# Adaptive Authentication

A Risk-based Authentication System

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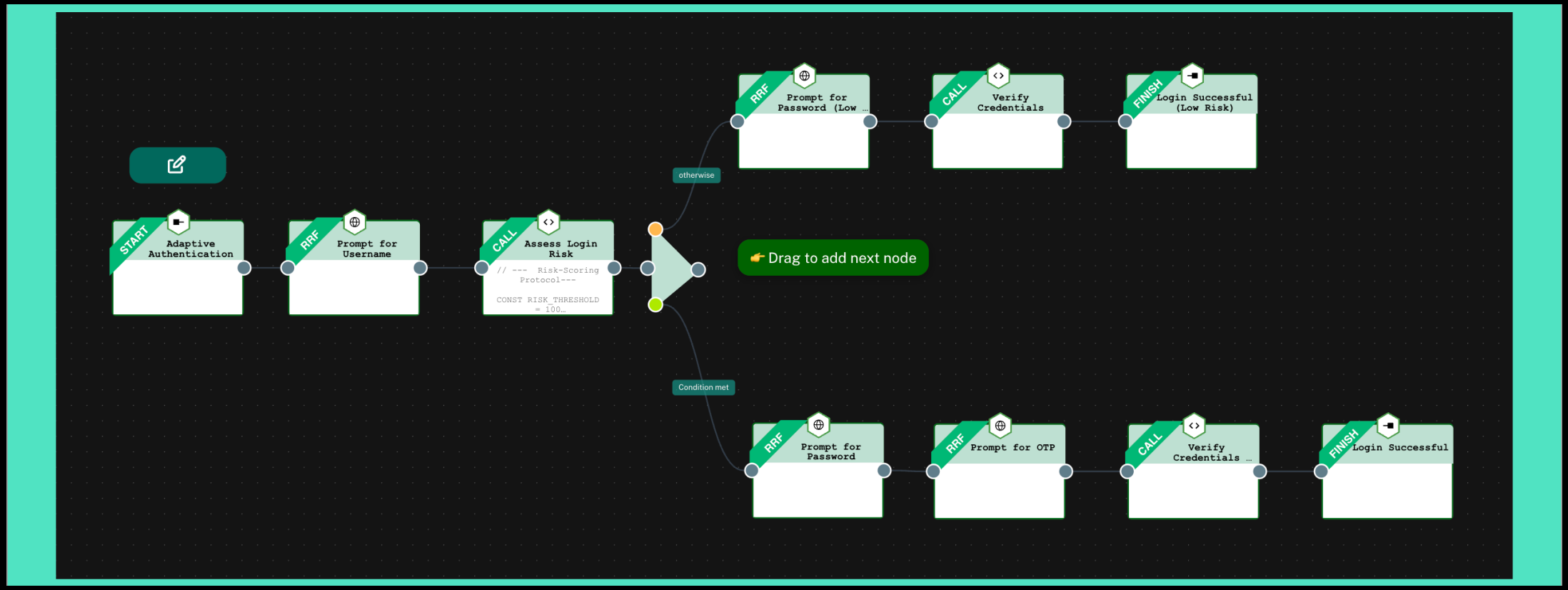
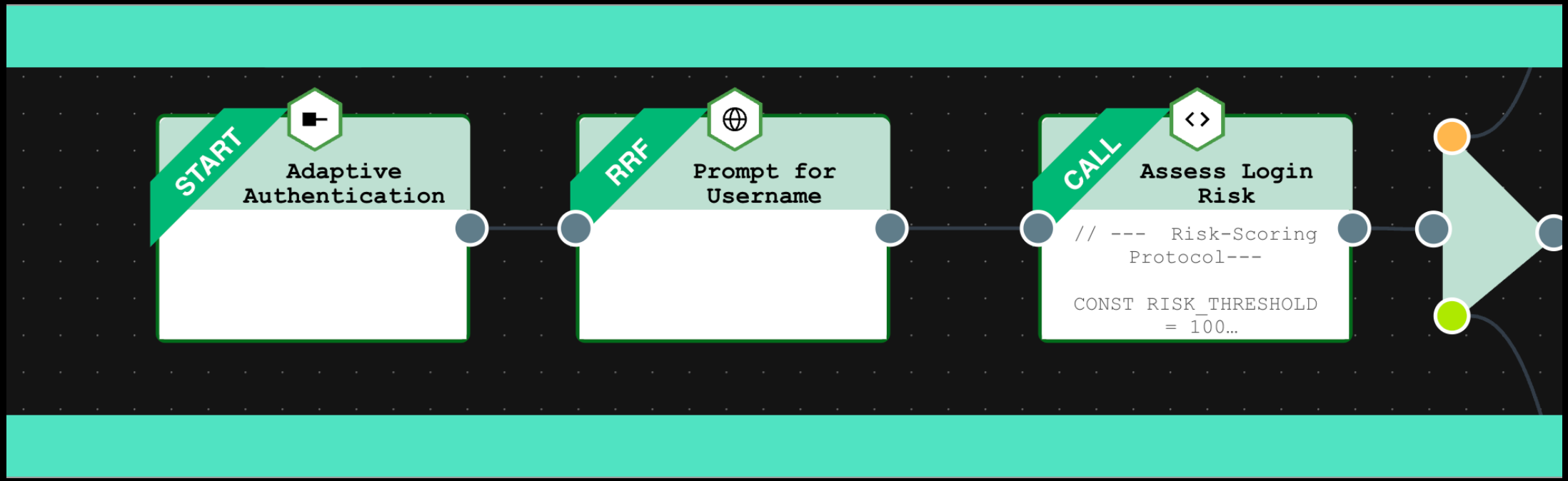
# Objective

- To design a risk-based authentication system that enhances security against high-risk login attempts while preserving a frictionless experience for trusted users.




# Authentication Flow

- This flow is divided into three phases: Identification & Risk Assessment, The Adaptive Decision Path, and Credential Verification.
- Based on the initial risk assessment, the user is directed down one of two paths:
  - Low-Risk: A frictionless, single-factor (password) verification.
  - High-Risk: A Multi-Factor approach to authentication (Password + OTP).



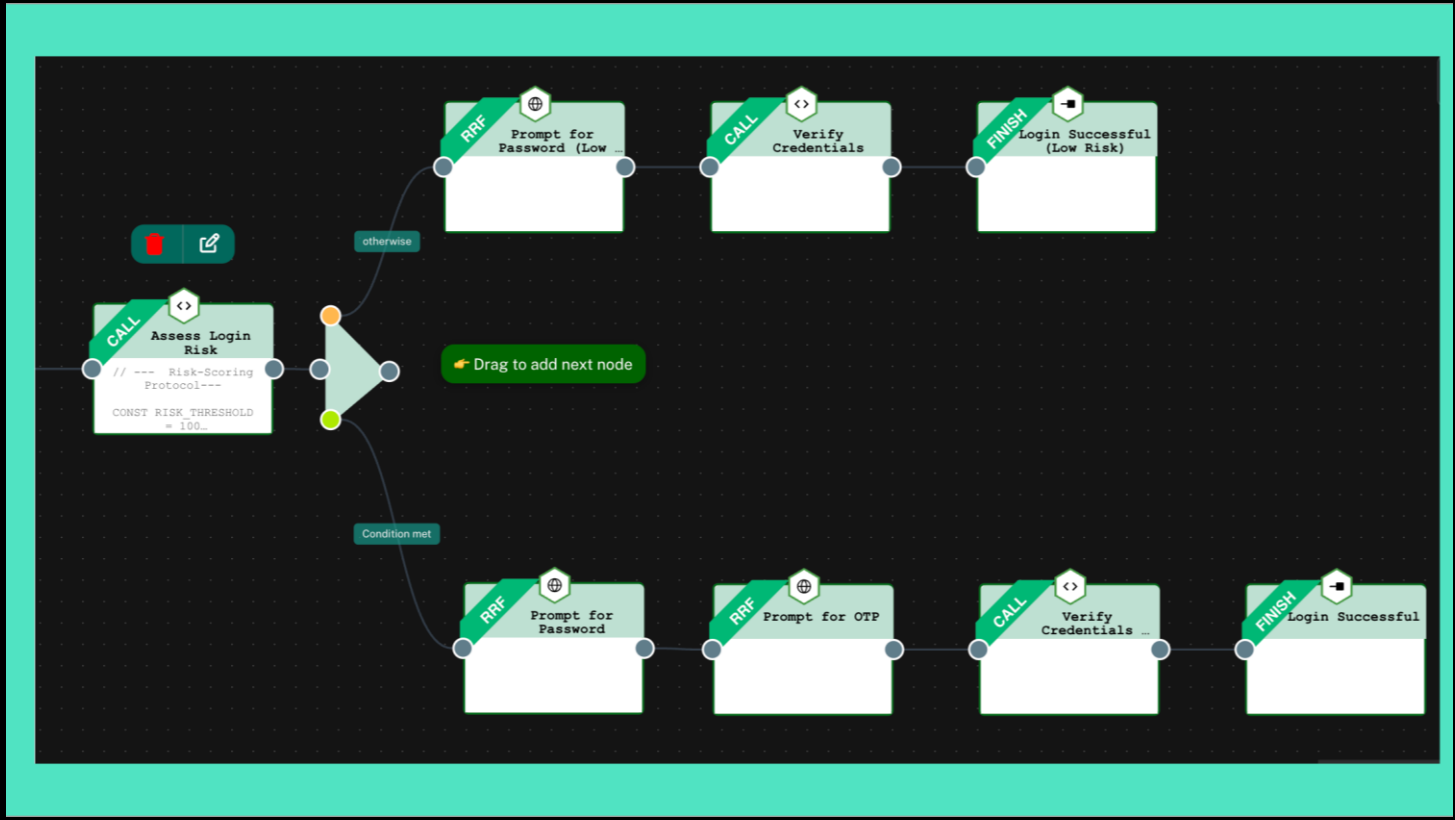

# Phase I: Identification & Risk Assessment

- The flow begins by collecting the user's primary identifier
- A CALL node delegates then executes the risk assessment logic
- The logic for the risk assessment is defined as pseudocode within the node.

# Risk Assessment Logic

- This pseudocode uses a flexible risk-scoring model
- It evaluates multiple risk signals including device IP, New Device, and Impossible Travel
- It then makes a final decision based on the risk scoring threshold.

```
// ---  Risk-Scoring Protocol---

CONST RISK_THRESHOLD = 100

FUNCTION analyze(username, request_context):

  risk_score = 0

  // 1. Check IP Reputation (High Impact)

  IF is_ip_blacklisted(request_context.ip_address)
THEN
    risk_score += 90
  END IF

  // 2. Check for New Device (High Impact)

  IF is_new_device_for_user(username, request_context.device_fingerprint) THEN
    risk_score += 75
  END IF

  // 3. Check for Impossible Travel (Critical Impact)

  IF is_impossible_travel(username, request_context.location)
THEN
    risk_score += 150
  END IF

  // 4. Check for Atypical Login Time (Medium Impact)

  IF is_atypical_login_time(username, request_context.timestamp)
THEN
    risk_score += 30
  END IF

  // 5. Decision

  IF risk_score >= RISK_THRESHOLD
THEN
    RETURN "high"

  ELSE
    RETURN "low"
  END IF
```

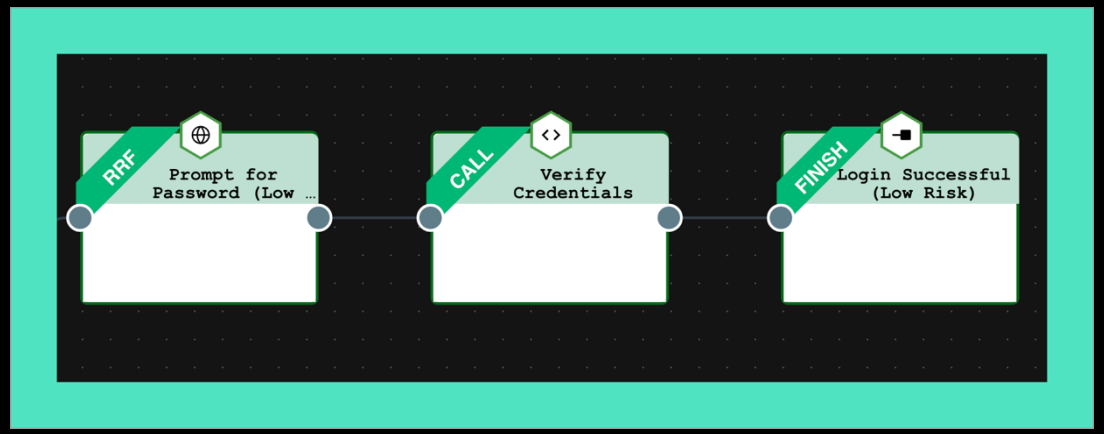



# Phase II:
# The Adaptive Decision

- The WHEN node acts as as the decision point of the flow
- It evaluates the risk level from the risk assessment
- The user is then taken through either the high risk or low risk path.

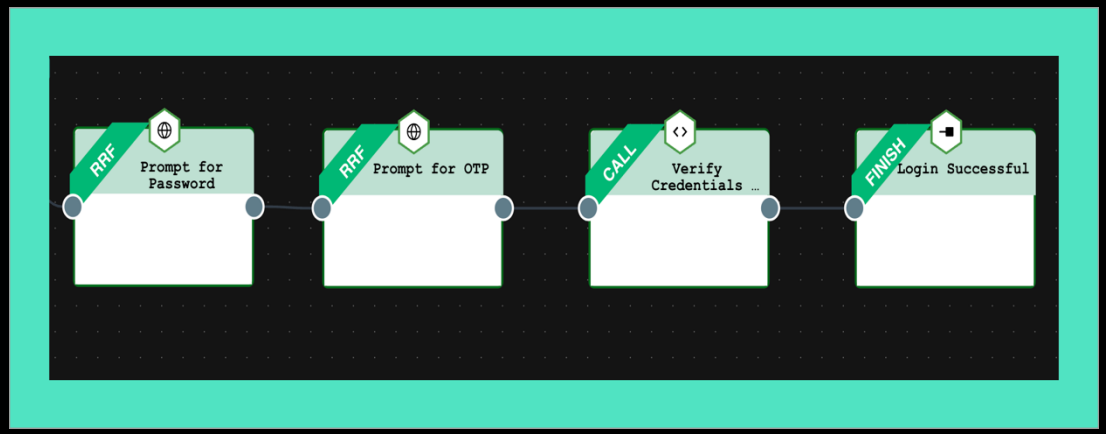
# Phase III: Credential Verification

## Low-Risk Path




Password Only

## High-Risk Path




Password + OTP