

System for mobile and continuous telemonitoring in preventive medicine research of daily routine

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Introduction

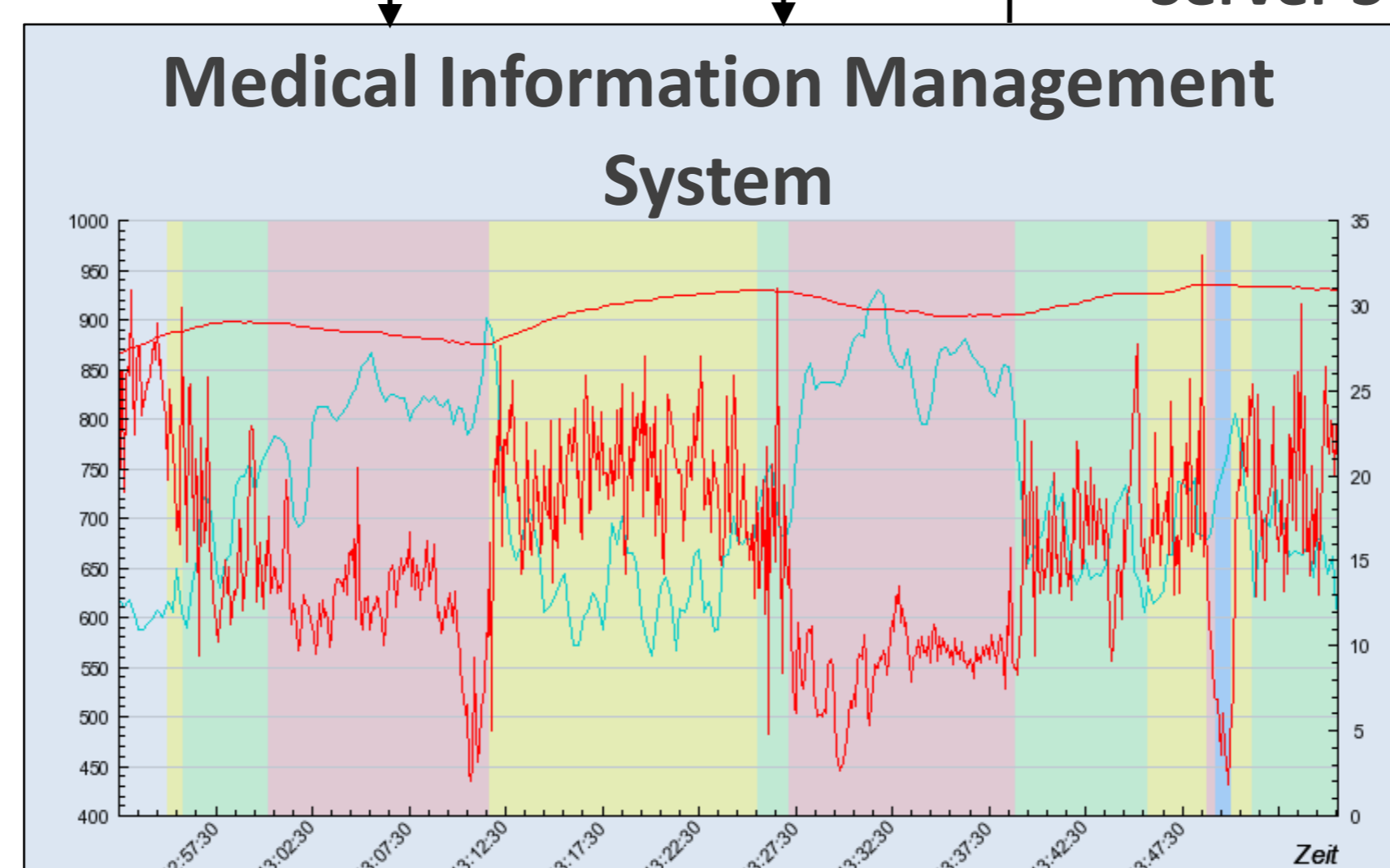
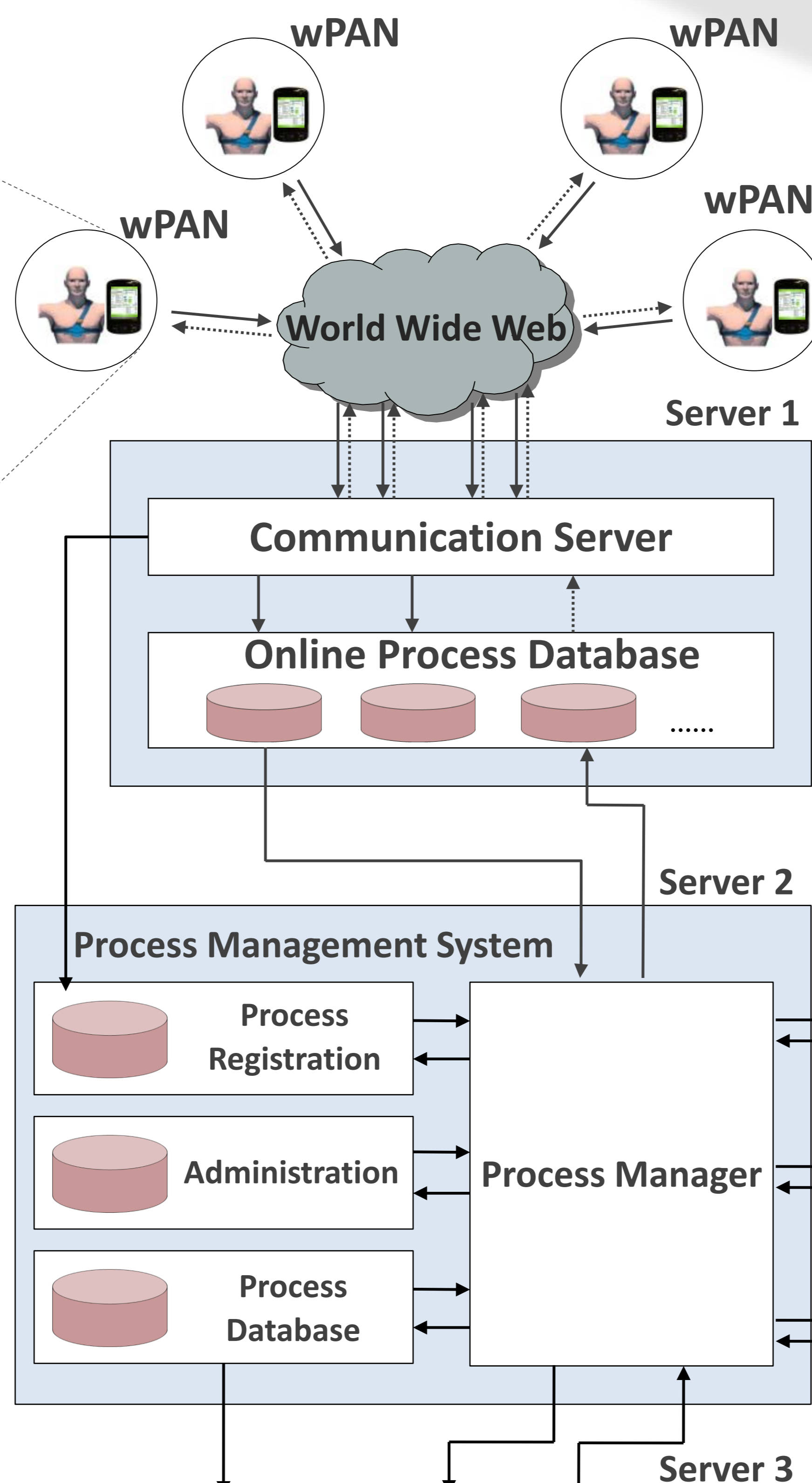
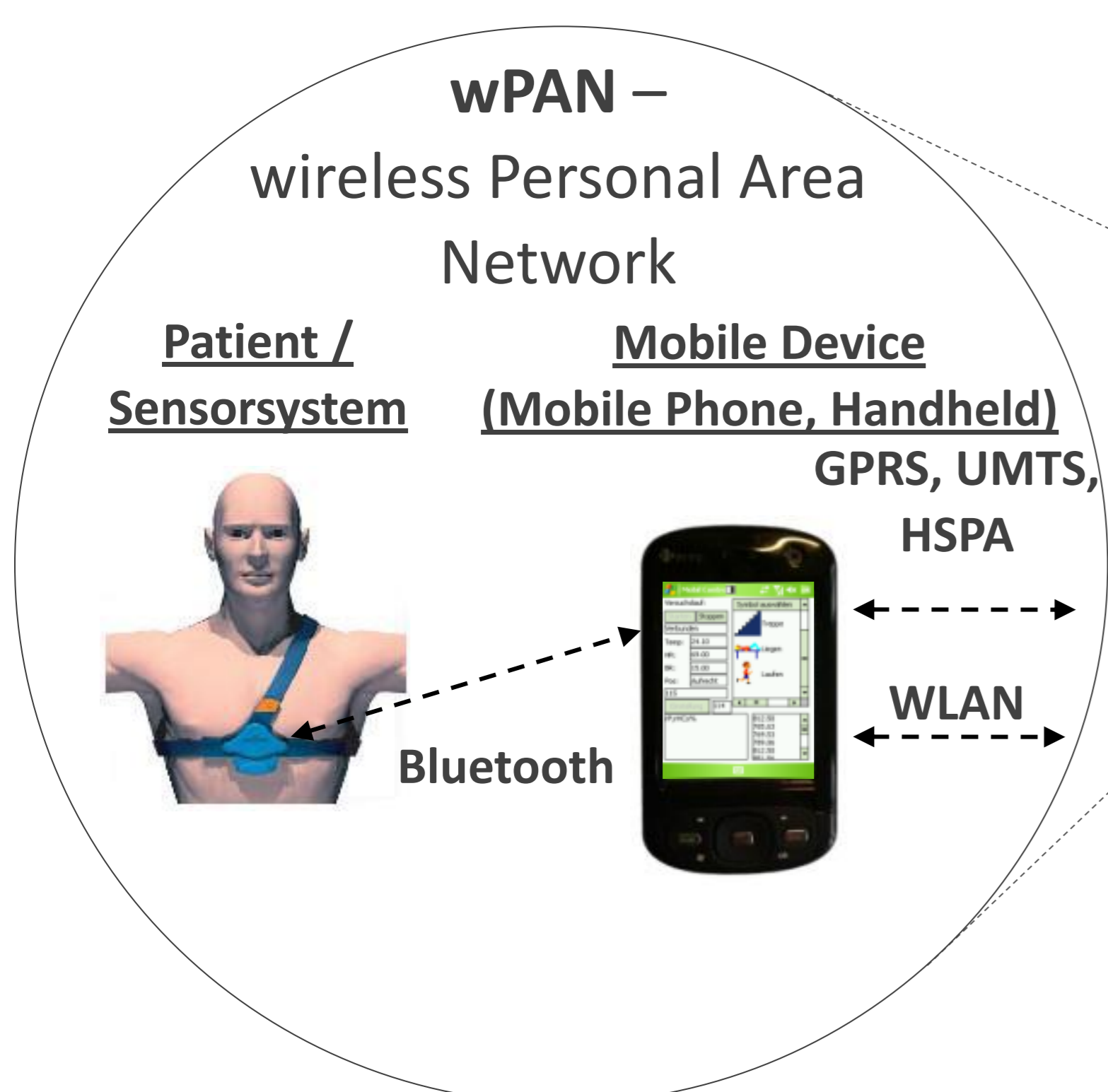
The acquisition of physiological parameters for preventive medicine studies makes high demands on the flexibility of the used measuring system. The focus of interest is especially the use afield during usual daily routine (e.g. at work or during leisure time) and the continuous monitoring of a subject's status. Moreover, the aim is the reduction of effort and time exposure of the medical staff by a fully automated analysis of the subject's raw data.

online process-database. The communication server also sends a status signal to the process management system when a new data transmission grows up.

The process manager then gets the raw data from the online process database and stores it in a subject-dependent process database. Meanwhile, it also obtains reference data and individual analysing instructions from a medical information management system. The process manager then sends the data to diagnostic servers that contain analysing and calculating

modules (e.g. artificial intelligence) provided as web-services. The modules could be used for stress and fitness estimations for example. The results are stored in the appropriate database of the subject.

The web-based medical information management system, including a visualising application, enables the investigator to monitor the incoming raw data and the results of the modules during the investigation. If required, the process manager can also send important information or results back to the handheld.



Results

The presented telemonitoring system realises a continuous monitoring process regardless of location of both subject and investigator. It archives the real-time transmitted raw data with a 2-4 second delay. The results of the analysing processes depend on the analysing method, the occupancy rate or the number of clients that are investigated at the same time respectively.

Furthermore, the parts of the client's system weigh 300-400 gram, depending on the chosen mobile device, and can be worn comfortably under any kind of clothing. The system was used successfully in 24-hour investigations in the institute for preventive medicine.

Methods

A sensor system permits the acquisition of different physiological parameters (e.g. rr-intervals, heart rate, breathing rate, skin temperature) and their continuous transmission to a handheld via Bluetooth.

The handheld (e.g. smart phone) allows the reception of sensor-measurement data by an integrated Bluetooth module. In addition to the acquisition of the sensor-measurement data the mobile device also allows the documentation of dialogue information (e.g. choice of activities, questionnaires for workload) that accompany the medical-measuring process. All acquired data are synchronised by the handheld and send immediately to a central server system via mobile radio standards or WLAN alternatively.

A communication server receives the continuous incoming data of several subjects parallel, checks their validity, stores it in a

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