

GPRS Based Water Tele-Control System

Eman Awad, Abellatief Al-Karaki, Mahmoud Malkawi, & Walaa Shawar
Supervisor: Dr. Murad Abu Subaih



Project Description

GPRS Based Water Tele-Control system is a type of SCADA system, that used to fully supervise and control the water network; by gathering the information from the sensor distributed over the remote nodes and sending them to a central computer system, which allow the network administrator to monitor and manage all the aspects related to the water network through his computer screen. That eliminates the need for the continuously field visits and save the time and effort.

The transmission of the data performed through the GSM network using GPRS wireless technology, which distinguished by high data rate, low delay and low cost. On the other side, GSM is featured by providing better mobility, coverage and it is almost reach all the areas.

The Project has following Tasks:

- 1) Control the water distribution operation over the city.
- 2) Inform the central office by amount of water that each consumer consumes.
- 3) Allow the administrator to get different kinds of information from the network.
- 4) The system also give different types of alarms, such as: theft and leakage alarm

System Components

The system contains the following components each developed as its own subsystem:

Hardware Components

At the central office a computer will be used, that acts as the brain of the whole network.

GPRS Wireless modems: extends the system control wirelessly, and connect all the system nodes; which distributed over a spread geographical areas far from each other with the central office.

Each node at the system has its own components and sensors needed to perform its task. These components include: a main tank, water level indicator, analog and digital flow meters, valves, pumps, and LCDs.

Software Components

Many software programs have been built to accept the different signals from the sensors then process them and give the suitable commands.

The Software Mainly Includes the following modules:

GPRS and Serial Modules, Data and Database Modules, GUI Modules, and PIC and sensors Modules.

Hardware System

The figure below shows the system hardware components, and how they are communicating with each other via GPRS network, which acts as the system backbone.

The system has been divided into four subsystems:-

1. Water source node.
2. Main distribution node.
3. End-user node.
4. The central office.

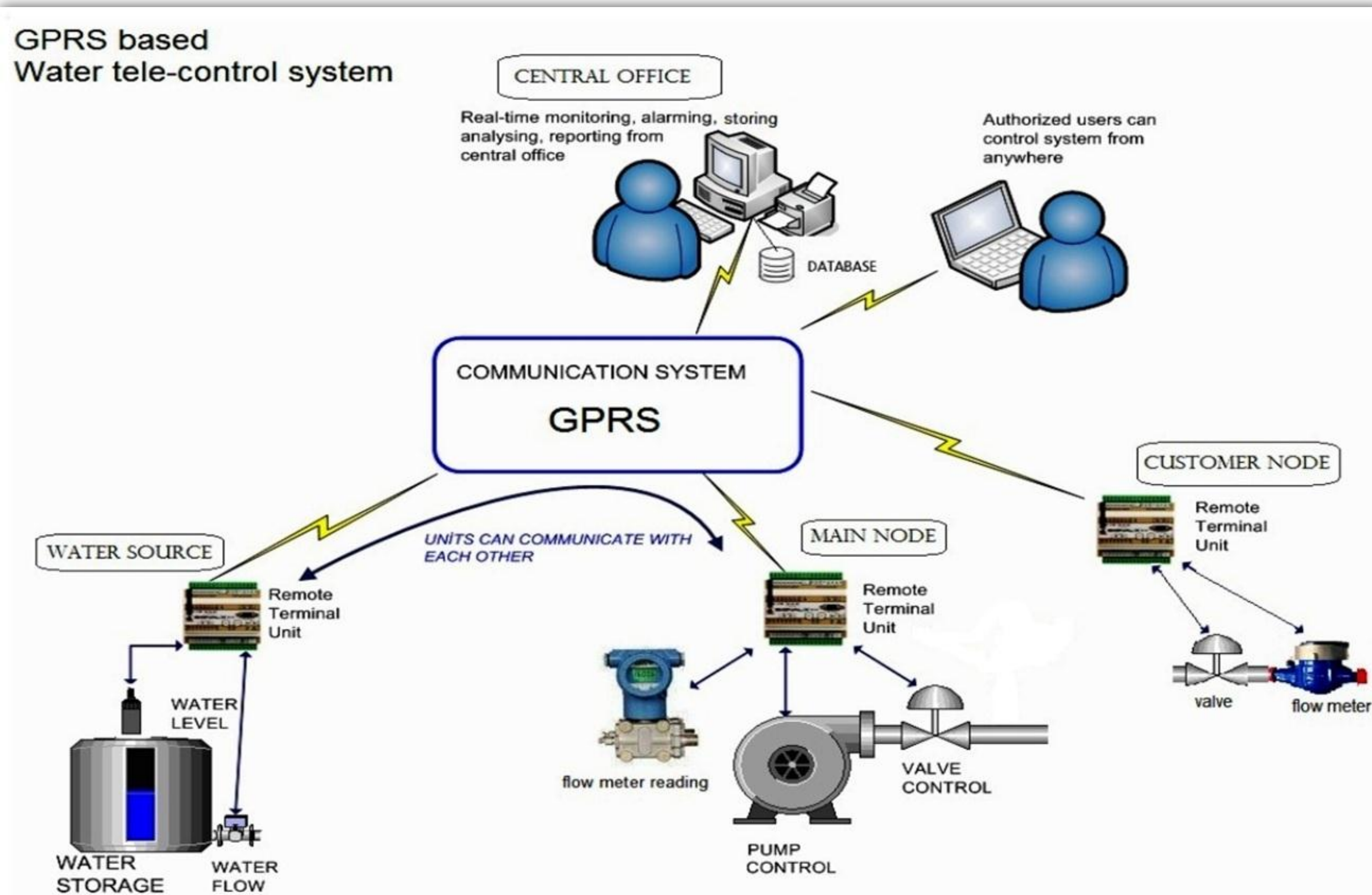


Figure 1: Water Network Tele-Control Idea

User Interface

A graphical user interface has been designed to provide an interactive environment for the users to deal with, in an easy way, and free the users from learning complex command languages. C# programming language has been chosen to do so.



Figure 3: User Interface windows

Software System

The system software can be divided into two main parts: C# software program and microcontroller programming each one perform specific tasks, and get the necessary AT commands that needed to establish the connection with the GPRS modem.

C# software includes: Databases used to store and update the data received from the network nodes, Graphical user interface that provides interactive environment for the user to deal with, and the main program that contains that main functions and commands needed.

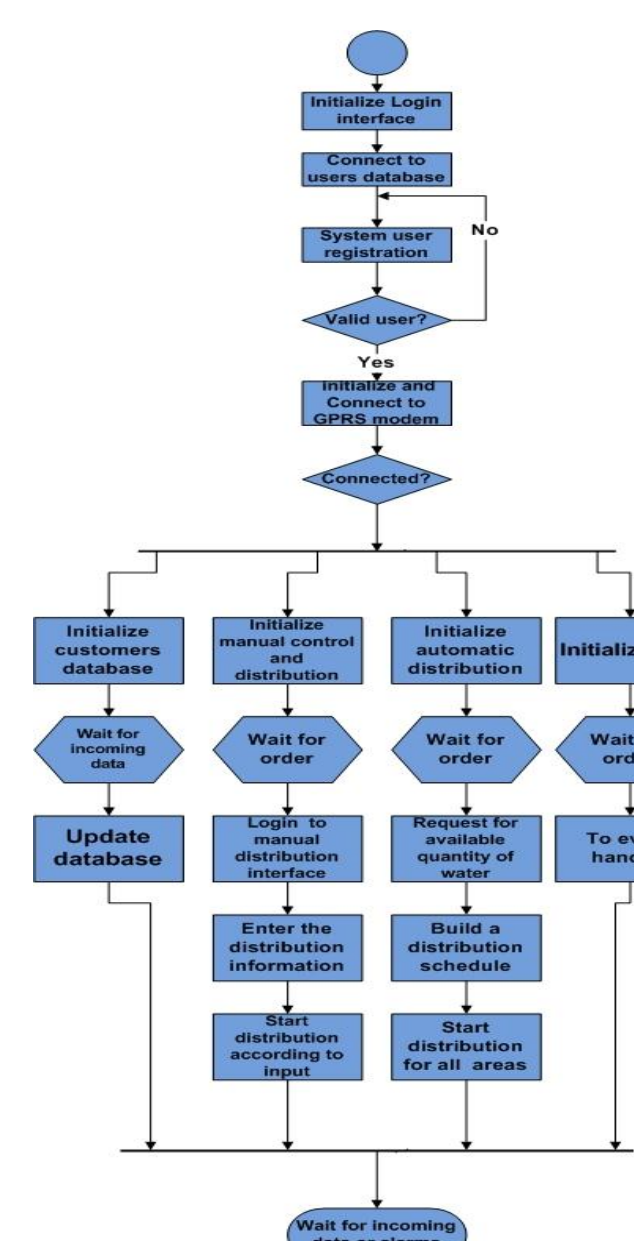


Figure 4: Central Office flow chart

Microcontroller software makes the microcontroller capable to process the signals it receives from the sensors distributed all over the water network nodes, these signals describe the water network status.

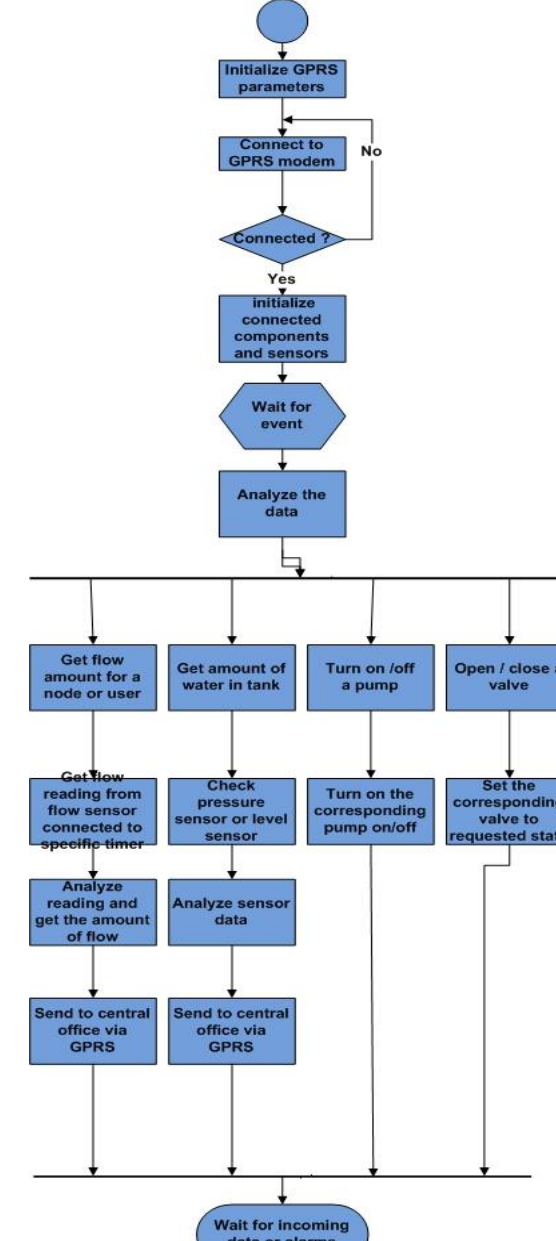


Figure 5: Nodes flow chart