

# Safe harbor statement

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ORACLE

# DevOps, Source Code, and AI/ML

Embracing the fast-evolving data technologies landscape

**Cris Pedregal, John Lathouwers, and Arno Schneuwly**

Technical Staff, Oracle R+D



# CERN and Oracle collaboration in two-and-a-half small pieces



## CERN has been Oracle R+D's close(st) technical partner for 40+ years

We learn from each other, and we benefit from complementary strengths

Current collaborations include:

- DB disaster recovery to the cloud, Multi-cloud requirements ...
- Ongoing & new AI/ML work, including model management, OCI GPUs, ...
- Dr. Paula Martínez Suárez joins ATLAS: FPGAs for ML, ...

Today, short pieces from John and Arno

- **John:** work with CERN on open source that makes (Oracle/devops) technologies better and easier to use. Started last year, at this workshop.
- **Arno:** research on AI/ML for source code and application development. Looking at CERN approaches and use cases for mutual interests. Starting now, at this workshop.

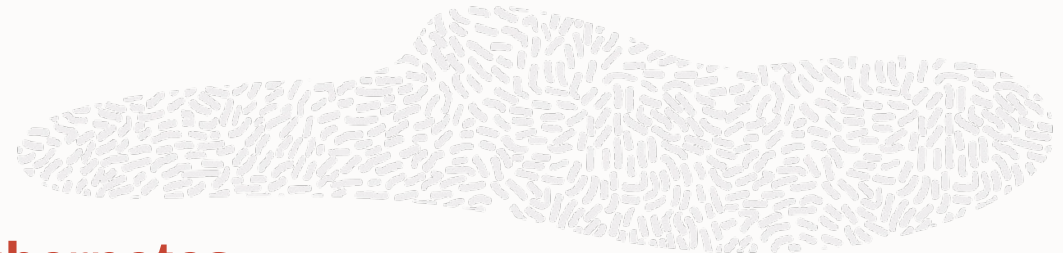


# Driving Innovation through Collaboration

—  
John Lathouwers



# Synergies not Silos



Files

main

Go to file

- > samples
- > scorecard
- > docs
- > hack
- > internal/controller
  - ords\_init.sh
  - restdataservices\_controller.go**
  - restdataservices\_controller\_t...
  - restdataservices\_ordsconfig...
  - suite\_test.go
- > test
  - .dockerignore
  - .gitignore

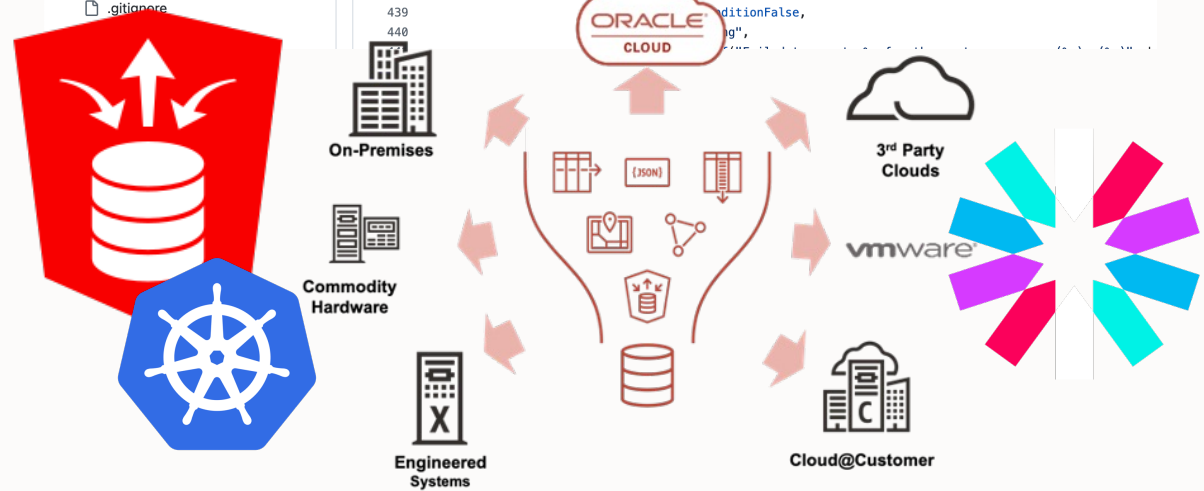
oracle-ords-operator / internal / controller / restdataservices\_controller.go

Code Blame 1048 lines (953 loc) · 36.5 KB

```

384 func (r *RestDataServicesReconciler) WorkloadReconcile(ctx context.Context, req ctrl.Request, ords *
418     ObjectMeta: objectMeta,
419     Spec: appsv1.DeploymentSpec{
420         Replicas: &ords.Spec.Replicas,
421         Selector: &selector,
422         Template: template,
423     },
424 }
425 desiredSpecHash = generateSpecHash(desiredWorkload.(*apps1.Deployment).Spec)
426 desiredWorkload.(*apps1.Deployment).ObjectMeta.Labels[spechashLabel] = desiredSpecHash
427 }
428
429 if err := ctrl.SetControllerReference(ords, desiredWorkload, r.Scheme); err != nil {
430     return err
431 }
432
433 definedWorkload := reflect.New(reflect.TypeOf(desiredWorkload).Elem()).Interface().(client.Object)
434 if err = r.Get(ctx, types.NamespacedName{Name: ords.Name, Namespace: ords.Namespace}, definedWorkload); err != nil {
435     if apierrors.IsNotFound(err) {
436         if err := r.Create(ctx, desiredWorkload); err != nil {
437             condition := metav1.Condition{
438                 Type: "availableORDS",
439                 Status: metav1.ConditionFalse,
440                 Reason: "CreateFailed",
441             }
442             r.SetStatusCondition(&desiredWorkload.Status, condition)
443             return err
444         }
445     }
446 }

```



## Kubernetes

- Oracle Rest Data Services (ORDS)
  - Kubernetes Operator
  - Full Lifecycle Management
  - **CERN, Oracle ORDS, APEX, OraOperator Engineers**
- Oracle Operator for Kubernetes (OraOperator)
  - Existing OpenSource Solution
  - Database Lifecycle Management
  - **CERN, Oracle ORDS, OraOperator, Database Engineers**

## JWT Profile to support RBA

- Additional functionality
- **CERN, Oracle ORDS Engineers**



# AI for Source Code: A Practitioner's Insights into Automating DevOps

—  
Arno Schneuwly

# The AI4Code Market

JAMES GOVERNOR'S MONKCHIPS

## AI disruption – code editors are up for grabs

By James Governor | @monkchips | February 21, 2025

### Vibe Coding and the Future of Software Engineering

Written by: alexp on February 19, 2025

AI-coding startup Codeium in talks to raise at an almost \$3B valuation, sources say

MongoDB Announces Acquisition of Voyage AI to Enable Organizations to Build Trustworthy AI Applications

Google launches a free AI coding assistant with very high usage caps

OpenAI Researchers Find That Even the Best AI Is "Unable To Solve the Majority" of Coding Problems

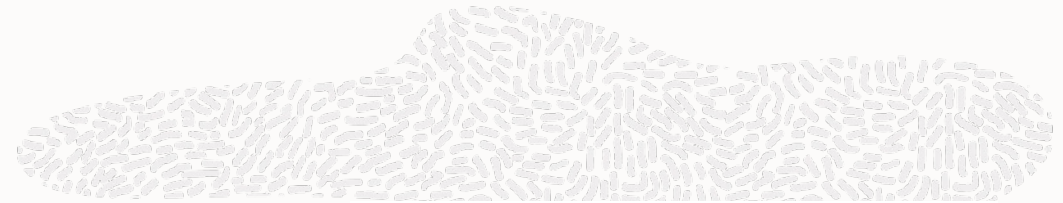
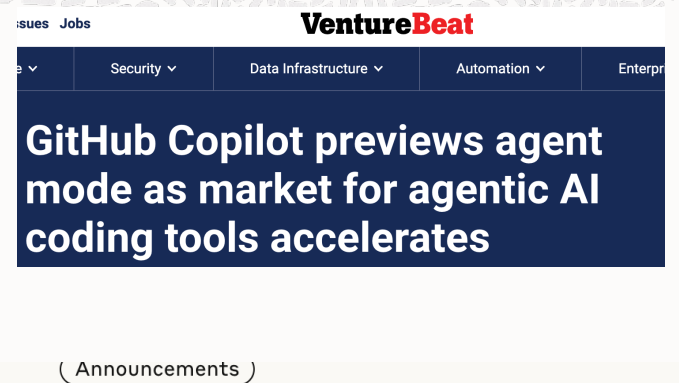
Maybe these AIs should learn to code.

Oracle Code Assist, Java-Optimized, Now in Beta

At Oracle CloudWorld, the company announced incremental enhancements for Oracle Cloud Infrastructure and OCI Kubernetes Engine to ease deployment and management of AI workloads.

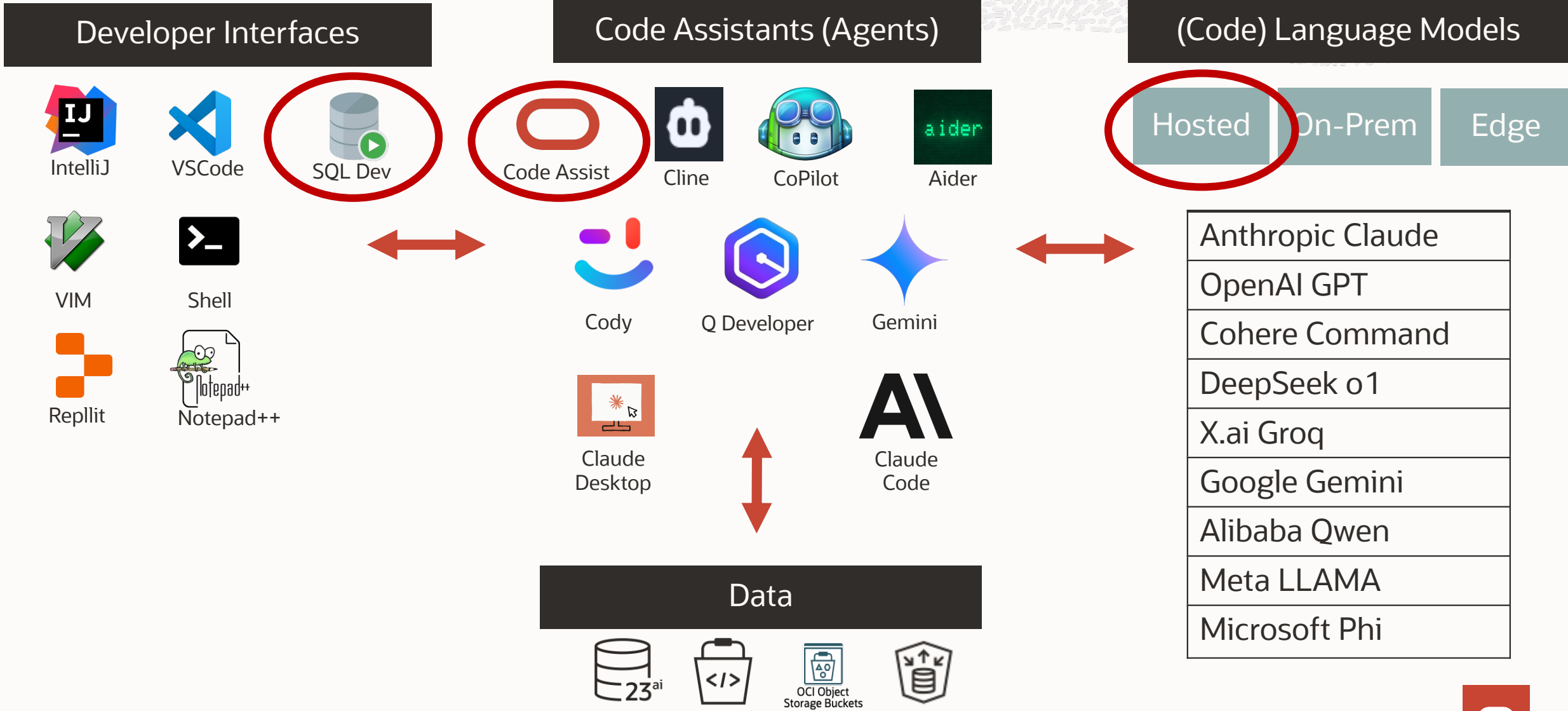
## Claude 3.7 Sonnet and Claude Code

24 Feb 2025 • 5 min read

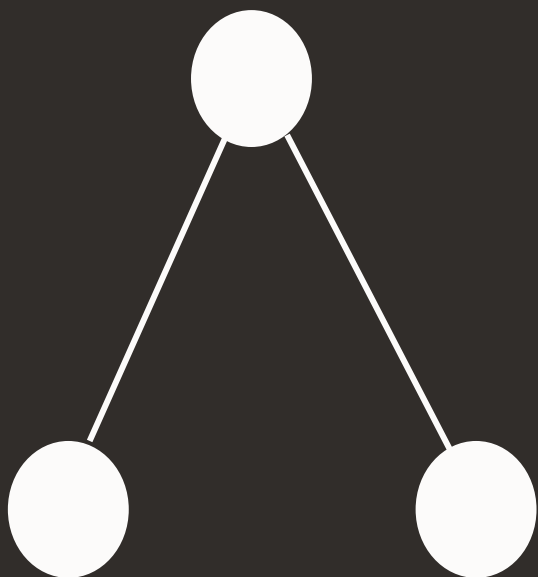




# Coding Assistant Ecosystem







## A Glimpse Into Some of Our R&D

### A Graph Path Prediction Paradigm



# The Role of ASTs in Code Models

Masked Language Modelling is a way to train language and code models.

MLM for Natural Language

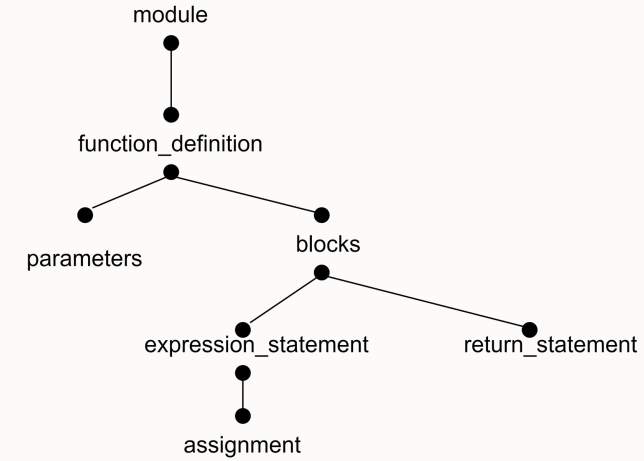
This MASK a simple test

MLM for Code

def bark ( arg ) : MASK (

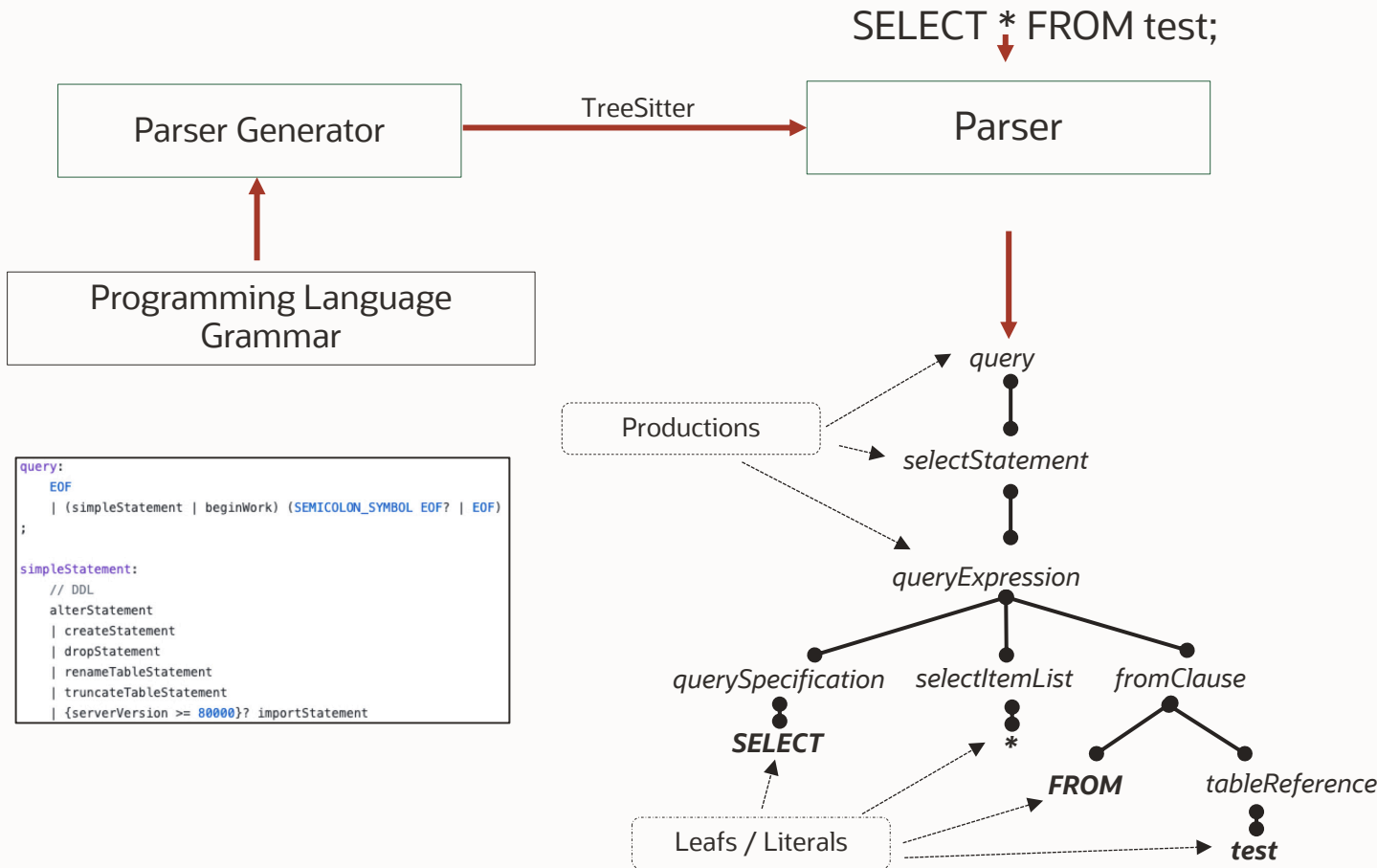
MLM for ASTs

module Function\_def  
initiation Parameters MASK Expression\_s  
tatements Assignment Return\_state  
ments



# From a SQL Query to AST Paths

## Parsing System – AST Generation



## AST Information

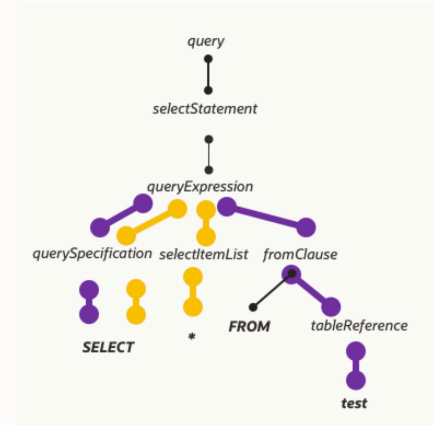
### Paths

#### Categories

Production Rules

Cross-Context Paths

Terminal Paths

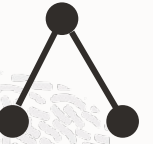


Applies to any Programming Language!



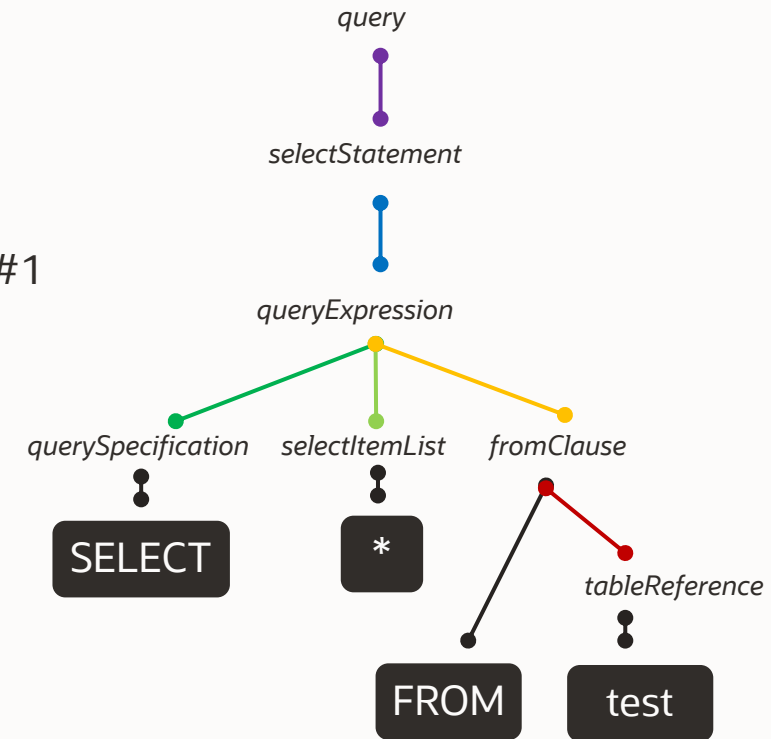
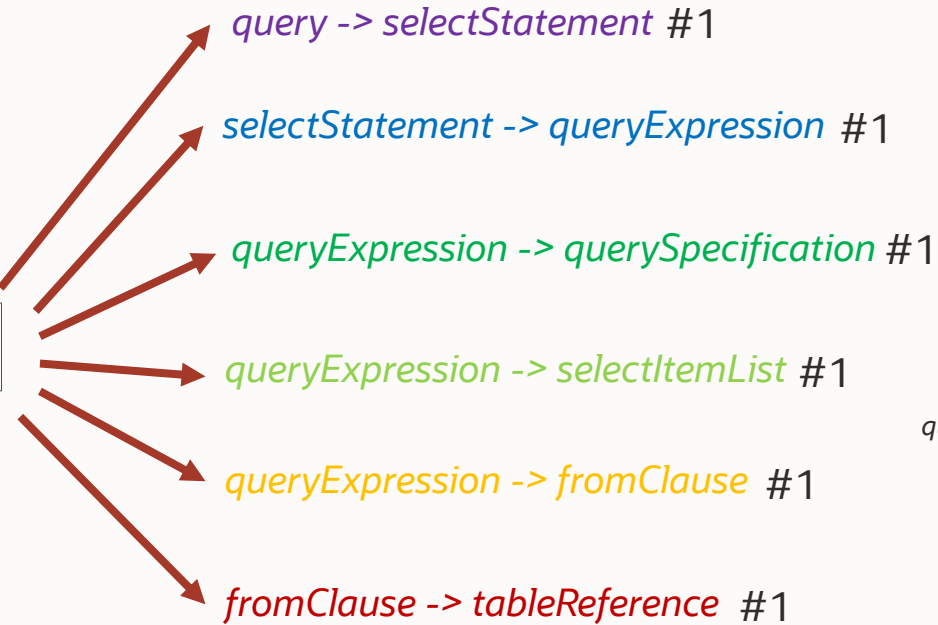
# Rethinking the Incorporation of ASTs into Language Models

Design a task to predict the AST paths of the input code tokens.



## Paths

### Input Tokens (Code Snippet)

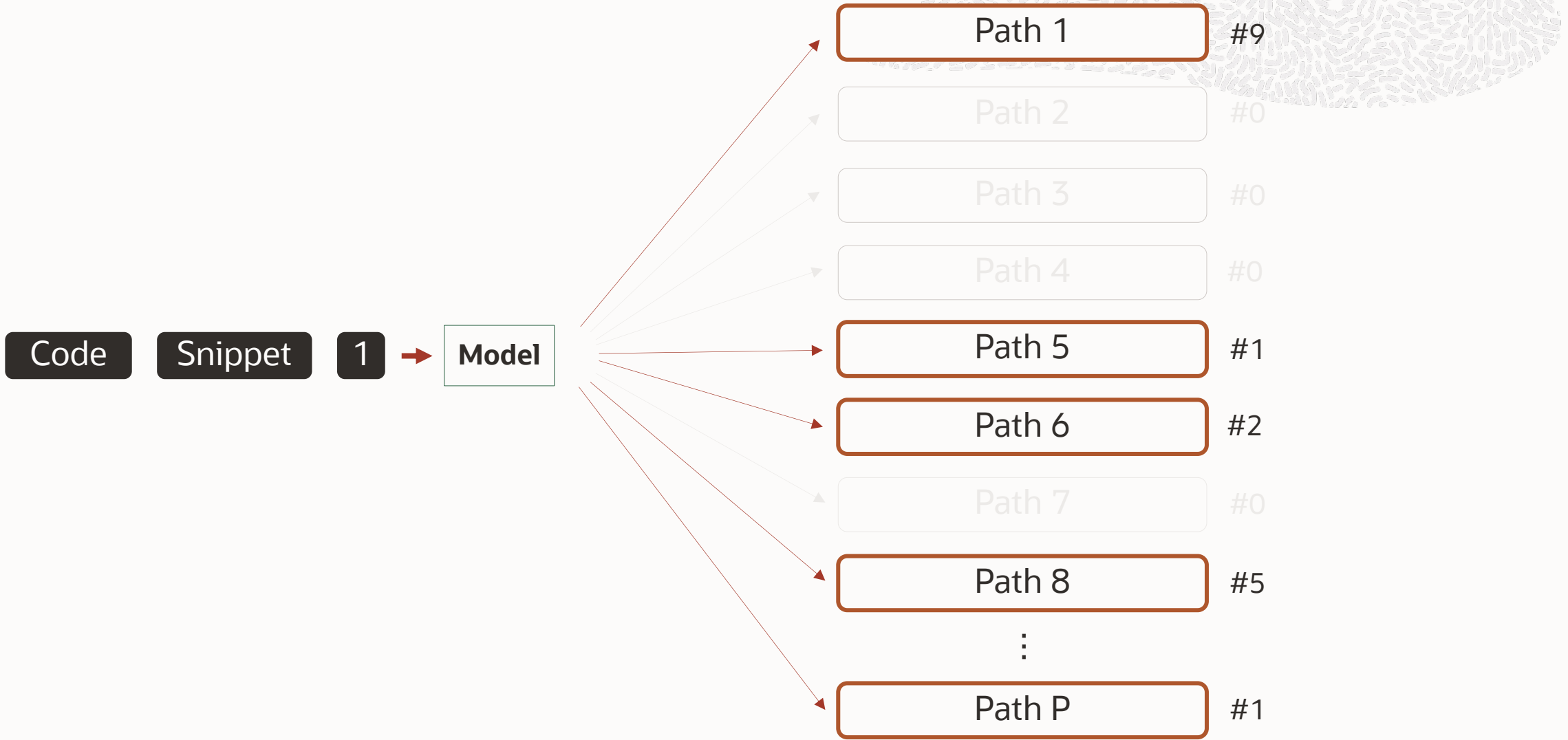


## AST Path Prediction - APP

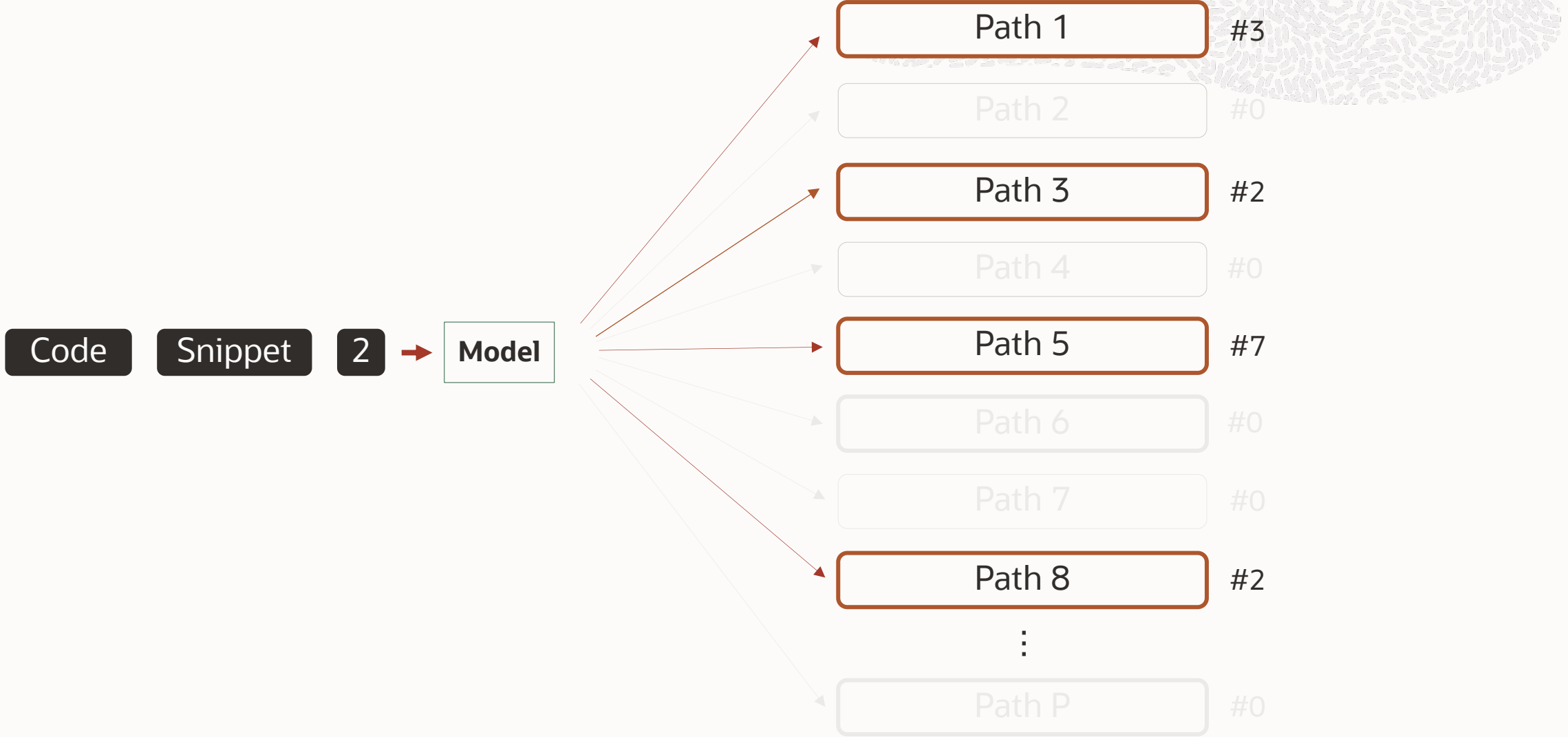




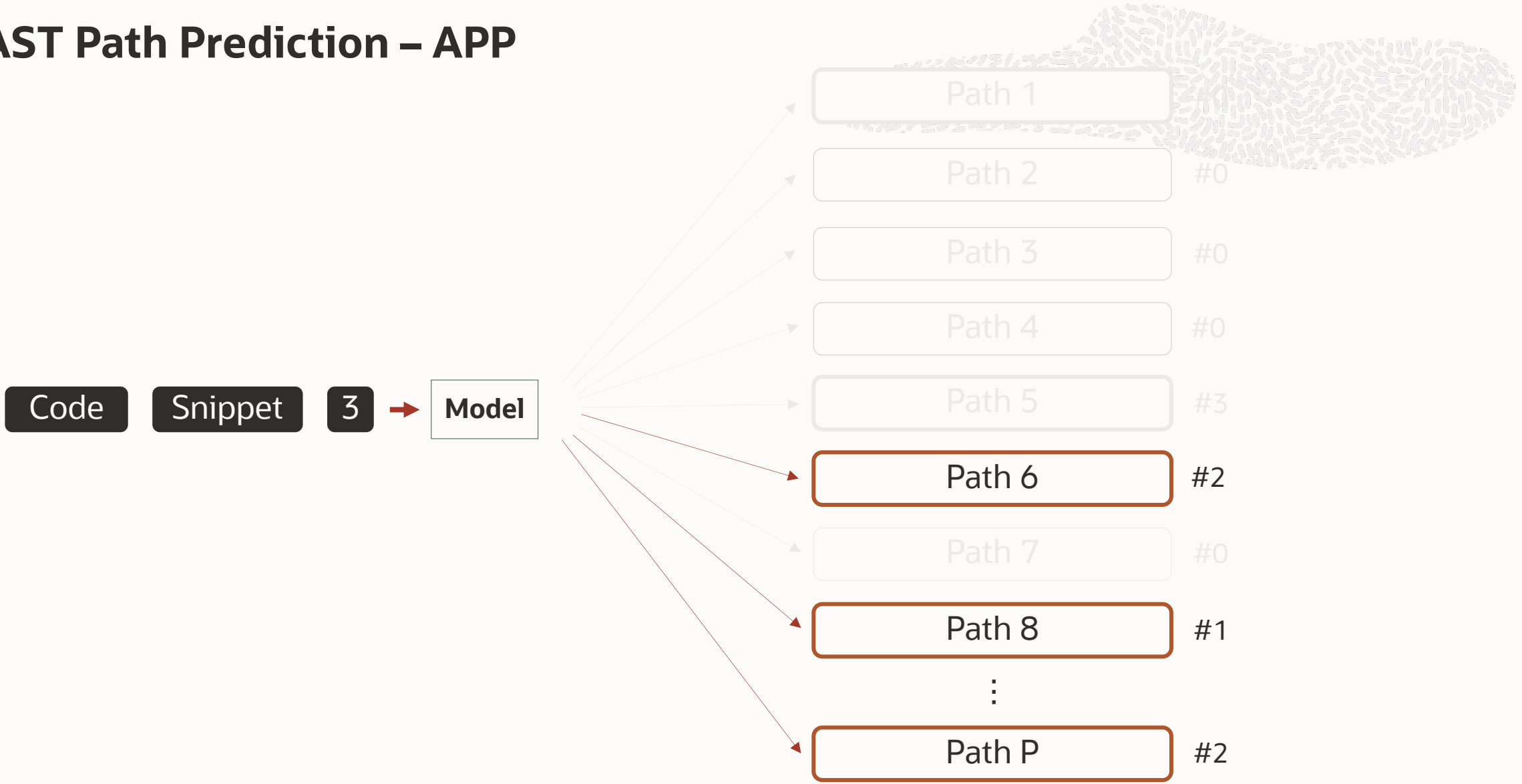
# AST Path Prediction – APP



# AST Path Prediction – APP

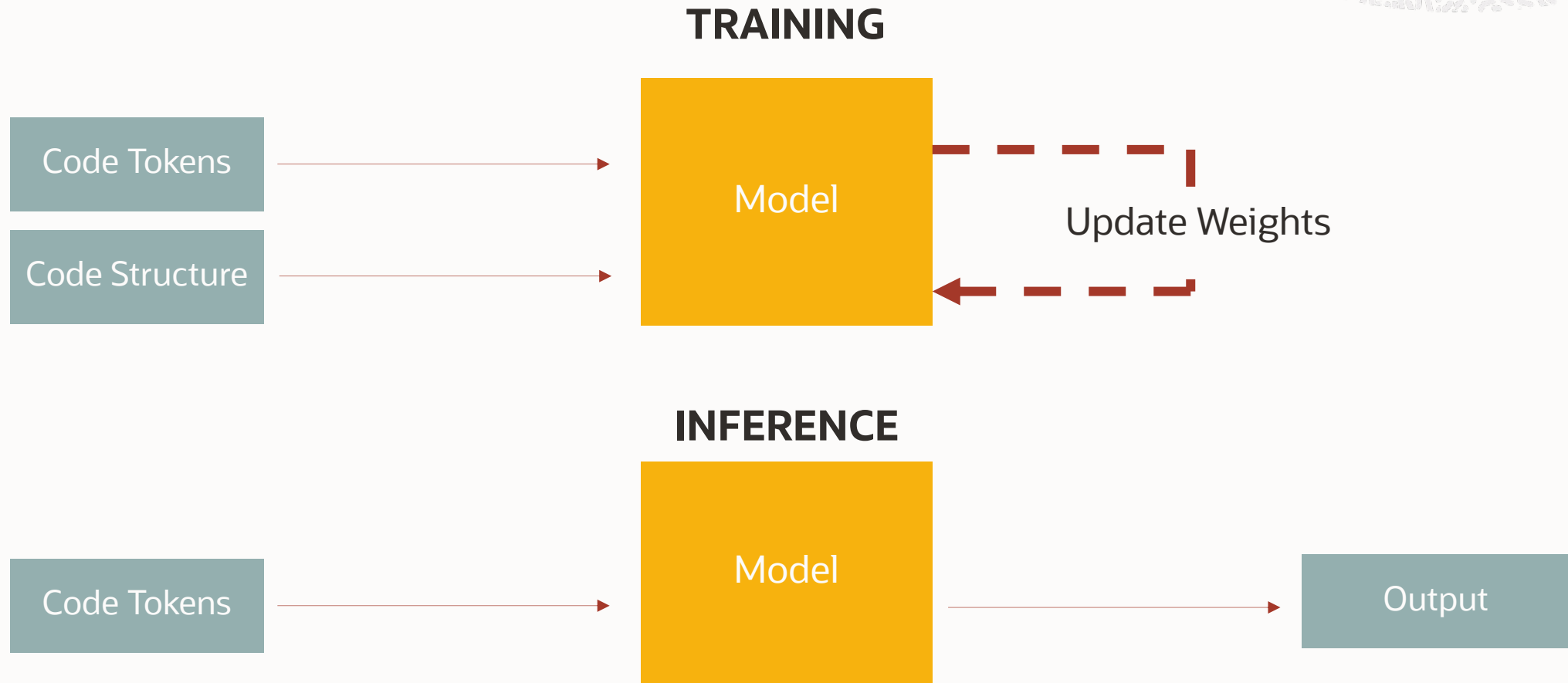


# AST Path Prediction – APP





# What is the goal of APP?





# A Few Comments...



- **Code Embeddings**
- Data Availability / Fine-Tuning
- **Other Graph Structures** (Control Flow Graphs, Query Plans, Call Graphs, ...)
- **Agents:** (Formal) Verification Methods



# Conclusion

# CERN and Oracle collaboration – Let us know *your* ideas and interests

We want to hear **your** ideas for joint work  
– CERN *and* openlab partners

We design, build, deploy, and operate a full range of IT products and services  
-- from infrastructure to applications, at customer and public clouds

- our expert Geneva colleagues are your first contact: **Sengul & Audrey**

We exist in an open IT ecosystem: we want to understand and anticipate the needs and wants of customers, in a fast-evolving landscape

- the CERN collaboration is key to both understanding and anticipating
- talk to R+D: **Cris & John** – we'll bring in others as appropriate