

# Milestone 1 Document

## Project Title: Conversational IVR Modernization Framework

### Use Case Focus: Pre-Consultant Trivage IVR (Legacy VXML-Based System)

---

## 1. Executive Summary

The Pre-Consultant Trivage IVR system currently operates on a traditional VoiceXML (VXML)-based Interactive Voice Response framework designed to handle structured call flows such as appointment booking, service inquiries, consultant routing, and general customer support. While functionally stable, the system lacks conversational intelligence, contextual awareness, and dynamic personalization.

This project, Conversational IVR Modernization Framework, aims to transform the legacy IVR into a conversational, AI-enabled interface by integrating it with modern Conversational AI platforms such as ACS and BAP Service.

Milestone 1 focuses on:

- Comprehensive analysis of the existing legacy system
- Documentation of current architecture and workflows
- Identification of integration requirements
- Technical gap analysis
- Risk and feasibility assessment
- Definition of modernization strategy

This document provides a structured, end-to-end system analysis and requirements gathering report aligned with the project objectives.

---

## 2. Introduction

### 2.1 Background

Interactive Voice Response (IVR) systems have traditionally relied on DTMF (Dual Tone Multi Frequency) inputs and rigid decision trees. The Pre-Consultant Trivage IVR system follows a hierarchical VXML-based structure where users navigate via numeric keypad inputs.

Modern customer expectations demand:

- Natural language understanding

- Context retention
- Intelligent routing
- Personalized responses
- Reduced navigation complexity

Conversational AI platforms such as ACS and BAP enable Natural Language Processing (NLP), speech recognition, and AI-driven dialogue management.

---

### 3. Problem Statement

The current Pre-Consultant Trivage IVR:

- Uses static VXML menus
- Requires numeric input navigation
- Lacks intent recognition
- Cannot handle open-ended queries
- Has limited scalability
- Involves high redevelopment cost for modifications

There is a need to modernize the system while:

- Preserving legacy investments
  - Minimizing redevelopment effort
  - Ensuring backward compatibility
  - Enhancing user experience
- 

### 4. Objectives of Milestone 1

Objective	Description
Legacy System Assessment	Analyze architecture, call flows, logic structure
Requirements Documentation	Identify integration requirements with ACS/BAP
Gap Analysis	Identify limitations of VXML-based framework
Technical Feasibility	Evaluate compatibility with conversational AI
Risk Identification	Document constraints and mitigation strategy
Integration Strategy Blueprint	Define high-level architecture plan

---

## 5. Existing System Analysis

### 5.1 Current Architecture Overview

The Pre-Consultant Trivage IVR consists of:

- Telephony Gateway
- Application Server
- VXML Interpreter
- Backend Database
- CRM Integration Layer

#### Current Flow Model:

User Call → Telephony Gateway → VXML Script Execution → DTMF Input → Decision Tree Routing → Backend Response

---

### 5.2 Functional Capabilities

Function	Description
Menu Navigation	Number-based selection
Appointment Booking	Manual selection-based
Consultant Routing	Static department mapping
Query Handling	Predefined script responses
Call Logging	Basic log storage

---

### 5.3 Technical Characteristics

Component	Technology
IVR Framework	VoiceXML (VXML)
Input Method	DTMF
Backend	SQL-based database
Integration	REST APIs (limited)
Hosting	On-premise

---

## 6. Limitations of the Current System

Category	Limitation
User Experience	Rigid navigation, long wait times
Scalability	Manual script updates required
Intelligence	No NLP or intent recognition
Context Awareness	No session memory
Analytics	Limited conversational insights
Personalization	No adaptive behavior
Maintenance	High operational overhead

## 7. Proposed Modernization Approach

The modernization strategy includes:

1. Retain core VXML logic
2. Introduce Conversational AI layer
3. Build middleware integration layer
4. Enable real-time voice input/output
5. Implement intent-based routing

## 8. Integration Requirements

### 8.1 Functional Requirements

Requirement ID	Description
FR1	System must support natural language input
FR2	Map conversational intents to legacy IVR flows
FR3	Enable real-time speech-to-text conversion
FR4	Maintain session context
FR5	Support fallback to DTMF when needed
FR6	Ensure secure API communication

---

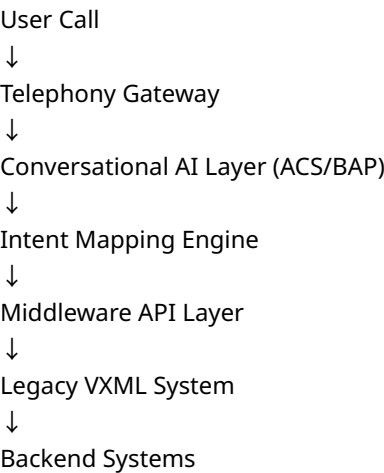
## 8.2 Non-Functional Requirements

Category	Requirement
Performance	Response latency < 2 seconds
Scalability	Support concurrent sessions
Reliability	99.5% uptime
Security	Encrypted communication
Compliance	Adhere to data privacy standards
Compatibility	Must integrate with existing VXML engine

---

## 9. Integration Architecture Strategy (High-Level)

Proposed Architecture:



---

## 10. Technical Challenges Identified

Challenge	Impact	Mitigation Strategy
VXML rigidity	Limited flexibility	Middleware abstraction
Real-time latency	User dissatisfaction	Optimize API calls
Data synchronization	Inconsistent responses	Standardized API contracts

Challenge	Impact	Mitigation Strategy
Voice recognition accuracy	Incorrect routing	NLP model tuning
Legacy constraints	Integration complexity	Incremental migration

## 11. Compatibility Gaps

Area	Gap Identified
Input Mode	DTMF vs Natural Language
Session Handling	Stateless VXML vs Contextual AI
Error Handling	Limited fallback logic
Logging	No conversational analytics
Scalability	Hardware-bound deployment

## 12. Advantages of Modernization

Advantage	Impact
Improved User Experience	Reduced call navigation time
Conversational Interaction	Human-like engagement
Reduced Call Drop Rates	Improved satisfaction
Reuse of Legacy Assets	Cost efficiency
Scalable Architecture	Future-ready system
Data Insights	Enhanced analytics

## 13. Limitations of Proposed Approach

Limitation	Explanation
Initial Integration Cost	Middleware and AI setup
Training Requirement	NLP model training needed
Migration Risk	Potential disruption

Limitation	Explanation
Dependency on AI Platform	Vendor reliance
Complexity	Increased architectural layers

## 14. Risk Assessment

Risk Level	Description	Probability	Impact
Medium	Integration failure	Moderate	High
Low	Data breach	Low	High
Medium	Performance degradation	Moderate	Medium
Low	User adoption resistance	Low	Medium

## 15. Feasibility Analysis

### 15.1 Technical Feasibility

The system supports REST-based APIs, making integration technically feasible.

### 15.2 Operational Feasibility

Minimal retraining required as backend logic remains intact.

### 15.3 Economic Feasibility

Reuse of VXML assets reduces redevelopment costs.

## 16. Integration Strategy Blueprint

Phase 1: Analyze call flows and extract logic mapping

Phase 2: Define intent mapping between conversational AI and VXML nodes

Phase 3: Design middleware for bidirectional communication

Phase 4: Prototype with sample transaction testing

## 17. Expected Outcomes (Milestone 1 Completion)

- Complete documentation of legacy architecture
  - Identified integration requirements
  - Defined compatibility gaps
  - Documented risk assessment
  - Prepared technical blueprint for Module 2
  - Established modernization roadmap
- 

## 18. Deliverables for Milestone 1

1. Legacy System Architecture Documentation
  2. Requirements Specification Document
  3. Gap Analysis Report
  4. Risk & Feasibility Assessment
  5. Integration Strategy Overview
- 

## 19. Conclusion

The Pre-Consultant Trivage IVR system represents a stable but traditional VXML-based infrastructure that requires modernization to meet current conversational standards.

Milestone 1 successfully establishes:

- A clear understanding of existing architecture
- Identification of integration requirements
- Recognition of technical and operational constraints
- Structured modernization strategy

By reusing legacy components while introducing conversational intelligence via ACS/BAP platforms, the project ensures a cost-effective and scalable transformation.

This milestone lays the foundational groundwork for:

- Middleware development (Milestone 2)
- Conversational AI integration (Milestone 3)
- Full deployment and validation (Milestone 4)

The modernization framework ensures enhanced user engagement, reduced operational complexity, and long-term scalability for the Pre-Consultant Trivage IVR system.