

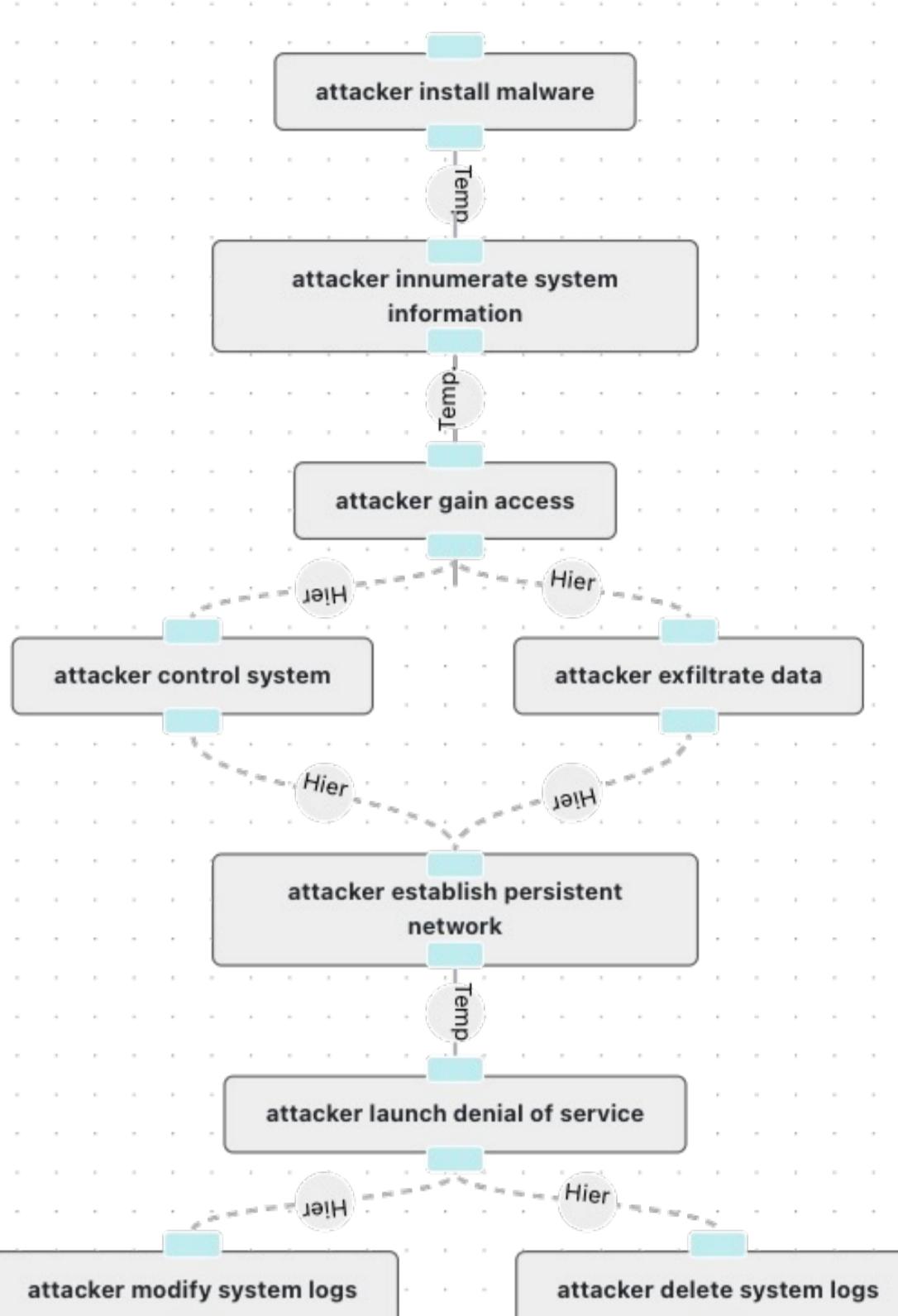


# Human-in-the-loop Schema Induction

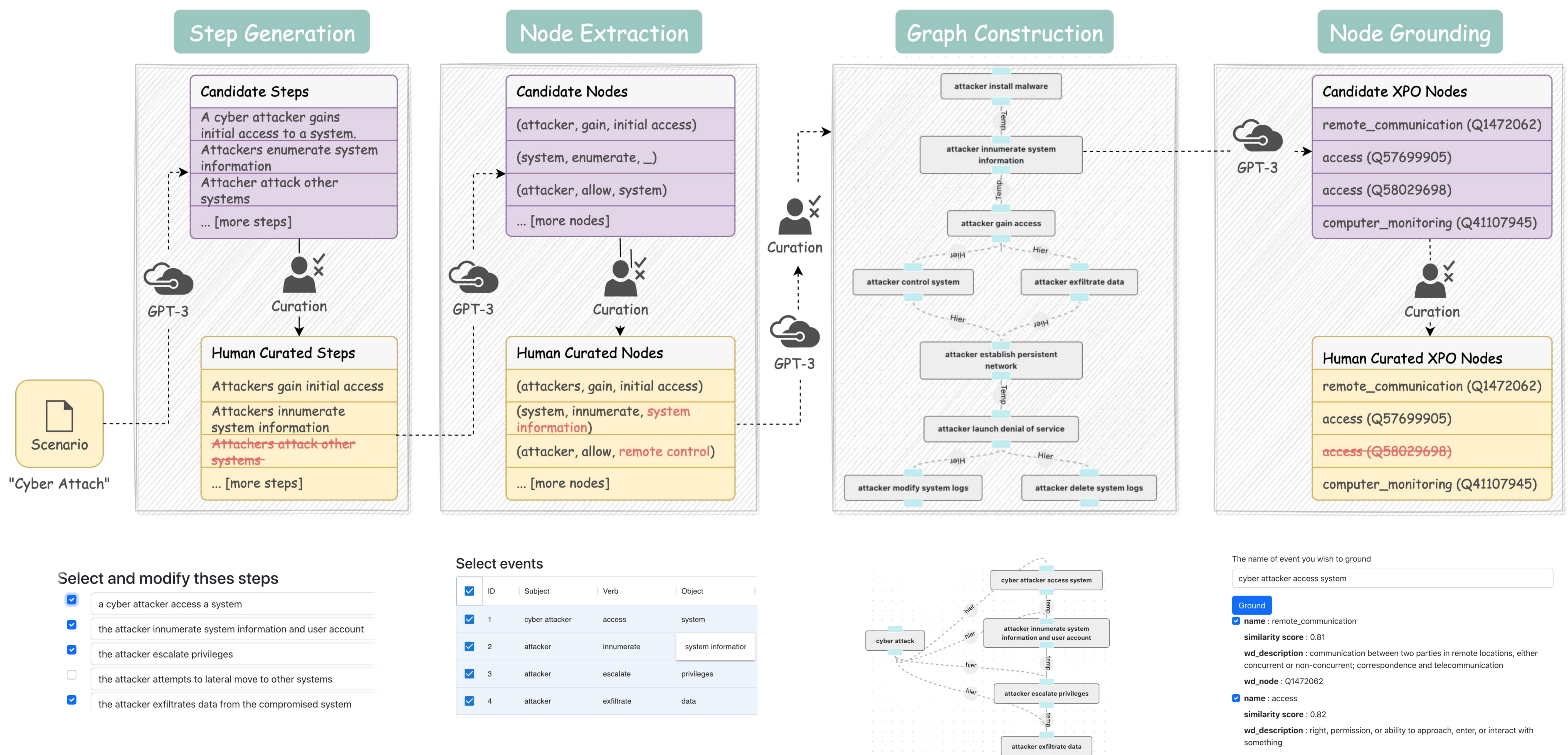
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## Introduction: Event Schema

- What is the event schema?
  - Event schema is a **structured representation of actions (events)**
  - It represents the **development of events** in cognition or reality
- Why we need schemas?
  - It is essential for **understanding the natural language** (e.g. the logic in a long passage) and for **improving on the downstream tasks** (e.g. Question-Answering, event inference)
  - E.g. Documents about the war between Russia and Ukraine Schema:  
... → battle → negotiation → armistice → another battle ...  
Q: Why Russia called for a peace talk after the battle?  
Q: What's the result of the negotiation? ...
- What's current bottlenecks for automatic schema induction?
  - ✓ low cost, high efficiency
  - ✗ unstable quality influenced by incompleteness, domain transferring, etc.
- What's our expectation for the schema induction?
  - ✓ **high quality**, ✓ **high efficiency**
- What we have in hand?
  - ✓ GPTs: good **background knowledge** in various scenarios w/o fine-tuning
  - ✓ limited human force: high quality
- Our proposed approach:
  - First, GPTs offer candidate materials (steps, nodes, relations...)
  - Next, human judges correct them with their knowledge



## Methods: Human Improves Machine Generation at Each Step



## Evaluations: High Quality and High Efficiency

	EVC	FOD	JOB	MED	MRG
Step Acc	11/12	7/8	10/10	10/10	12/12
Node Acc	13/15	10/10	11/12	12/12	12/14
Graph Node ED	1	0	0	0	0
Graph Edge ED	8	0	7	3	16
Grounding Success Rate	5/12	3/10	3/11	6/12	9/12
Self-reported time (min)	15	10	11	10	14

✓ high efficiency: Reducing from hours to minutes

✓ high quality: Human improves automatic generation

✓ easy to use: Clear instruction & friendly interaction

— — shows **good commonsense knowledges** of the GPTs

— — shows **human improvements** made on the auto generations

— — shows the **efficiency** of our approach