# EP Simulation Platform — Business Requirements Document (BRD)

**Version:** 1.0  
**Owner:** Shalki / Program Office  
**Audience:** Software vendor / engineering partner  
**Context:** Soft‑land from JPT (no disruption to JPT architecture) and deliver an end‑to‑end Executive Presence (EP) platform for GMBA/EMBA.

## 1. Purpose & Vision

Build a modular EP Simulation Platform that students access via JPT SSO to **practice, be coached, and be assessed** in high‑stakes leadership moments. The platform supports **individual and group simulations**, **multi‑avatar AI conversations**, **live present‑to‑avatar**, **advanced laptop‑camera analytics**, **evidence‑based reports**, and **AI‑generated learning modules**. Professors author scenarios, allocate to individuals or teams, and orchestrate live sessions with role assignments.

**Success outcomes** - Demonstrable improvement in EP across the six clusters (A–F).  
- Faculty ability to author/allocate in minutes and debrief with explainable evidence.  
- Program differentiation and scalability without changing JPT architecture.

## 2. Scope

**In scope (Phaseable):** - JPT → EP **SSO** deep link and role‑based access.  
- **Student app** (dashboard, prep, simulation, reports, learning, re‑sim).  
- **Professor Studio** (author scenarios/personas/roles, allocate individual/group, live console, analytics).  
- **Multi‑avatar** via HeyGen (initial) with abstraction layer for provider swap.  
- **Video analytics** from laptop camera (client‑first; server‑assist optional).  
- **Evaluation & Reporting**: 6‑cluster rollups, evidence citations, longitudinal growth.  
- **Learning generation**: text, PPTX, micro‑video.  
- **File workflows**: upload decks, memos, data sheets; inline previews.  
- AWS‑native secure, observable architecture.

**Out of scope (v1):** - Full in‑house avatar animation stack (kept as later option).  
- Mobile native apps (responsive web only).

## 3. Stakeholders & Personas

* **Program Head / Boss**: sponsor, approves scope.
* **Faculty / Professors**: authors, allocators, facilitators, reviewers.
* **Students (GMBA/EMBA)**: participants (individual and team).
* **Platform Admin**: manages roles, scenarios, catalogs, retention.
* **Engineering Partner**: delivery and support.

## 4. EP Measurement Framework (Reporting Canon)

Use six clusters (saved as canonical taxonomy): - **A) Core Presence & Character** – Gravitas; Emotional Intelligence; Credibility & Ethics; Presence & Optics; Resilience & Energy.  
- **B) Communication & Influence** – Clarity; Influence/Stakeholders; Meeting/Time Craft; Crisis Leadership; Thought Leadership.  
- **C) Strategy & Decisioncraft** – Strategic Orientation; Decision Excellence; Learning Agility.  
- **D) People & Culture Leadership** – Talent Magnetism & People Leadership; Cultural & Global Intelligence.  
- **E) Execution & Business Acumen** – Execution Reliability; Financial/Operational Acumen; Digital/Data/AI Fluency.  
- **F) External & Governance Orientation** – Customer/Market Obsession; Board/Investor Readiness.

**Scoring** - Each dimension scored **1–9** (anchor descriptors maintained in content library).  
- Segment awareness: Opening (O), Objection‑handling (H), Closing (C), Reflection (R).  
- **Cluster score** = weighted mean of dimensions; **Composite EP** = weighted mean of clusters.  
- Every score must cite **evidence** (timestamped clip + transcript span + feature snapshot).

## 5. Functional Requirements

### 5.1 Student App

1. **Dashboard**
   * See assigned simulations (Pending/In‑Progress/Completed), due dates, attempt count, last score, mode (individual/group).
   * Filter, sort; click to open Prep Room.
2. **Prep Room**
   * Scenario brief, objectives, personas, role card (if group), pre‑reads, data room.
   * Upload **files** (PPTX/PDF/XLSX/CSV) via pre‑signed links; preview PDFs and spreadsheets; mark pre‑read complete.
   * Device check (mic/cam/screen). Consent capture.
3. **Simulation Room (Individual)**
   * **AI avatars** (HeyGen) on stage; bi‑directional audio/video; live transcript.
   * **Present‑to‑avatar**: screen‑share slides; avatars react and probe.
   * **Micro‑prompts** (pace, ROI, clarify) non‑intrusive; agenda/timebox visible.
   * Record telemetry and features (speech/vision/interaction) with privacy controls.
4. **Simulation Room (Group)**
   * Multiple students + multi‑avatar stakeholder(s); **role‑aware** prompts by persona.
   * Team chat (optional), hand‑raise; **breakouts** (5–10 min huddles).
   * Shared artifacts; presenter baton; timers/milestones.
5. **Reports**
   * **Immediate debrief** and full report post‑session.
   * Cluster/dimension scores with evidence clips; O/H/C/R deltas; attempt comparison (A1→A3); cohort percentile bands.
   * **Team metrics** (if group): talk‑time balance, decision latency, coordination quotient, meeting craft.
6. **Learning Modules**
   * Auto‑generated **text** lessons, **PPTX** deck, **90‑sec micro‑video**; tied to observed gaps.
   * Suggested practice drills; one‑click **re‑simulation**.

### 5.2 Professor Studio

1. **Scenario Builder**
   * Create/clone scenario; set metadata (title/domain/difficulty/outcomes).
   * Add **personas/avatars** with tone, challenge style; build objection trees and escalation rules.
   * Define **role matrix** (for group) with responsibilities and role‑weighted scoring.
   * Bind **rubrics** (select dimensions + segment weights).
   * Attach **context packs** (docs/links) for RAG; run policy/risk checks.
   * Save as **Draft** → **Publish** with versioning.
2. **Allocation Center**
   * Assign to **students/teams/cohorts**; select mode (individual/group); set windows/schedules.
   * Require pre‑read acknowledgement; artifact checklist; notifications.
   * Monitor acceptance and readiness (device check status).
3. **Live Console**
   * View room health; agenda timeline; elapsed/remaining time.
   * **Moderation:** pause/resume, inject curveballs, start breakout, bookmark evidence.
   * **Communications:** broadcast message or role‑targeted note.
4. **Assessment & Debrief**
   * Review individual/team reports; add **faculty overlays** (comments, scores).
   * Build **clip playlists** for class debrief; export PDFs.

### 5.3 Admin

* Tenant settings (branding, retention policies, feature flags).
* Roles & permissions; domain packs; catalog curation; audit logs.

## 6. Non‑Functional Requirements

* **Performance:** Join‑to‑first‑avatar‑response p95 < 2.0s; coaching cue latency p95 < 600ms; report ready p95 < 20s.
* **Availability:** 99.5% monthly; graceful degradation to audio‑first.
* **Security:** Cognito/SAML SSO; TLS; KMS encryption; WAF/Shield; least‑privilege IAM.
* **Privacy:** Consent gating; feature‑only processing option; retention windows; user‑initiated deletion (subject to policy).
* **Compliance:** Audit trails; access logs; region residency options.
* **Observability:** CloudWatch metrics, traces, structured logs; alerting on SLO breaches.

## 7. Integrations & Platform Components

### 7.1 HeyGen (Avatar Provider)

* **Use cases:** Multi‑avatar conversations, persona switching, voice TTS, lip‑sync.
* **Required functions:** session create/join, multi‑persona scene, real‑time prompts, webhooks for events (utterance, cue).
* **Abstraction:** Avatar Orchestrator service hides provider specifics; support provider swap.

### 7.2 AWS (Core)

* **Identity:** Amazon Cognito (SAML with JPT), role claims in JWT.
* **API:** Amazon API Gateway + Lambda / or ALB + ECS Fargate for services.
* **Realtime:** WebRTC signaling; Amazon IVS or Kinesis Video Streams for ingestion; optional Amazon Chime SDK for multi‑party rooms.
* **Speech:** Amazon Transcribe (streaming STT); Amazon Polly (TTS for coach voice/micro‑videos).
* **Vision:** Client‑first MediaPipe in browser; server‑assist via Amazon Rekognition (landmarks) and SageMaker endpoints (pose/gesture refinement) as needed.
* **Data:** Amazon Aurora PostgreSQL (scenarios, sessions, roles, rubrics, scores); Amazon DynamoDB (low‑latency session state); Amazon OpenSearch (transcripts, semantic search).
* **Storage & CDN:** Amazon S3 (raw/derived media, modules) + lifecycle to Glacier; Amazon CloudFront (delivery).
* **Index/RAG:** OpenSearch indices for context packs; embeddings pipeline via SageMaker/Batch.
* **Analytics:** QuickSight (optional) for faculty/program dashboards.
* **Security/Observability:** CloudWatch, CloudTrail, AWS WAF/Shield, KMS encryption.

## 8. Data Model (High‑Level)

* **users**(id, sso\_sub, role, cohort, program\_meta)
* **teams**(id, name, cohort\_id); **team\_members**(team\_id, user\_id, team\_role)
* **scenarios**(id, title, domain, difficulty, status[draft/published], owner\_id, version)
* **personas**(id, scenario\_id, role, tone, objection\_tree\_json, escalation\_rules\_json)
* **role\_matrix**(id, scenario\_id, role\_code, description, responsibility, weight\_map\_json)
* **allocations**(id, scenario\_id, target\_type[student/team/cohort], target\_id, mode[individual/group], window\_start, window\_end, status)
* **rooms**(id, allocation\_id, type[individual/group], start\_ts, end\_ts, status)
* **room\_participants**(room\_id, user\_id, assigned\_role\_code)
* **turns**(id, room\_id, speaker, text, ts, features\_json)
* **metrics\_individual**(id, room\_id, user\_id, cluster\_code, dimension\_code, segment, score, evidence\_refs)
* **metrics\_team**(id, room\_id, metric\_code, value, evidence\_refs)
* **reports**(id, room\_id, report\_json, generated\_at)
* **learning\_modules**(id, room\_id, type[text/pptx/mp4], s3\_uri, outline\_json)
* **files**(id, user\_id, room\_id, kind[deck/report/data], s3\_uri, checksum, virus\_scan\_status)

## 9. End‑to‑End Process Flows

### 9.1 JPT Soft‑Landing SSO

1. JPT renders “Executive Presence” CTA → 2) SAML→Cognito; EP receives JWT (sub, name, role, cohort).
2. EP creates/refreshes user profile; redirects to Student Dashboard / Professor Studio.

### 9.2 Scenario Authoring (Professor)

1. Create scenario → 2) Add personas/avatars (tones, objections, escalations) → 3) Define role matrix (group only) → 4) Bind rubric (dimensions + segment weights) → 5) Attach context packs (docs/links) → 6) Run policy checks → 7) Publish.

### 9.3 Allocation

1. Select scenario → 2) Choose target (students/teams/cohort) → 3) Mode (ind/group) + schedule window → 4) Require pre‑reads and file checklist → 5) Notify assignees.

### 9.4 Individual Simulation

1. Prep Room (brief, uploads, consent, device test) → 2) Join room; avatar starts conversation → 3) Live transcript + cues; present deck if applicable → 4) Telemetry captured (speech/vision/interaction) → 5) End; evaluation kicks in → 6) Debrief + full report + learning modules.

### 9.5 Group Simulation

1. Prep (roles, materials) → 2) Join team room; avatars join → 3) Role‑aware dialogue, baton control, breakouts → 4) Team & individual telemetry → 5) End; **team + individual** reports + learning.

### 9.6 Evaluation & Reporting

1. Feature extraction (prosody, hedge rate, gaze %, gesture cadence, talk/listen) → 2) LLM evaluators apply rubrics (1–9) with evidence spans → 3) Cluster rollups + Composite EP → 4) Team metrics (TTBI, decision latency, CQ, MCS) → 5) Reports with clips & transcripts → 6) Persist + notify.

### 9.7 Learning Generation

1. Gap analysis → 2) Draft text lesson → 3) Generate PPTX deck → 4) Optional micro‑video (TTS + slides) → 5) Deliver to student with re‑sim link.

### 9.8 File Workflow

1. Student uploads deck/data via pre‑signed S3 URL (virus scan) → 2) Stored + previewable → 3) Bound to session and visible during sim.

## 10. User Stories (Selected)

* As a **student**, I want to present my deck to a CFO avatar and receive specific feedback with video evidence so I can improve for my next attempt.
* As a **professor**, I want to author a multi‑persona board scenario and allocate it to Team A as a group sim with role assignments.
* As a **professor**, I want to see team talk‑time balance and decision latency so I can coach coordination.
* As an **admin**, I want to enforce feature‑only processing unless students consent to video storage.

## 11. Acceptance Criteria (Vendor)

* **SSO**: Single‑click launch from JPT; correct role landing (student/professor).
* **Avatar**: Multi‑persona scenes via HeyGen; dynamic prompts; stable 2‑second p95 latency.
* **Present‑to‑Avatar**: Screen‑share works reliably; avatars respond to slide content cues.
* **Analytics**: Prosody/lexical/vision features computed on commodity laptop; fallback to audio‑only.
* **Reports**: 6‑cluster view, evidence clips, segment deltas, team metrics; PDF export.
* **Learning**: Generates text + PPTX (mandatory) and micro‑video (optional) per session.
* **Group Sim**: Role matrix honored; team + individual scoring; breakouts; professor console tooling.
* **Security**: Consent gates; encryption; retention policies; audit logs.

## 12. Risks & Mitigations

* **Vision compute cost** → client‑first extraction; sampled server refinement; lifecycle retention.
* **Evaluator drift** → monthly calibration with gold clips; inter‑rater checks; prompt versioning.
* **Network variability** → adaptive bitrate; audio‑only fallback; local buffering.
* **Faculty time to author** → scenario templates; cloning; agentic assistants (later).

## 13. Environments & DevOps

* **Envs:** Dev, Staging, Prod; separate AWS accounts/VPCs.
* **CI/CD:** GitHub Actions or CodePipeline; infra as code; blue/green deployments.
* **Secrets:** AWS Secrets Manager; key rotation.
* **Monitoring:** Dashboards (latency, joins, STT confidence, dropped frames, report times); pager alerts.

## 14. Glossary

* **EP**: Executive Presence.
* **O/H/C/R**: Opening, Objection‑handling, Closing, Reflection.
* **TTBI**: Talk‑Time Balance Index.
* **CQ**: Coordination Quotient.
* **MCS**: Meeting Craft Score.
* **RAG**: Retrieval Augmented Generation.
* **Persona**: Simulated stakeholder (e.g., CFO).
* **Role Matrix**: Team role definitions and weights for group sims.