

Mobile Cloud Computing Experiment

Husnu S. Narman*
husnu@ou.edu

*School of Computer Science, University of Oklahoma, Norman, OK 73019

I. CONCEPT OF EXPERIMENTS WITH GRAPHICAL EXPLANATION

In this experiment, I try to find how much time and energy are consumed by Travel Sale Person Problem in mobile Cloud environment and solely in the tablet. First, I developed a basic Android application for Android-based tablet by using Android Studio. In this application, various travel sale person algorithms have been used in back-end and simple user interface is implemented. The user can choose which algorithm to use to solve the travel sale problem of different number of cities (number of cities from 130 to 1060). I am interested in finding the time and energy consumption of the application in different cases.

- **Case 1:** Solely execute the application on the tablet.
- **Case 2:** Solely execute the application on the VM on the laptop.
- **Case 3:** Solely execute the application on the VM on the desktop.
- **Case 4 and Case 5:** Tablet and Desktop are in the same network and the application is started on the table and tablet connect to desktop in the same network to request solution. In Case 4, the all power in the desktop is used to run algorithm and sent results back to tablet. In Case 5, Tablet connect to VM under the desktop and VM power is only used to find solution.
- **Case 6 and Case 7:** Case 4 and Case 5 are tested when tablet and desktops are on different network.

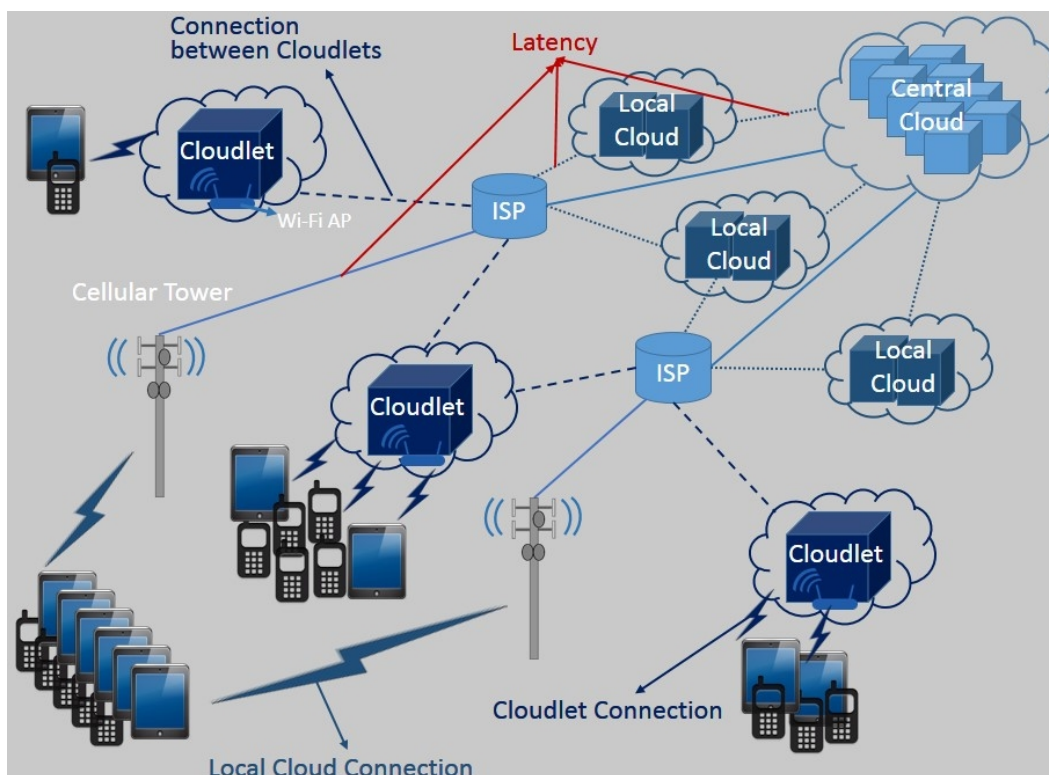


Fig. 1. General architecture.

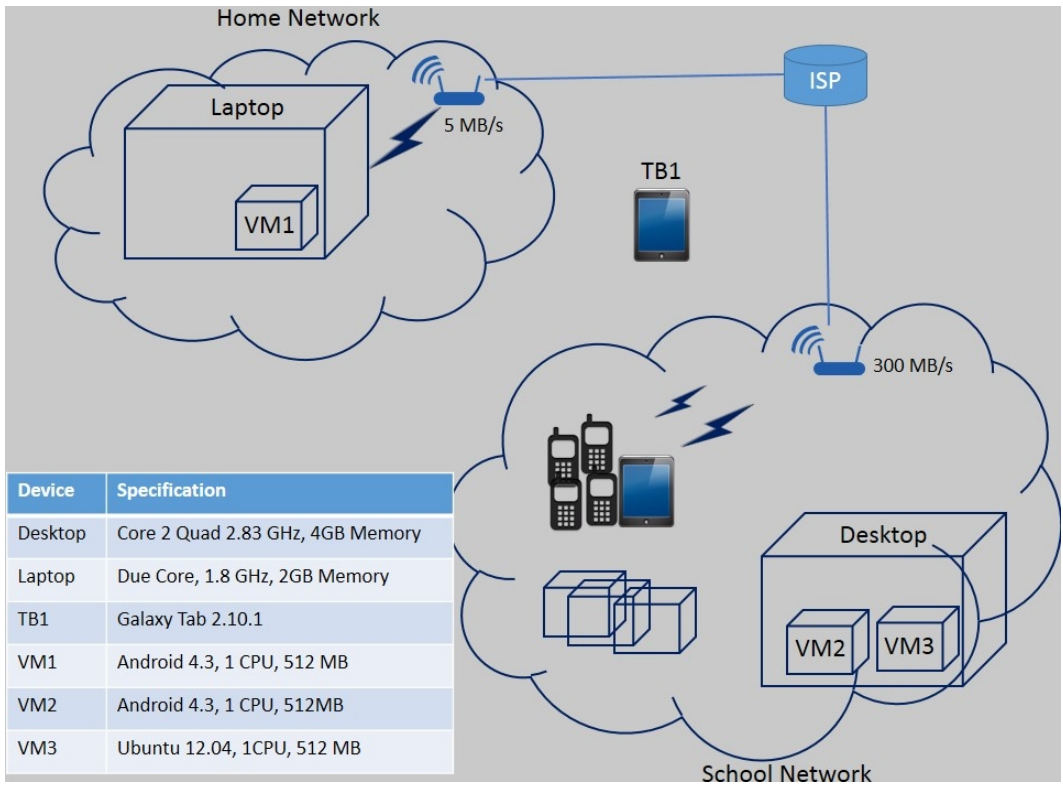


Fig. 2. Experiment Environment.

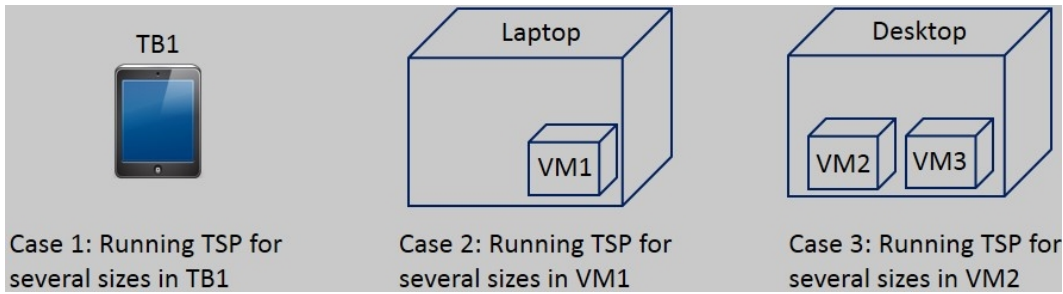


Fig. 3. Case 1, 2 and 3.

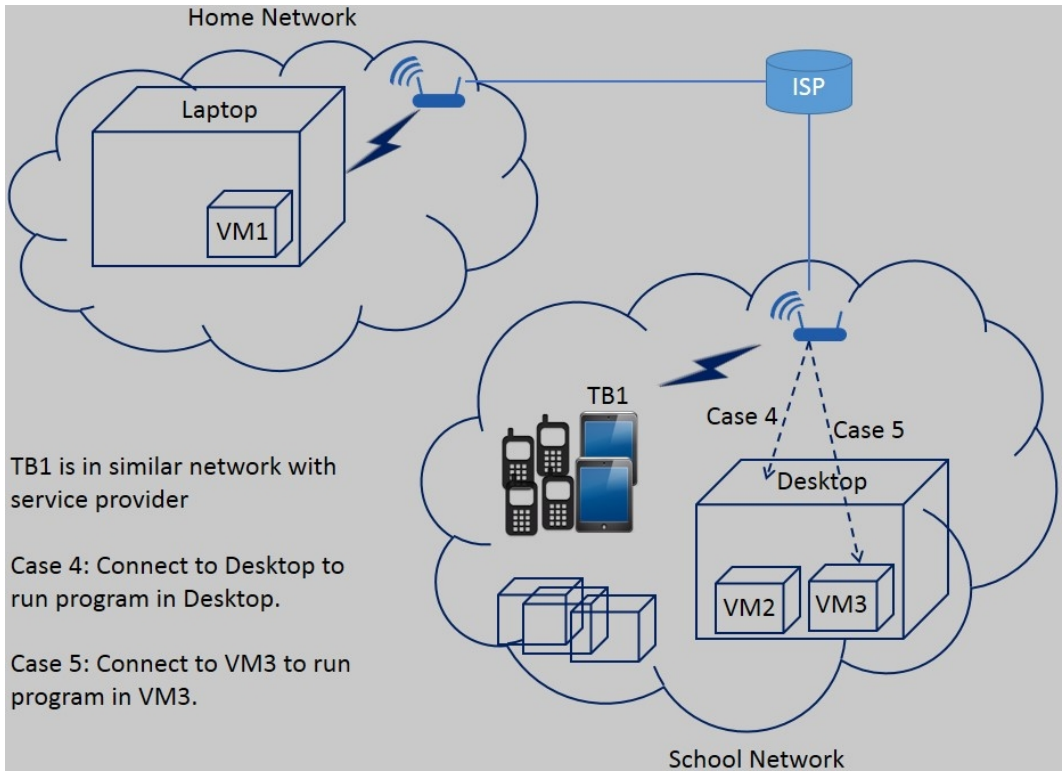


Fig. 4. Case 4 and 5.

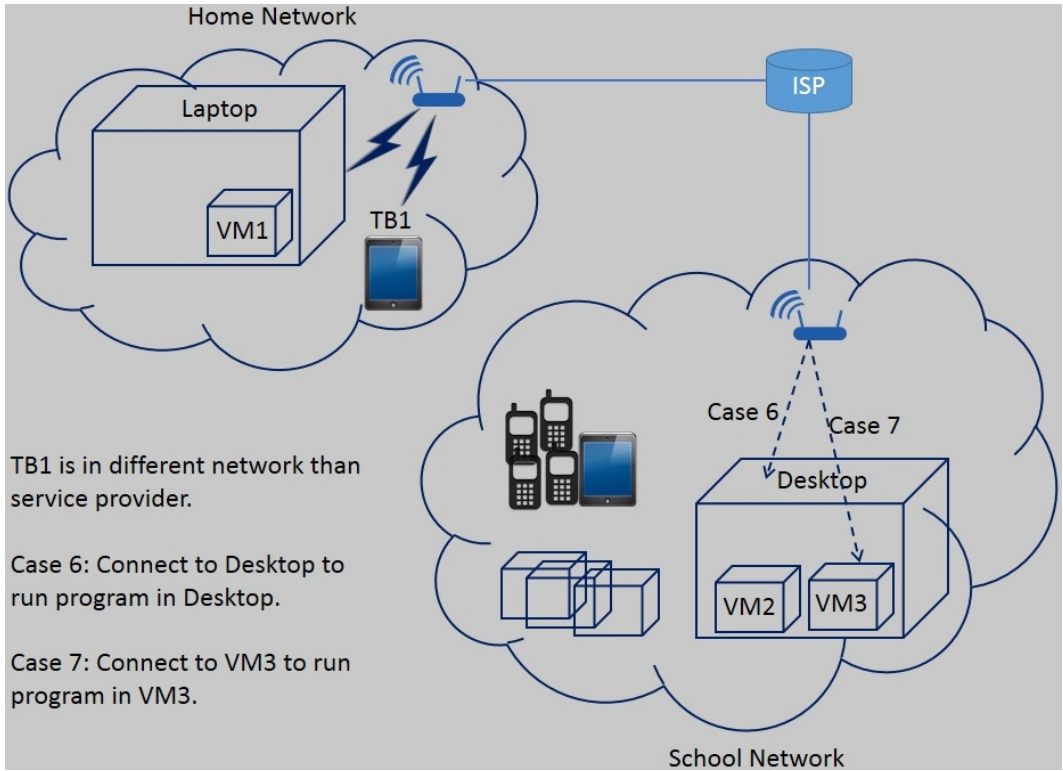


Fig. 5. Case 6 and 7.

	Time (sec/1000)						
	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7
Gre 100	202	220	52	61	38	61	62
Gre 198	1052	720	228	67	78	67	74
Gre 442	10405	3950	2104	317	426	315	430
Gre 783	60548	22000	11529	1811	2367	1809	2362
Gre 1060	149485	59740	27974	4557	5828	4644	5997
Two 100	5473	5570	2455	190	525	187	528
Two 198	30054	20060	9301	917	2383	929	2385
Two 442	85218	67120	34278	2657	8289	2663	8310
Two 783	181060	180990	101919	8399	25540	8357	25668
Two 1060	181934	183320	180579	16277	47173	16246	47408
Average	70543.10	54369.00	37041.90	3525.30	9264.70	3527.80	9322.40

	Energy (mj)				
	Case 1	Case 4	Case 5	Case 6	Case 7
Gre 100	44	16	8	17	12
Gre 198	357	12	29	6	6
Gre 442	5899	28	41	31	29
Gre 783	34000	30	41	7	7
Gre 1060	83600	6	3	1	18
Two 100	2300	31	41	8	41
Two 198	15000	6	26	34	29
Two 442	47800	35	35	10	19
Two 783	99200	36	14	8	12
Two 1060	99400	12	8	7	8
Average	38760.00	21.20	24.60	12.90	18.10

Energy is not spent when we run TSP on VM1 and VM2 directly because we are not consuming any energy from tablet. We just try how much time TSP takes while running TSP on different type of host machines for Android 4.3.