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“Architectural Model of Enterprise Multiservice Network Maintaining Mobility”

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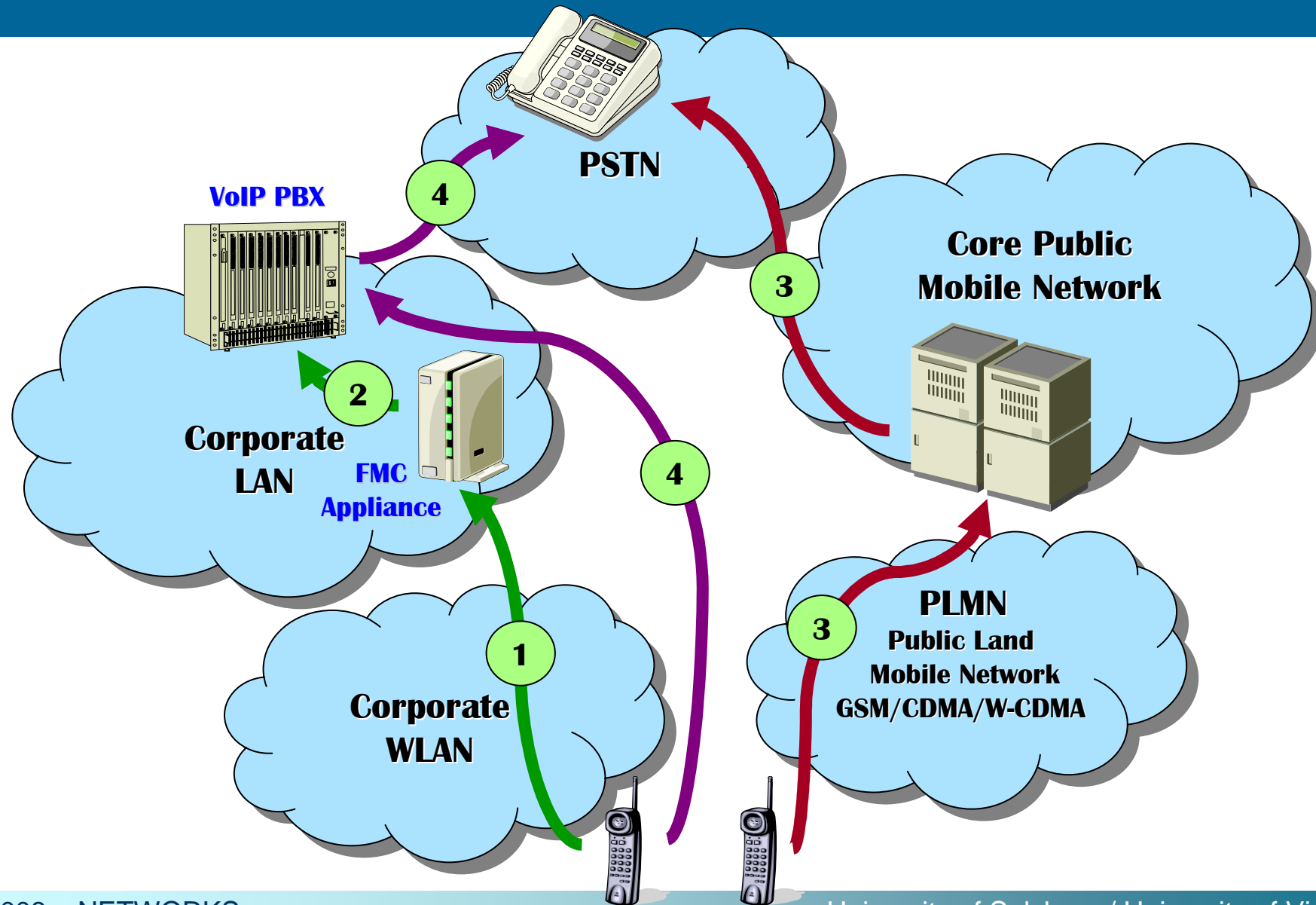


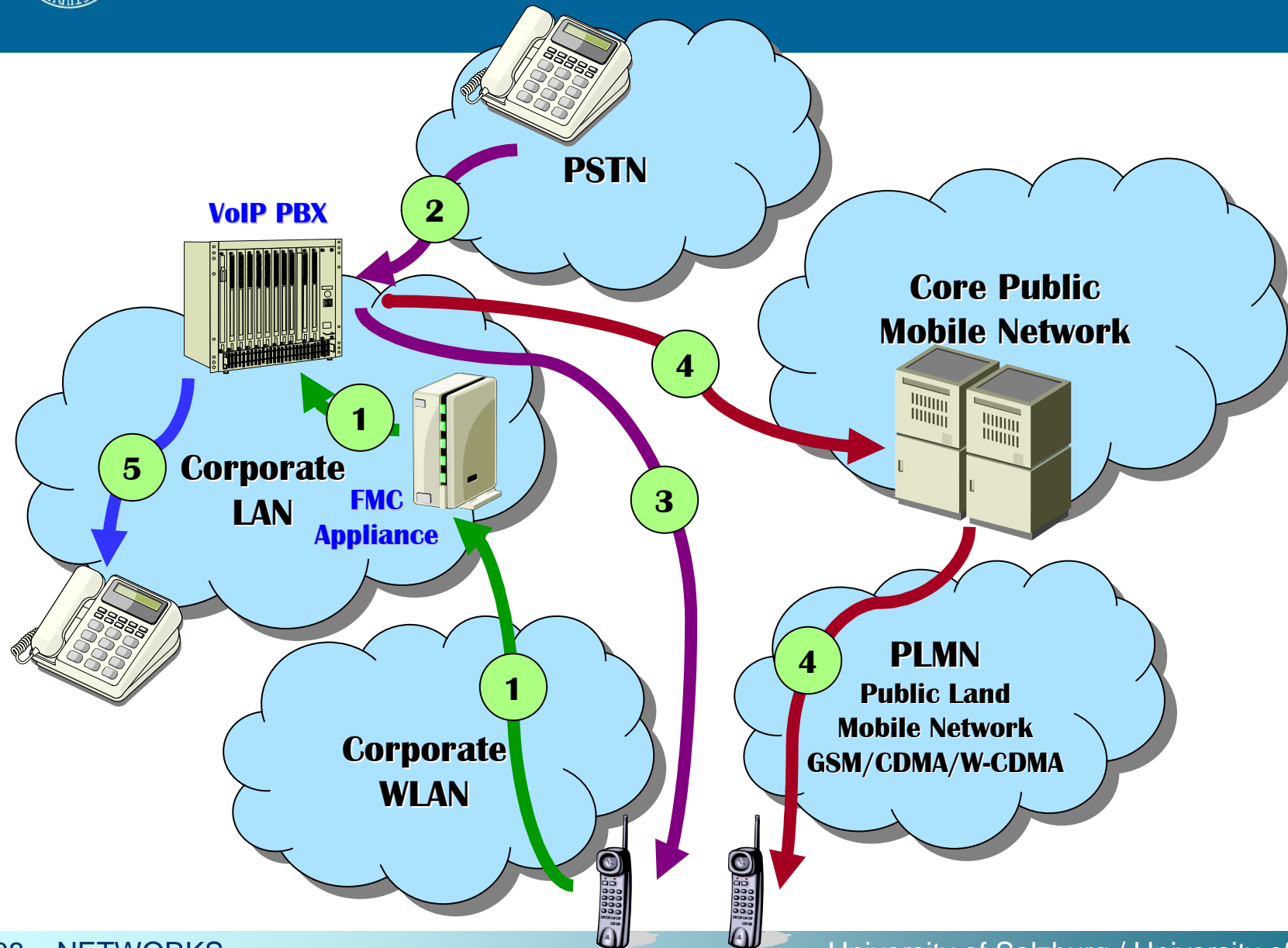
- **With an explosion of ways to reach employees, e.g., mobile phone, e-mail, instant messaging, and voicemail, often project staff still cannot reach each other efficiently.**
- **The result is delays in business processes as participants must wait for returned phone calls or e-mail before proceeding.**
- **Forrester research report found that project delays occur with high frequency because of the inability to reach decision makers quickly.**
- **This inability results in real delays in completing projects, or providing information to clients, or approvals in the normal course of business.**



Case Studies in Fixed-Mobile Convergence

- **An application server called the *FMC Appliance* is located within enterprise IP network.**
- **It gives mobile employees key PBX benefits such as a unified voice mailbox, directory and a single number service.**
- **The *FMC Appliance* is a communication proxy that allows dual-mode devices to send and receive voice calls within the enterprise.**
- **Calls are automatically transferred between networks to maintain a high level of service while optimizing costs.**







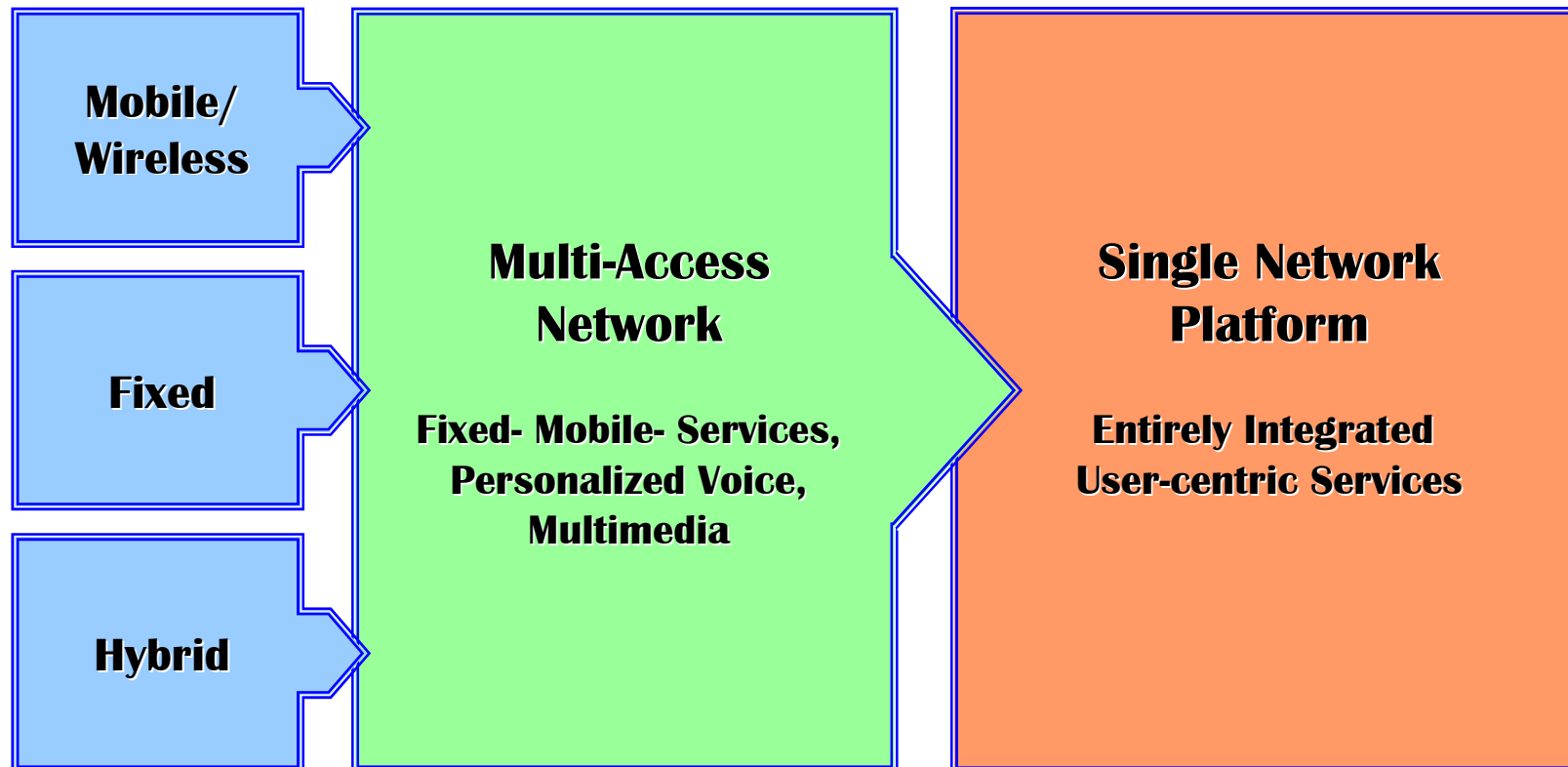
- **Business intelligence linking and sharing in real-time is essential for successful competition in today's business world.**
- **Therefore, enterprises need seamless network access as their business borders extend across local area networks (LANs) and around the world.**
- **An extension the enterprise converged network by WLAN connectivity increases productivity of employees.**
- **Studies at the number of large enterprises exposed a profound benefit: wireless mobility rapidly and positively changes the way employees work and gives them more control over their jobs.**



Enterprise-centric Approaches of Fixed-Mobile Convergence



Evolution of Enterprise Network toward Convergence





The following approaches in the delivering converged seamless services are developed:

- **Unlicensed Mobile Access (UMA)** - provides GSM services over WLAN radio with built-in roaming and handover between WLAN and GSM.
- **VoIP extension** - downloadable clients for dual-mode handsets that extend the end user's subscription to the handset.
- **IMS-VCC (IP Multimedia Subsystem - Voice Call Continuity)** - provides seamless voice call continuity between the cellular domain and any IP-connectivity access networks that support VoIP.



- **VoWLAN provides cost-effectiveness calls through IP networks. Inside, enterprises employ VoIP, which is cheaper to use than cellular phones.**
- **Implementing wireless VoIP allows employees to carry their desk phones with them, eliminating cellular phone calls and related per-minute costs.**
- **The access-selection feature built into the phone can enable dual-mode phone to determine the best way for the user to communicate.**



- **The common WLAN offer highly variable data rates and quality of service (QoS).**

- **The real bandwidth and connection quality depends largely on**
 - **user's distance from the nearest access point (AP),**
 - **number of other users connected to the same AP,**
 - **bandwidth demands of each user, and**
 - **amount of interference from nearby APs or other sources.**



- **To really make wireless VoIP an extension of wired VoIP, corporate WLANs must dump technology designed to support simple hot-spot access for data traffic in favor of technology used in a true wireless communications network.**

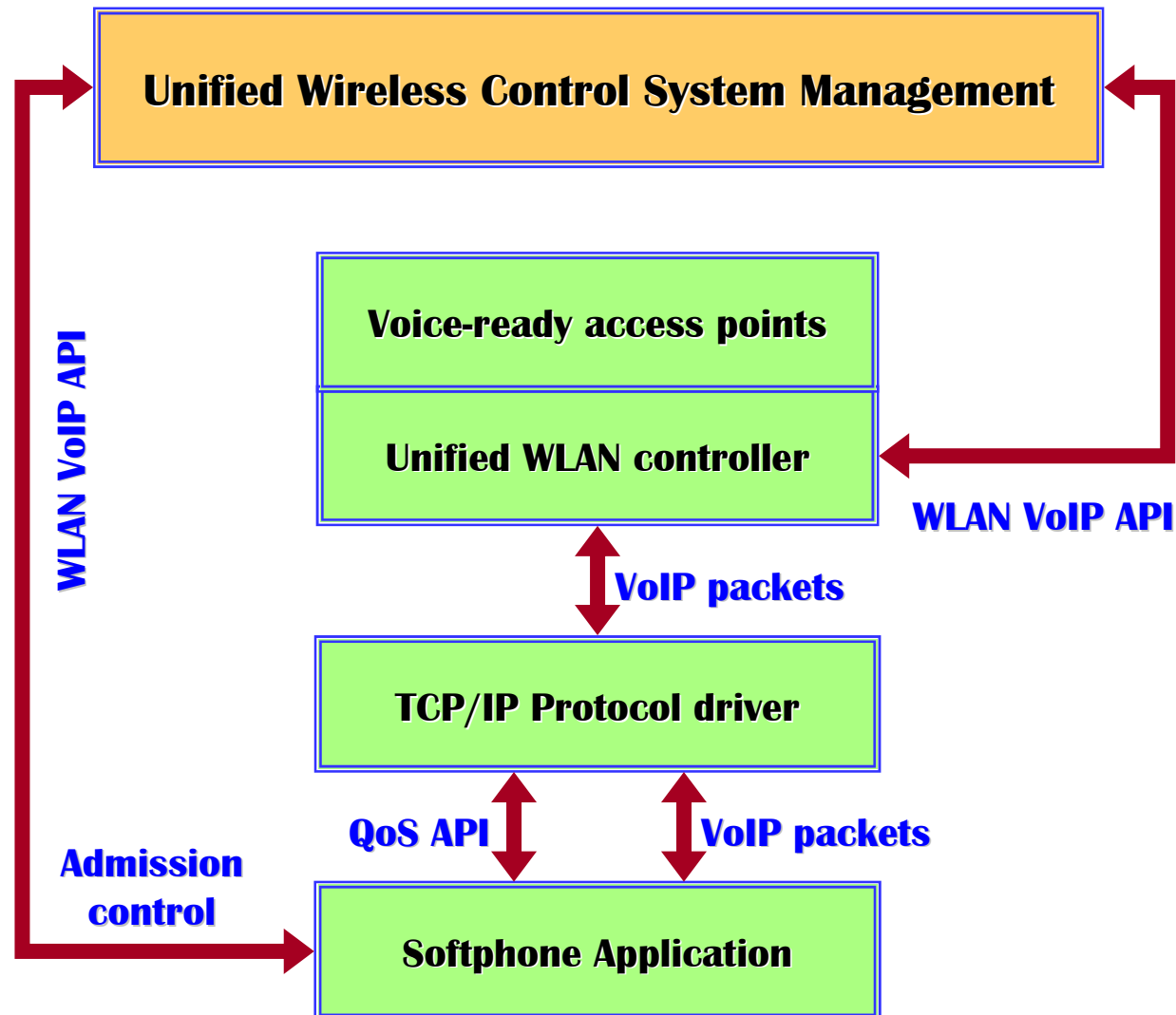
- **The following are key technical requirements for such a WLAN:**
 - **network must be able to predictably prioritize and deliver packets;**
 - **APs must be designed to work as a coordinated system;**
 - **architecture must support all existing Wi-Fi client devices.**



- **With increase of VoIP use, it is becoming feasible for service providers to align services and extend network architectures to deliver a personalized seamless service over wireless and broadband infrastructure.**
- **Combining wireless mobility with the VoIP nomadic capabilities enables having one personal phone number and features that follow the customers.**
- **This solution also supports the MVNO (Mobile Virtual Network Operator) model, especially appealing in the case of dual-mode service with a single number.**

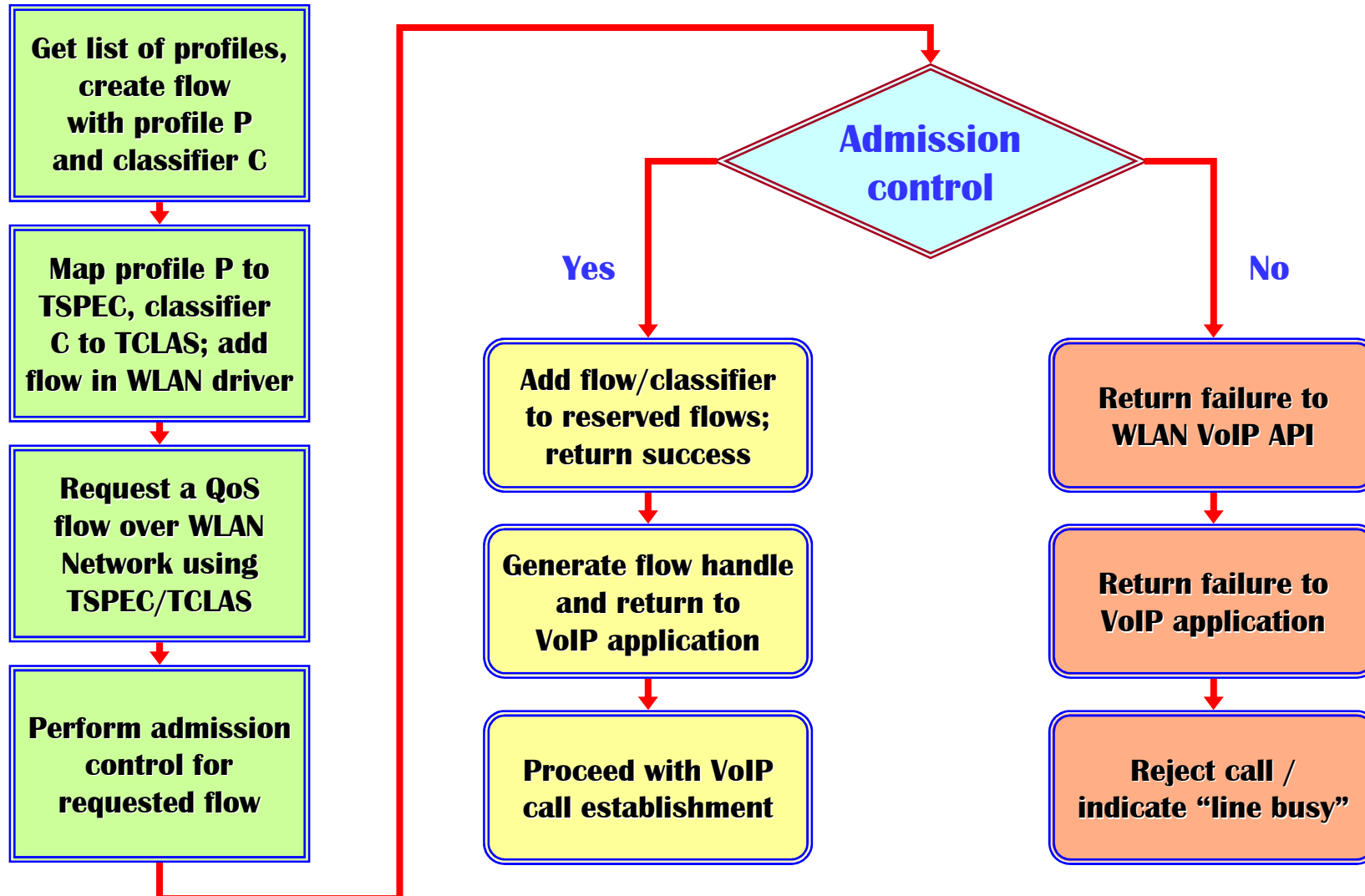


VoWLAN Communication Architecture





Algorithm of VoWLAN Call Flow Formation

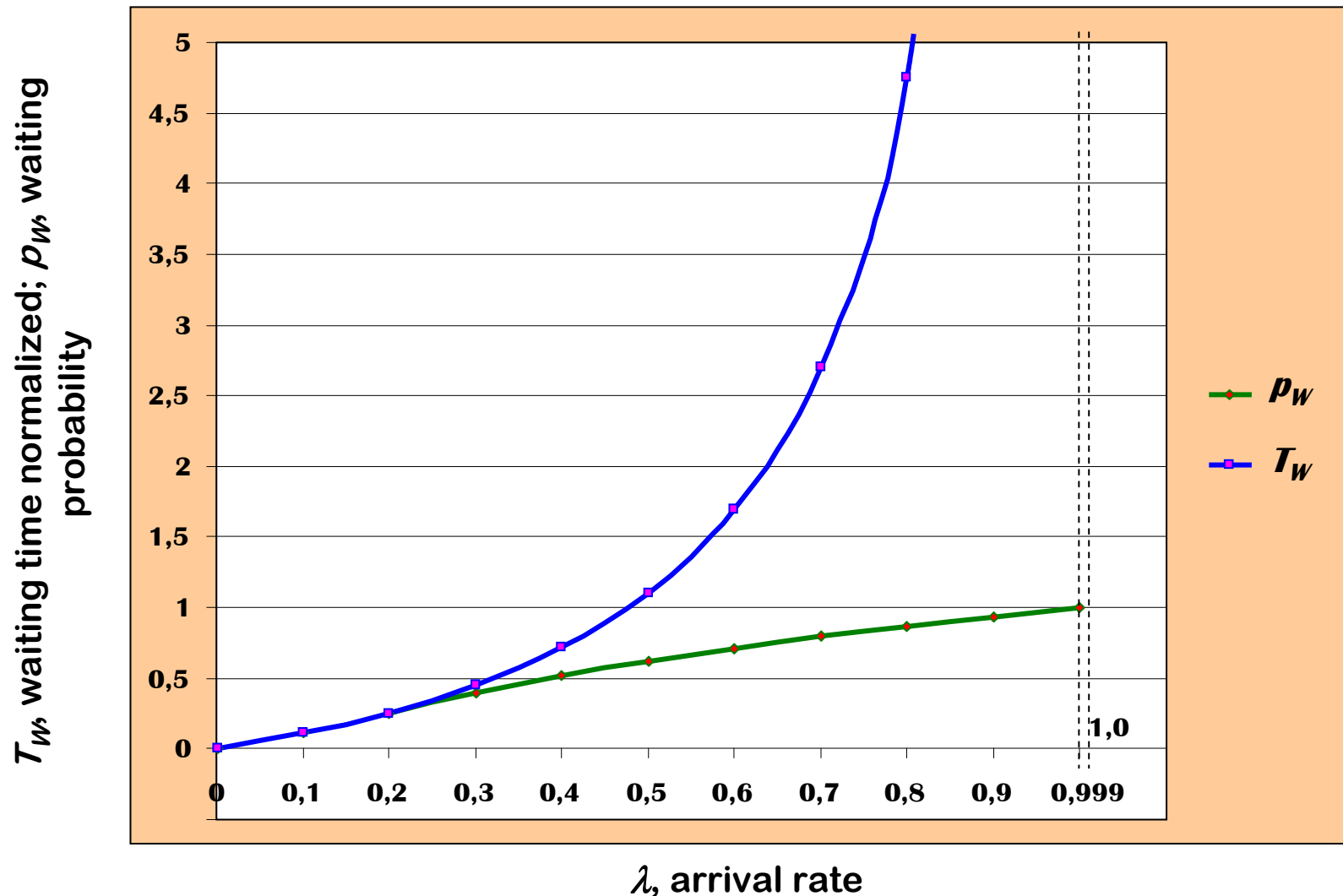




- In the heterogeneous enterprise communication architecture - mean waiting time and the probability of waiting are of the particular interest for system analysis.
- The solutions for different traffic assumptions require the numerical evaluation of roots of transcendental equations by the aid of computers.
- For other types of arrival or service processes implicit solutions are known.
- But often these solutions are not straightforward and require a lot of evaluation work.



Average Waiting Time and Probability for VoIP Packets





Example of Network and Services Scenario



- **We have examined here a seamless services delivery model for providing enhanced business services to the enterprise customers, along with the ability to migrate to more tightly integrated FMC and IMS solutions.**
- **We have evaluated a network infrastructure, services and applications, including the prospective converged services.**
- **We have proposed a mathematical model of the delivery framework in order to analyze network behavior as a response to the new services introducing.**



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Thanks for attending !