Special seminar to bachelor thesis

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Abstract. In the paper we focus on solving the issues caused by going offline inside a state synchronizing network. In order to keep the state consistent across all clients in a network, various synchronization methods are used. These methods expect all clients to be available at any time and don't describe situations where some of the clients go offline and later attempt to reconnect. First we analyze a sample of synchronization methods, while comparing the ways they could support offline mode. After that we choose the most fitting method and provide a detailed description of possible modifications allowing client re-connections without loss of data or state conflicts. Finally we implement and compare these modifications.

Keywords: Synchronization · Offline · Implementation

1 Introduction

With time progressive web applications are becoming more and more popular. As they grow in popularity the need for cloud applications that support collaboration of multiple users on same document is higher than ever. This collaboration brings it's own set of challenges. Currently the main addressed problem is making sure both users have the same document in front of them and that each difference is passed to others without issues. This becomes more difficult when we start considering the possibility of multiple users editing or deleting parts of document at the same time. These issues are addressed and solved by using some of already existing synchronization methods. Most of these are academically proven to work and so are a safe choice for implementation.

One big issue that isn't addressed by these methods are users with flaky internet connection. When user disconnects all of his work is lost. This not only causes frustration, but also prevents these applications from being used in the enterprise environment, where losing progress is not acceptable.

Analyze existing synchronization methods and their applications multi-document systems, with offline capabilities taken into mind.

Explore solutions for offline synchronization. If and how is synchronization metadata stored and how is reconnection handled.

Suggest and implement a solution that transparently handles synchronizations in a larger system even in case of disconnection.

We need to synchronize those, but also not lose any data created.

Making a library that simplifies this processs.

Recently new advances in state synchonization of multiple clients were made as a part of text editor collaboration modes, that enable multiple users to edit one file at the same time. These methods are present in many other systems, such as office packages and online chat platforms.

None of the synchronization methods describes a client reconnection scenario. And most of the implementations, lack a way to handle bad network conditions. Which is something that I want to explore and implement.

Podrobnejie rozpsan vod do problematiky, motivcia... Na konci s ciele prce. Rozsah cca. 1.5 2 strany (spolu s ilustranm prkladom aj prehadom sasnho stavu).

1.1 Illustrational example

Tu by mohol by ilustran prklad, cez ktor sa vysvetuj hlavn pojmy...

1.2 Overview of current state

Got good overview of synchronizaiton methods, their drawbacks and pros. Explored browser storage mechanisms. Decided for client-server solution.

Prehad sasnho stavu v oblasti, ktorej sa prca tka... Citovan zdroje sa uvdzaj na konci lnku.

2 Suggested solution

Nvrh rieenia, postupy, algoritmy, schmy, diagramy, tabuky, at, o je potrebn... Rozsah 2 3 strany. Papers not complying with the LNCS style will be reformatted. This can lead to an increase in the overall number of pages. We would therefore urge you not to squash your paper. Odseky. Odseky by sa mali tka hlavnch bodov, ale mete poui kudne aj nejak odrky (slovan, neslovan). Klasick text by mal obsahova normlne psmo alebo kurzvu, resp. Courier new na zdrojov kdy. Tabuka 1. Tabuky by mali ma svoje slo a popis (menm psmom) nad tabukou a na krajoch (vavo a vpravo) by sa nemali ormova. Mali by by vycentrovan.

Table 1. Table captions should be placed above the tables.

Heading level	Example	Font size and style
Title (centered)	**Lecture Notes**	14 point, bold
1st-level heading	**1 Introduction**	12 point, bold
2nd-level heading	**2.1 Printing Area**	10 point, bold
3rd-level heading	**Run-in Heading in Bold.** Text follows	10 point, bold
4th-level heading	*Lowest Level Heading.* Text follows	10 point, italic

Displayed equations are centered and set on a separate line.

$$x + y = z \tag{1}$$

Please try to avoid rasterized images for line-art diagrams and schemas. Whenever possible, use vector graphics instead (see Fig. 1).

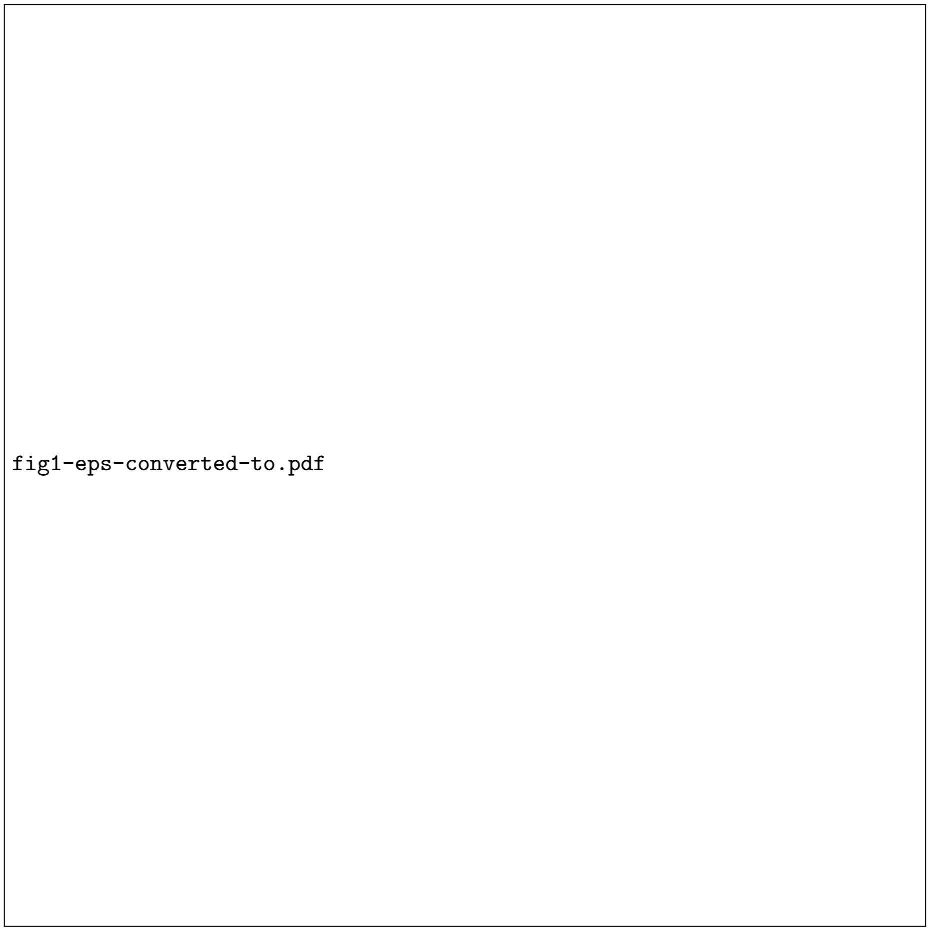

Fig. 1. A figure caption is always placed below the illustration. Please note that short captions are centered, while long ones are justified by the macro package automatically.

Theorem 1. *This is a sample theorem. The run-in heading is set in bold, while the following text appears in italics. Definitions, lemmas, propositions, and corollaries are styled the same way.*

Proof. Proofs, examples, and remarks have the initial word in italics, while the following text appears in normal font.

For citations of references, we prefer the use of square brackets and consecutive numbers. Citations using labels or the author/year convention are also acceptable. The following bibliography provides a sample reference list with entries for journal articles [1], an LNCS chapter [2], a book [3], proceedings without editors [4], and a homepage [5]. Multiple citations are grouped [1–3], [1, 3–5].

Kd programu sa pe nasledovne:

```
program Inflation (Output)
  const  MaxYears = 10;
  var    Year: 0..MaxYears;
         Factor1, Factor2, Factor3: Real;
  begin
    Year := 0;
    Factor1 := 1.0; Factor2 := 1.0; Factor3 := 1.0;
    WriteLn('Year 7% 8% 10%'); WriteLn;
    repeat
      Year := Year + 1;
      WriteLn(Year:5,Factor1:7:3,Factor2:7:3,
        Factor3:7:3)
    until Year = MaxYears
end.
```

Ak sa odvolvate na litratru, treba ich uvies v hranatch ztvorkch hned za danm odkazom na ne, napr. V prci [1] sa rozober fibonacciho algoritmus, ktor me by znane zjednoduen [2, 3], at.

STRANY SA MUSIA SLOVA ponc prvou stranou...

3 Conclusion

o sa spravilo, o sa plnuje, at.

Poakovanie. Ak si ho niekto zasli, treba tam uvies (napr. Kolega, ktor pomha s Javou, at).

References

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