in figure 33 and 34 you put number of players on the x-axis. Should this be number of game sessions too, or am I confused?
- In section 6.5 you suggest that operators should prioritize game traffic to have stable low latencies. At what cost would this be? How would the other traffic be affected by this? Could it happen that the gaming traffic rule out other traffic, such as voice calls?
- In the same section (6.5) you state that Mr Claypool says that Sony PSP generates traffic around 300 Kbps or less, but in your experiment, you tried FIFA 2007 which, according to table 11, on average just generated 12 & 13 Kbps which is much less than 300 Kbps, do you know why FIFA 2007 generates much less traffic? Did you have access to any other games that could have generated more traffic? It would have been interesting to see how a game, actually generating on average 300 Kbps, would behave in the same situation.