

Operating a Sensor Network at 3500 m Above Sea Level

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ABSTRACT

Sensor networks deployed in remote locations require easy to use but also extremely expressive tools for reliable operation. The PermaSense project has developed a platform based on a number of proven COTS components and integrated with the GSN based data backend. All tools are accessible from a single location in a web browser. This demo will present the monitoring and control tools in live operation with deployments on real field sites in the Swiss Alps.

1. INTRODUCTION

The PermaSense project strives for collecting geophysical data in the high-altitude environment of the Swiss Alps with a wireless sensor network (WSN). A key issue is unattended, long-term operation. This requirement is not only manifested in a reliable and tailored system architecture [3], but also in a data management, system control and monitoring services running on backend servers. In this paper, we present the set of tools necessary for reliable and successful long-term operation of a remote sensor network. In this demo we will present a live demonstration of the wireless sensor network on our field sites in the Swiss Alps and showcase the sensor nodes and base station technology used.

Applications like environmental monitoring heavily rely on the retrieval of quality observations from experimental research in field campaigns. Often, this quality is manifested in the data yield and many sensor network

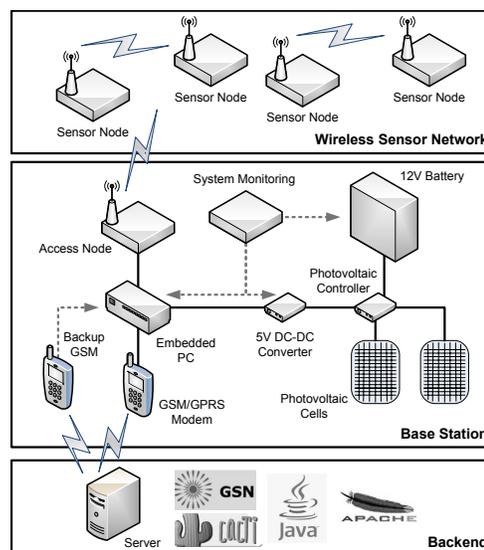


Figure 1: The tiered system architecture from the generation to the final backend tools.

related deployments have shown inferior performance w.r.t. this requirement. In most cases the dominant problem has been the lacking performance of the wireless sensor network [5]. However, the reliable data delivery from the sensor nodes to the base station is only a part of the larger puzzle involved [4]. In reality a complicated and multi-tier architecture is put in place (c.f. Fig. 1. Failure of any tier leads to performance degradation in the system context and hence tools for reliable monitoring of all tiers are essential.

2. END-TO-END SYSTEM MONITORING

In order to monitor and control each tier of a sensor network deployment, the PermaSense project has devised a web-based backend solution. This does not only encompass data handling of the data derived from the

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