**Deck outline you can paste into PowerPoint**

**1) Cover**

* **Title:** UAE Legal GraphRAG — Technical Proposal (EY)
* **Subtitle:** Azure-native core + optional Neo4j mirror for audit & demos
* **Logos:** EY + UAE (as appropriate)
* **Speaker notes:** 1-liner value prop: “time-accurate, explainable legal answers with audit-grade provenance.”

**2) Executive summary**

* Azure AI Search (hybrid) + Cosmos DB (Gremlin) + **function-called, parameterized Gremlin** + grounded generation
* **Bi-temporal** model (valid vs transaction time); **jurisdiction-aware** (federal, emirates, DIFC/ADGM)
* Private Link, RBAC, Purview; clear cost dials (RU/s, SU/h, $/1k semantic, tokens)
* Optional **Neo4j mirror** (Text2Cypher + Bloom + GDS) for audit & demos
* **Visual:** small architecture ribbon (front door → graph tools → grounding → answer)

**3) Objectives & success criteria**

* **As-of correctness** (entry-into-force & Gazette citations)
* Coverage: **UAE Legislation** (federal), **emirate gazettes**, **DIFC/ADGM** judgments
* **Explainability:** every claim backed by graph paths (amends/repeals/implements/cites/interpreted\_by)
* **Operational safety:** Private Link, RBAC, read-only graph tools, **groundedness check** before display
* **Notes:** define what “pass” looks like (groundedness >95%, temporal regressions all green, etc.)

**4) Sources & provenance (authorities)**

* UAE Legislation portal (federal); emirate gazettes (e.g., Dubai SLC, Abu Dhabi Gazette)
* DIFC Courts + ADGM Courts judgments portals
* Ministry / regulator portals for decisions & circulars
* **Visual:** logos + “source → parse → graph & index” strip
* **Callout:** keep **PDFs, hashes, and Gazette refs** for chain-of-custody

**5) Why GraphRAG (Local / Global / DRIFT)**

* **Local:** entity-centric hops (fast, precise)
* **Global:** corpus-level community summaries (themes, conflicts)
* **DRIFT:** global cues aim targeted follow-ups (recall ↑, cost ≪ full global)
* **Visual:** 3-lane diagram (Local / Global / DRIFT) with 1-sentence use case each

**6) Reference architecture (Azure core)**

* **AI Search**: hybrid BM25+vector (RRF), optional **semantic rerank**
* **Cosmos DB (Gremlin API)**: authoritative KG, Private Link, RBAC
* **LLM**: Azure OpenAI / Azure AI endpoints; **groundedness detection/correction**
* **Access**: **Text→Tool→Gremlin** (read-only, parameterized templates); optional **Agent Service** for short plans
* **Visual:** architecture block diagram with private endpoints

**7) Graph model (UAE-specific)**

* **Nodes:** Instrument, Provision (Article/Clause), Event/Statement, GazetteIssue, Authority, Jurisdiction, Court, Judgment, Topic
* **Edges:** HAS\_PROVISION, PUBLISHED\_IN, ISSUED\_BY, APPLIES\_IN, **AMENDS/REPEALS (via Event)**, IMPLEMENTED\_BY/DELEGATES\_TO, CITES, INTERPRETED\_BY/RELIES\_ON, HAS\_TOPIC
* **Visual:** compact ER diagram with icons

**8) Multi-temporal (bi-temporal) modeling**

* Event nodes keep **valid\_from/valid\_to** (law in force) + **tx\_from/tx\_to** (what we believed when)
* **As-of** filters in every retriever; **snapshot & diff** for “2022 vs 2024”
* **Visual:** timeline with Gazette publication → entry-into-force → amendment

**9) Ingestion & OCR**

* Fetch PDFs/HTML; **Arabic/English OCR** (Azure AI Document Intelligence)
* Segment to Article/Clause; extract citations/amendments; attach Gazette metadata & hashes
* Upsert to **Cosmos (graph)** + **AI Search (text)**; schedule change detection
* **Visual:** pipeline swimlane (fetch → OCR → segment → extract → validate → upsert)

**10) Indexing & search (front door)**

* Hybrid **BM25 + vectors** with **RRF**; filters: jurisdiction, instrument type, as-of date
* Optional **semantic rerank** ($/1k queries) for precision
* Every chunk stores **graph IDs** to hop structurally after search
* **Visual:** index schema: text + key graph IDs

**11) Retrieval: Local (precision)**

* Seed from named entities (law/article/judgment)
* k-hop across **amends/repeals/cites/interpreted\_by**, filtered by **as-of** & **jurisdiction**
* Return **paths + spans** (for grounding)
* **Visual:** example path chip (Art. 12 ← amended by Law 3/2023 (Gazette 7/2023))

**12) Retrieval: Global & DRIFT (synthesis)**

* **Global:** communities by topic/sector; map→reduce **community summaries**
* **DRIFT:** pick top community reports → targeted Local hops → fuse
* Version **summary\_as\_of** so answers are reproducible
* **Visual:** community clusters + summary card

**13) Text→Tool→Gremlin vs Text2Cypher**

* **Neo4j demo:** **Text2Cypher** (declarative, strong ecosystem) + Bloom audit
* **Azure prod:** **function-called Gremlin templates** (read-only, hop/row/time limits) for safety
* Tool catalog: as\_of\_snapshot, amendments\_chain, implementing\_measures, case\_interpretations
* **Visual:** compare table (safety, speed, ops)

**14) Minimal agentic loop (only when needed)**

* Use for **multi-step** asks (compare time slices, cross-jurisdiction synthesis, conflict triage)
* Azure AI Agent Service executes **2–4 tools** then stops; logs every step
* **Default** remains single-step (search → one tool)
* **Visual:** plan → tool → evaluate → stop

**15) Generation & grounding**

* Draft from retrieved spans; **groundedness detection/correction** before display
* Always show **Gazette no./date** + instrument/article/judgment IDs
* **Visual:** answer card with inline citations & “show path” button

**16) Security, residency, governance**

* **Private Link** for Cosmos & AI Search; no public endpoints; VNet-integrated
* Entra ID RBAC; Key Vault; App Insights/Log Analytics; **Purview** for catalog & lineage
* **Visual:** network diagram with private endpoints & NSGs

**17) Evaluation & QA**

* **RAG triad:** context relevance, groundedness, answer relevance + **jurist review**
* **Temporal regression** on known amendments/repeals (Gazette-stamped)
* Latency SLOs; incident playbooks
* **Visual:** KPI panel (pass rates, p95 latency, cost/query)

**18) Cost model (the dials)**

* Cosmos **RU/s** (autoscale or reserved capacity); storage
* AI Search **SU/h**; **semantic rerank** ($1 per 1k after 1k free)
* **Tokens** (model choice, caching); OCR **pages**
* Private Link endpoints & data processed
* **Visual:** dials + simple formulas; link to spreadsheet

**19) Cost projection — Pilot (order-of-magnitude)**

* Example mix: ~30k RU/s; 1× S1 Search; ~200k semantic queries/mo; ~150M tokens/mo; 50k OCR pages
* Ballpark: **low thousands USD/mo** (dominated by LLM + retrieval)
* Neo4j demo: small AuraDB tier + same LLM/OCR → similar overall
* **Visual:** stacked bar (LLM + Search + Graph + OCR)

**20) Cost projection — National scale**

* Example mix: ~150k RU/s (2 regions); 3× S2 Search; ~5M semantic queries/mo; ~2.5B tokens/mo; 1M OCR pages
* Ballpark: **mid tens of thousands USD/mo** (LLM + semantic rerank dominate)
* **Levers:** reserved RU/s, semantic thresholds, small models for sub-tasks, caching
* **Visual:** sensitivity tornado (what if tokens ↑ / semantic off / reserved RU)

**21) Demo plan (Neo4j)**

* Slice: 100–200 federal instruments + 50 DIFC/ADGM judgments + 1–2 emirate gazettes
* Show **Text2Cypher** + **Bloom**; compute GDS communities for **Global/DRIFT**
* Mirror slice into Azure (AI Search + Gremlin tools + grounding)
* **Visual:** checklist with 2–3 demo stories

**22) Delivery roadmap**

* **Phase A (6–10 wks):** demo + Azure spine; 3–5 Gremlin tools; grounding gate; pilot users
* **Phase B:** full federal corpus; production hardening (Private Link, Purview, monitoring)
* **Phase C:** emirate & free-zone expansion; conflict detectors; drafting assistants
* **Visual:** phased timeline

**23) Risks & mitigations**

* Data freshness → scheduled crawlers + manual intake for critical updates
* Temporal errors → bi-temporal model + as-of tests + jurist review
* Cost creep → token/RU/SU budgets, semantic gating, caching, reserved capacity
* Security (prompt injection/tool misuse) → allow-listed tools, arg validation, timeouts

**24) Appendix — citations to include**

* **GraphRAG patterns** (Local/Global/DRIFT) — Microsoft docs
* **AI Search** hybrid + **semantic rerank** & pricing — product docs
* **Cosmos DB (Gremlin)** + **Private Link** — docs
* **Content Safety – groundedness**; **Document Intelligence** (Arabic OCR) — docs
* **UAE Legislation** portal; **Constitution** (Gazette/entry-into-force); **DIFC/ADGM** judgments portals

*(Add the exact URLs in this slide; you can export PDFs of each for records.)*