Rules, Data & Interface Models

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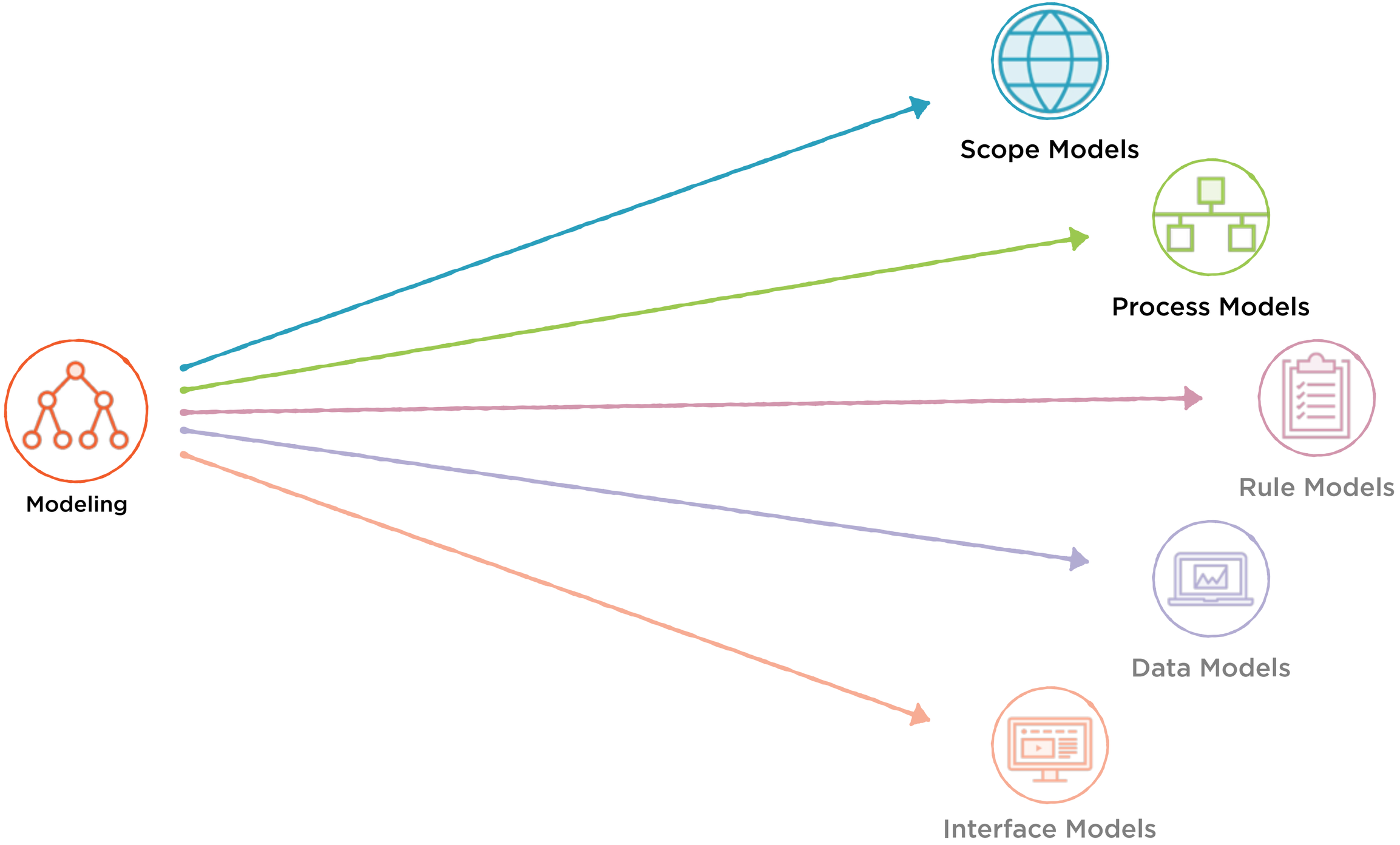
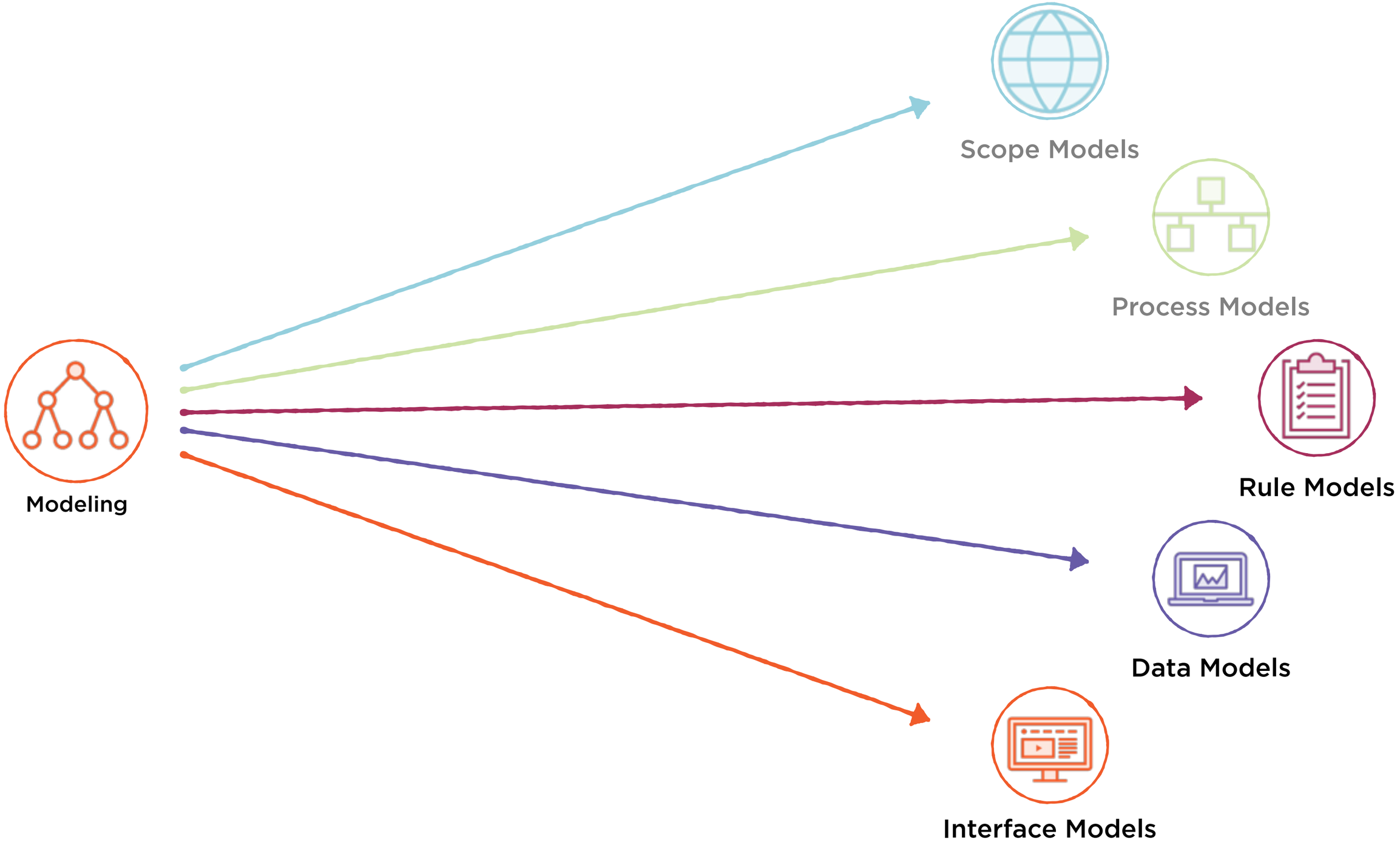

Scope Models
Process Models
Modeling
Rule Models
Data Models
Interface Models


Scope Models
Process Models
Modeling
Rule Models
Data Models
Interface Models

What's Ahead

Rule Models

- Business Rules Catalogs
- Decision Trees & Tables

Rule Models

Depict limitations on conduct of work

May be imposed on project, project's result, or a combination

Rules may be internal, contractual, regulatory, or legal in nature

Source and context of rules key to understanding and adherence

What's Ahead

Data Models

- Entity Relationship Diagrams
- Data Flow Diagrams
- Data Flow Dictionaries
- State Tables & Diagrams

Data Models

Show how data is collected and used in processes or by systems

Illustrate relationship(s) between data

Helpful in defining requirements and rules

What's Ahead

Interface Models

- Report Tables
- System Interface Tables
- User Interface Flows
- Display-Action-Response & Wireframes

Interface Models

Illustrate how and in what context processes overlap/data is transferred

Helpful when analyzing how users and systems interact, and how systems transfer work and data to each other

Rule Models:
Business Rules Catalogs

Business Rules Catalogs

Method of organizing business rules in a reference table

Typically includes...

- ID numbers
- Rule titles
- Rule descriptions
- Rule type
- Reference information

Business Rules Catalogs

Don’t specify how work is to be done

Describe what *shouldn’t* be done

Write rules clearly and make them independent of each other

Accuracy and consistency critical

Business Rules Catalogs

Business Rule Types

Eligibility: Gauges qualification or state of being

Example: Only new players are eligible for sign-up bonuses.

Business Rules Catalogs

Business Rule Types

Constraint: Limits the scope of activities

Example: Battle notifications will only be sent to players who have enabled push notifications and expressly opted in to receive this type of notification

Business Rules Catalogs

Business Rule Types

Calculation: Rules for how pricing, metrics, and values are derived

Example: Daily bonuses are to be calculated based on the specified formula, using consecutive days played, experience earned, and purchases made as variables

Business Rules Catalogs

Business Rule Types

Process: Describe how actions may be taken, and in what order

Example: New items must be added to the internal beta for testing before being scheduled for release in the live game

Business Rules Catalogs

Business Rule Types

Policy: Specifies authority levels, checkpoints, and limits

Example: All sponsored content must be approved by a producer or director

Creating a Business Rules Catalog

Rule ID	Rule Title	Rule Description	Rule Type	Reference Info
101	**Sign-Up Bonuses**	Only new players are eligible for sign-up bonuses.	Eligibility	Publisher requirements
102	**Battle Notification Opt-In**	Battle notifications will only be sent to players who have enabled push notifications and expressly opted in to receive this type of notification	Constraint	App Store guidelines
103	**Daily Bonus Calculations**	Daily bonuses are to be calculated based on the specified formula, using consecutive days played, experience earned, and purchases made as variables	Calculation	Refer to adaptive game rules for latest formula
104	**Addition of New Items to Game**	New items must be added to the internal beta for testing before being scheduled for release in the live game	Process	“Addition of New Items” Guide
105	**Approval of Sponsored Content**	All sponsored content must be approved by a producer or director	Policy	Sponsored content contracts

Business Rules Catalogs

Tips for Usage

Important rules remain current and consistent for all

Apply to entire organization in many cases, living beyond the project's scope

Traceability methods often helpful in ensuring validity and completeness

Business Rules Catalogs

Relation to Requirements

Certain requirements may be necessary to comply with business rules

Business rules often agreed upon during elicitation and requirements analysis

Decisions on business rules often necessary to complete requirement specification

Rule Models:
Decision Trees & Decision Tables

Decision Trees & Tables

Visualize the results of a series of decisions

Helpful tool to model many possibilities, especially where each decision has an impact on those subsequent to it

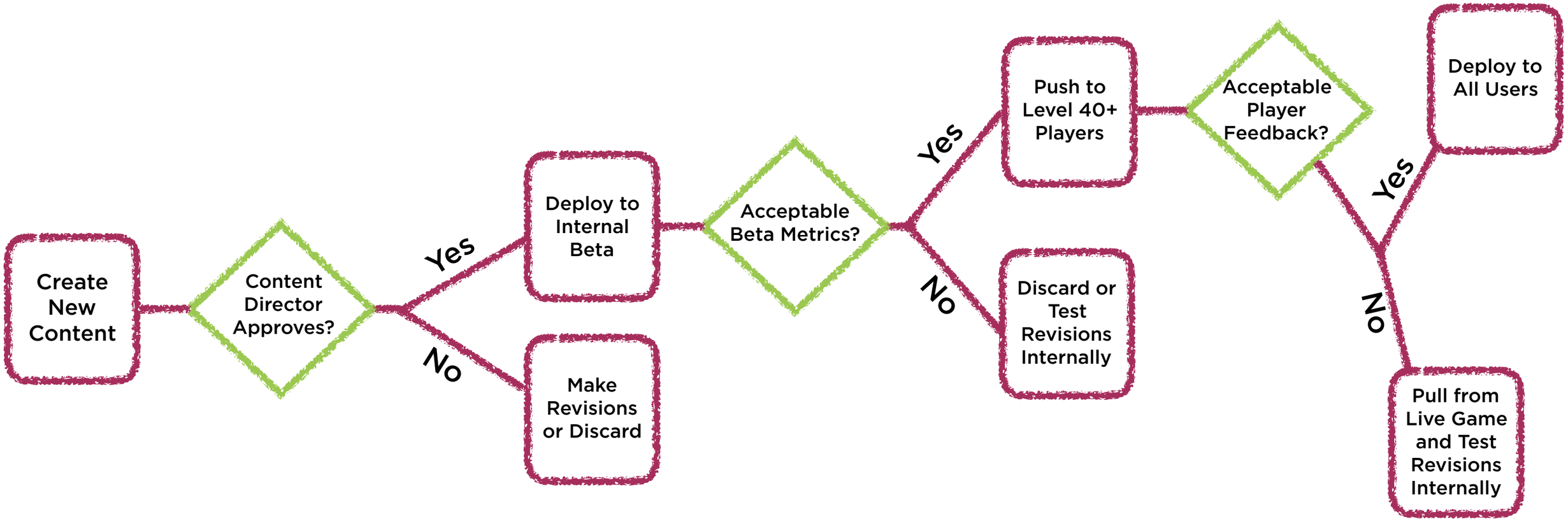
Decision Trees & Tables

Decision trees most useful when binary decisions, like yes/no, must be made

Decision tables used when more choices are available

Creating a Decision Tree

Publishing New Game Content



Decision Tables

Condition stubs list all potential outcomes being analyzed

Condition columns list which are met

Action stubs list all potential actions being analyzed

Action columns indicate which actions are taken

Creating a Decision Table

Decision Table	Rule 1	Rule 2	Rule 3	Rule 4
Conditions				
Condition Stub 1	N	Y	Y	N
Condition Stub 2		Condition Columns		
Condition Stub 3	–	N	–	Y
Outcomes				
Action Stub 1	X	–	–	–
Action Stub 2		Action Columns		
Action Stub 3	–	–	X	–

Y: Yes
N: No
– : Unneeded
X : Action taken

Creating a Decision Table

Decision Table	Rule 1	Rule 2	Rule 3	Rule 4
Conditions				
Content Director Approves	N	Y	Y	Y
Acceptable Beta Metrics	–	N	Y	Y
Acceptable Player Feedback	–	–	N	Y
Outcomes				
Make revisions or discard	X	–	–	–
Discard or Test Revisions Internally	–	X	–	–
Pull From Live Game & Test Revisions Internally	–	–	X	–
Deploy to All Users	–	–	–	X

Decision Trees & Tables

Tips for Usage

Helpful way to visualize complex if/then chains for better understanding

Visualization can help ensure all possibilities are addressed effectively

Redundancies can be identified and eliminated using these models

Decision Trees & Tables

Relation to Requirements

May help in identifying rules-related requirements, or requirements that apply only to specific outcomes

Data Models:
Entity Relationship Diagrams

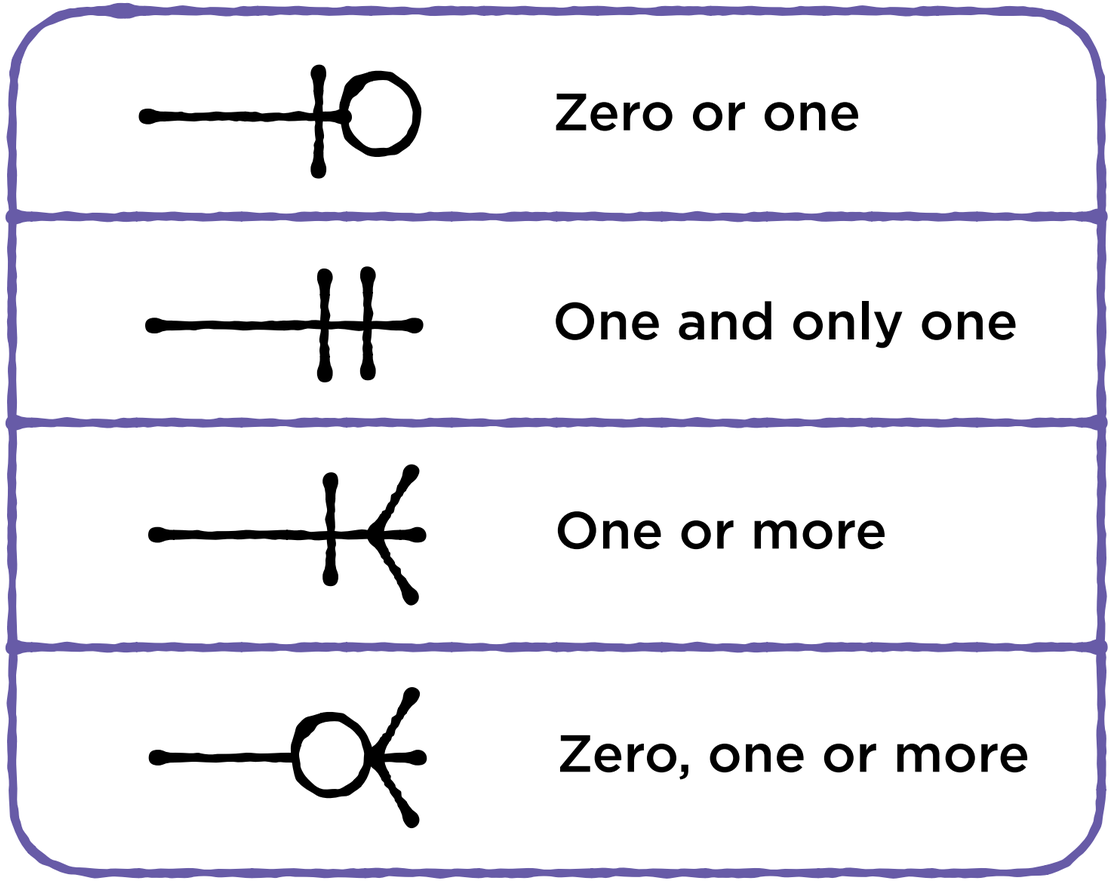
Entity Relationship Diagrams

Shows relationship between pieces of information or data objects

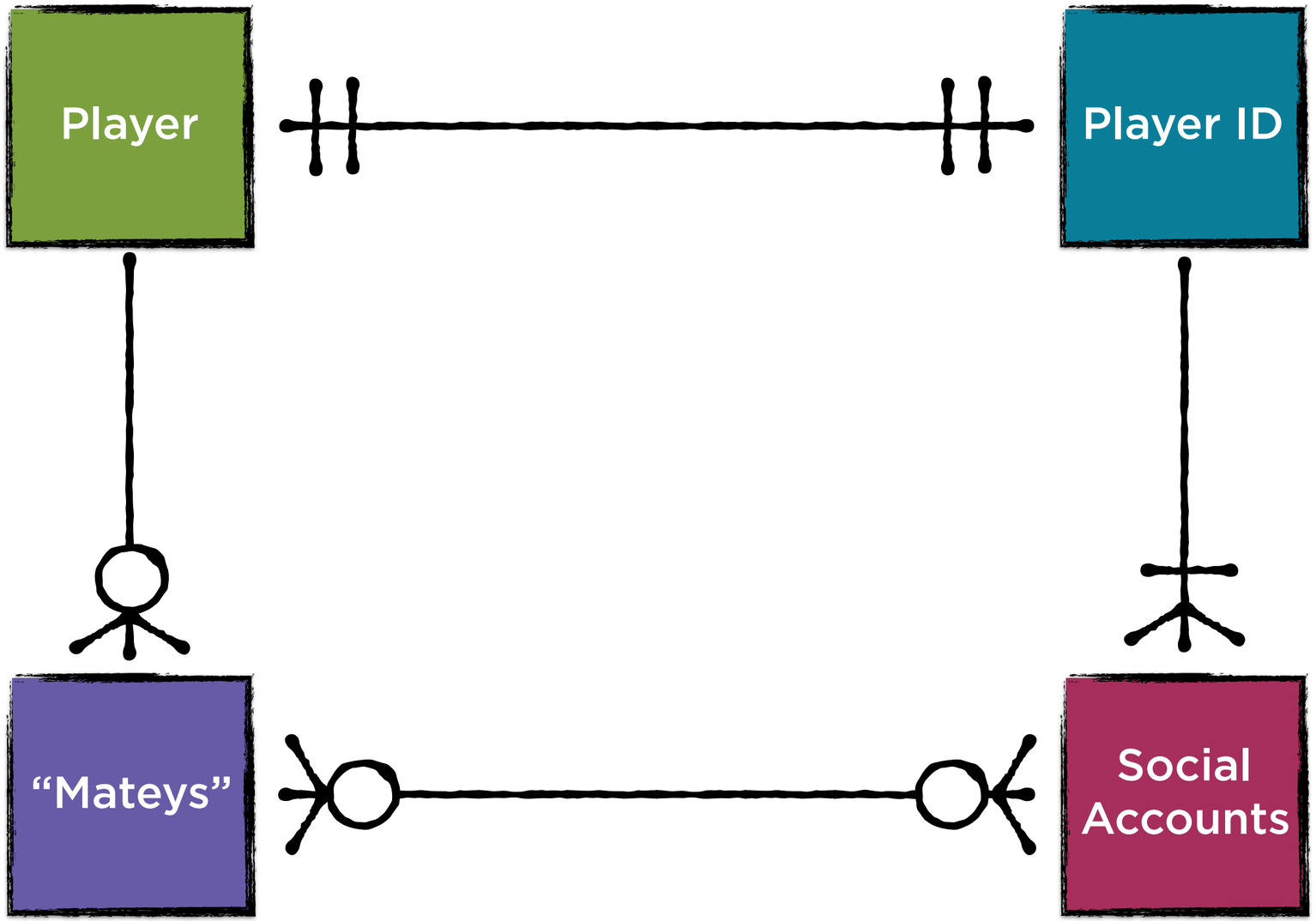
Data objects may encompass people, places, things, or concepts

Crow’s foot notation often used to describe relationship between objects

Entity Relationship Diagrams



Entity Relationship Diagrams



Entity Relationship Diagrams

Tips for Usage

Helps with data management by identifying points of creation, consumption, and output of data

Entity Relationship Diagrams

Relation to Requirements

Relationship of objects may indicate potential requirements

Allows for traceability from data sources back to business objectives

Data Models:
Data Flow Diagrams

Data Flow Diagrams

Builds off of business data diagrams, process flows, and ecosystem maps

Depicts connections between systems, users and data

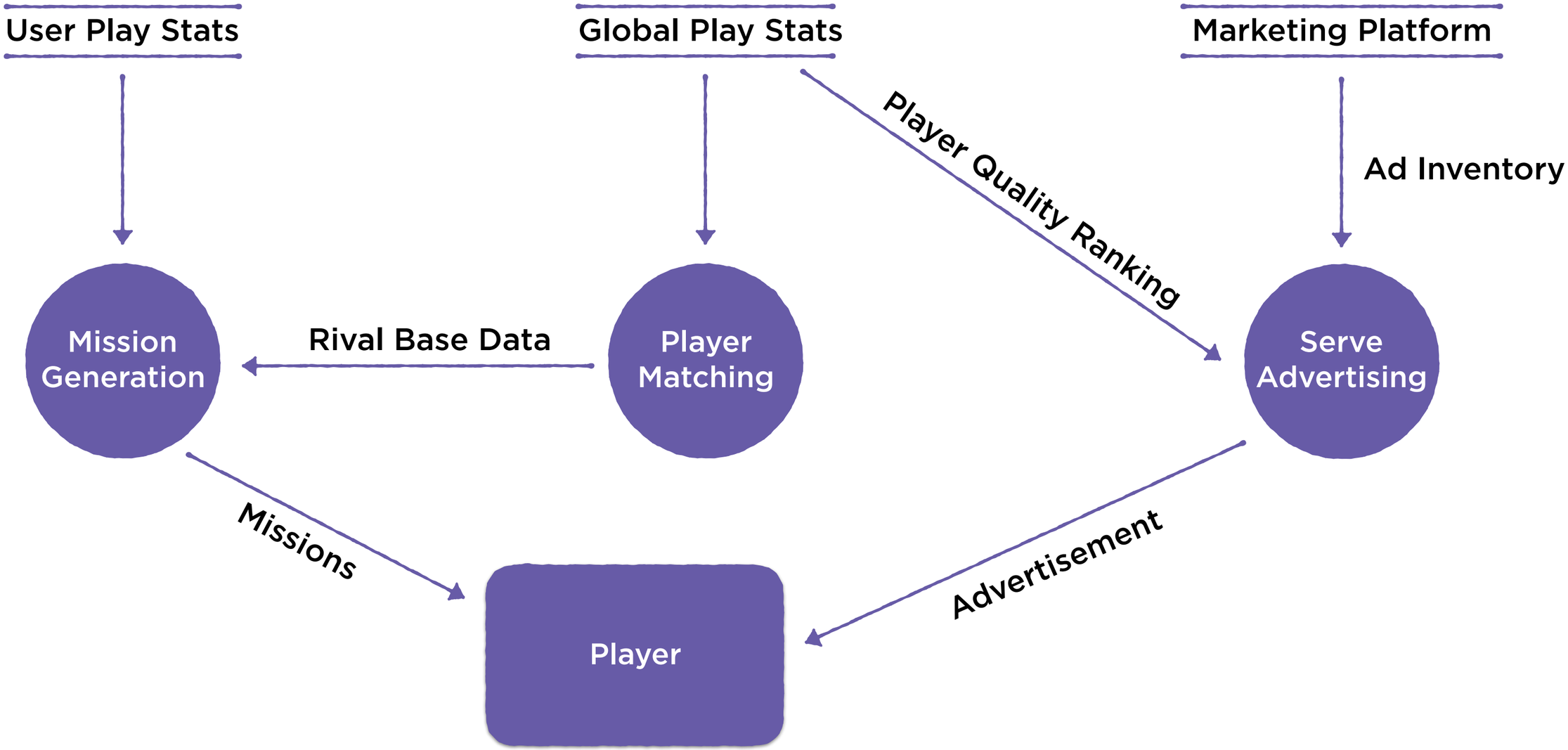
Data Flow Diagrams

Data Sets

Processes

External Entities

Creating a Data Flow Diagram



Data Flow Diagrams

Tips for Usage

Illustrates how data moves from sources, through processes, to users and others outside the system

Data Flow Diagrams

Relation to Requirements

Knowing how data flows leads to a better understanding of data requirements

Data Models:
Data Dictionaries

Data Dictionaries

Table including information on data types

- ID Number
- Business Object
- Name
- Description
- Data Type
- Parameters
- Valid Values

Creating a Data Dictionary

ID	Business Object	Name	Description	Data Type	Valid Values
P01	Player Stats	Number of Wins	Player history of victories	Integer	Integer>=0
P02	Player Stats	Trophy List	List of trophies player has earned that should be visible in their Award Room	Alphanumeric	Structured Text
P03	Global Stats	Player Rankings	Top player data, presented on leaderboards	Alphanumeric	Structured Text
P04	Global Stats	Player Matching	Player matching data, used to present potential PvP missions as nearby islands	Alphanumeric	Structured Text
P05	Marketing	Demographic Information	Information on player collected from social accounts and user input	Alphanumeric	Structured Text
P06	Marketing	Advertising Inventory	Locally cached allocation of advertising content that can be presented without latency to player	Graphic	.jpg, .png, .mp4 files

Data Dictionaries

Tips for Usage

Extremely valuable to database designers

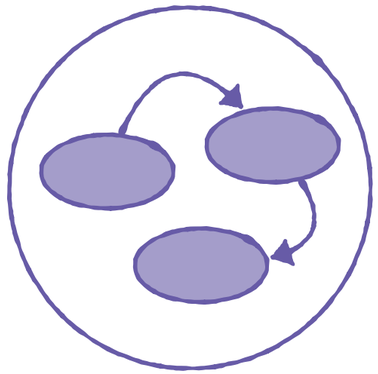
Powerful tool for conveying data needs and scope of requirements to business stakeholders

Data Dictionaries

Relation to Requirements

Include a high level of detail about data requirements

Data Models:
State Tables & Diagrams



State Tables & Diagrams

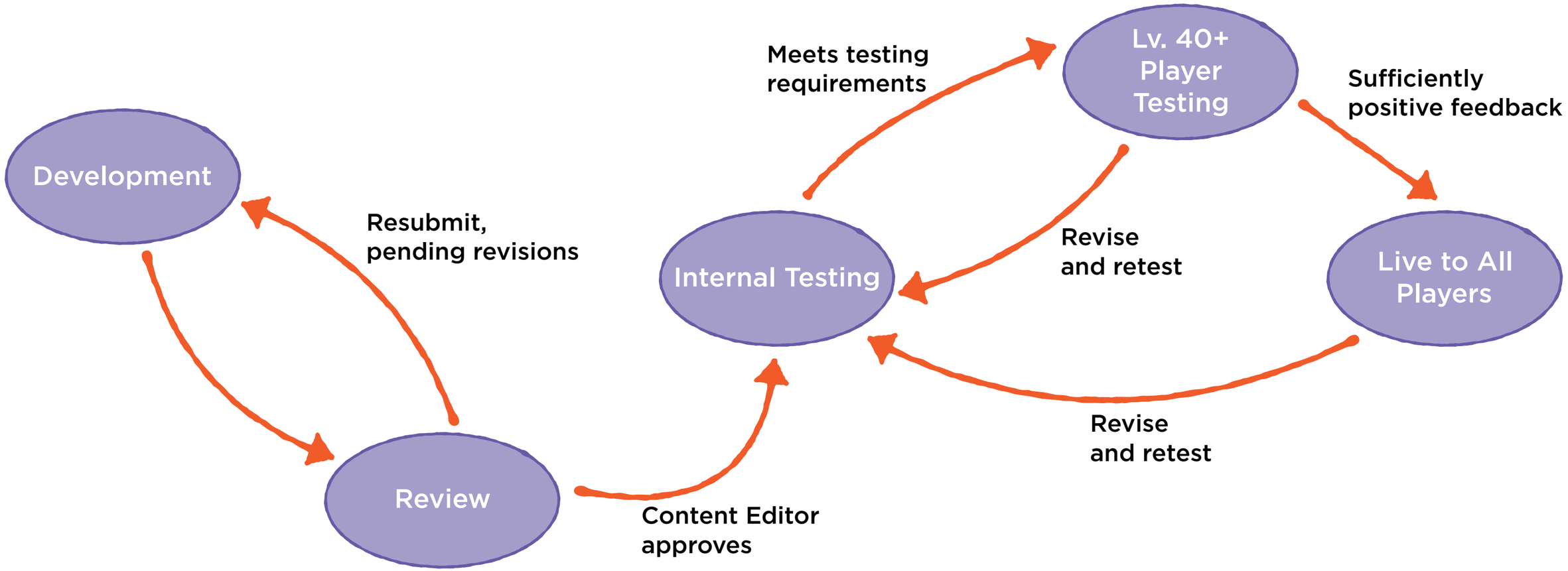
State diagrams visualize how object states may change over time

Ovals indicate states; lines indicate transitions

Initial and terminal states may or may not be included, depending on use case

Creating a State Diagram

Publishing New Game Content



State Tables

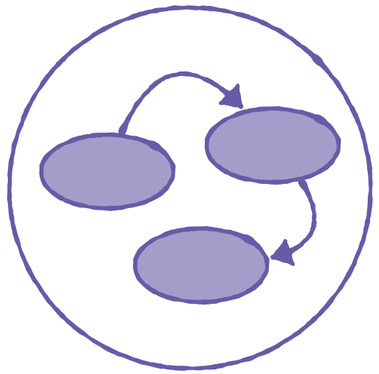
State tables include a list of all states and indicate which may be transitioned to and which may not

Initial states typically fill first column; target states usually populate first row

Invalid transition options marked with an **X**

Creating a State Table

Initial State	Target State: Development	Review	Internal Testing	Lv. 40+ Player Testing	Live to All Players
Development					
Review					
Internal Testing					
Lv. 40+ Player Testing					
Live to All Players					

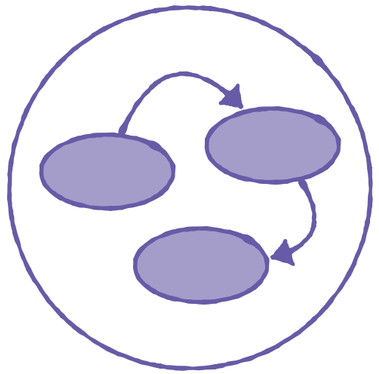


State Tables & Diagrams

Tips for Usage

Helps in understanding life cycle of objects as they pass through various processes and decision points

Tables help ensure all possibilities are addressed, while diagrams are more easily understood visualizations



State Tables & Diagrams

Relation to Requirements

Visualize requirements regarding data and its flow

Provides meaningful context to stakeholder understanding of how data and objects move

Interface Models:
Report Tables

Report Tables

Catalog of detailed requirements for a particular report

Useful when determining what type of reports can meet business needs, and what information should be included

Very helpful to include a template or example of the report with the table

Creating a Report Table

Report Prototype

ID	Last Login	Duration of Play	Missions Accepted	Assets Built	Ads Served	IAP Session Revenue
P01017	02:00:19	17:35	4	2	3	$1.99
P03924	94:43:14	12:10	2	1	2	$2.99
P09658	07:10:23	4:35	1	0	1	$0.99
P08337	165:12:09	3:37	0	1	0	$0.99
P04465	00:05:17	9:50	2	1	2	$0.00
P03134	331:47:23	7:47	1	0	1	$4.99

Creating a Report Table

List of Top-Level Elements

Element	Description
ID	Player ID (1 letter followed by 5 digit code)
Last Login	Amount of time since player ID last pinged server (Hours:Minutes:Seconds)
Duration of Play	Duration of last play session (Minutes:Seconds)
Missions Accepted	Number of missions undertaken during last play session (Integer)
Assets Built	Number of base buildings/naval improvements initiated during last session (Integer)
Ads Served	Number of ads viewed to at least 50% completion in last session (Integer)
IAP Session Revenue	Amount of IAP revenue tied to last play session ($xx.xx)

Report Tables

Tips for Usage

Combination of mockup and element definitions ensures common understanding of requirements

Important to specify data sources when several possibilities exist

Report Tables

Relation to Requirements

Report tables include all necessary information on report requirements

Mockups can lead to refined requirements and greater stakeholder buy-in

Interface Models:
System Interface Tables

System Interface Tables

Outlines all requirements for specific system interfaces

Both source and target requirements usually included

Includes names, descriptions, and other useful attributes for each object

Creating a System Interface Table

System Interface	
Source	Ice Cream Island Server
Target	Player Device
ID	PICI_PNS_CALLBACK_36
Description	Sends push notifications to players who have not initiated a new game session in > 36 hours
Frequency	On rule trigger, no more than 3 per week
Volume	One notification per player

Interface Objects

Object	Field	Data Dictionary ID	Validation Rule
Player ID	PlayerID	P08	1 letter followed by 5 numbers
Player Name	PlayerName	P09	Text
Notification Text	NotificationText	P10	Text
Hours Since Last Played	HoursSincePlay	P11	Hours:Minutes:Seconds
Push Notification ID	PushID	S100	Alphanumeric

System Interface Tables

Tips for Usage

Determining requirements with specificity early on can avoid later conflicts, confusion, pitfalls, and need for rework

System Interface Tables

Relation to Requirements

Includes all details regarding requirements for how systems are integrated

Interface Models:
User Interface Flow

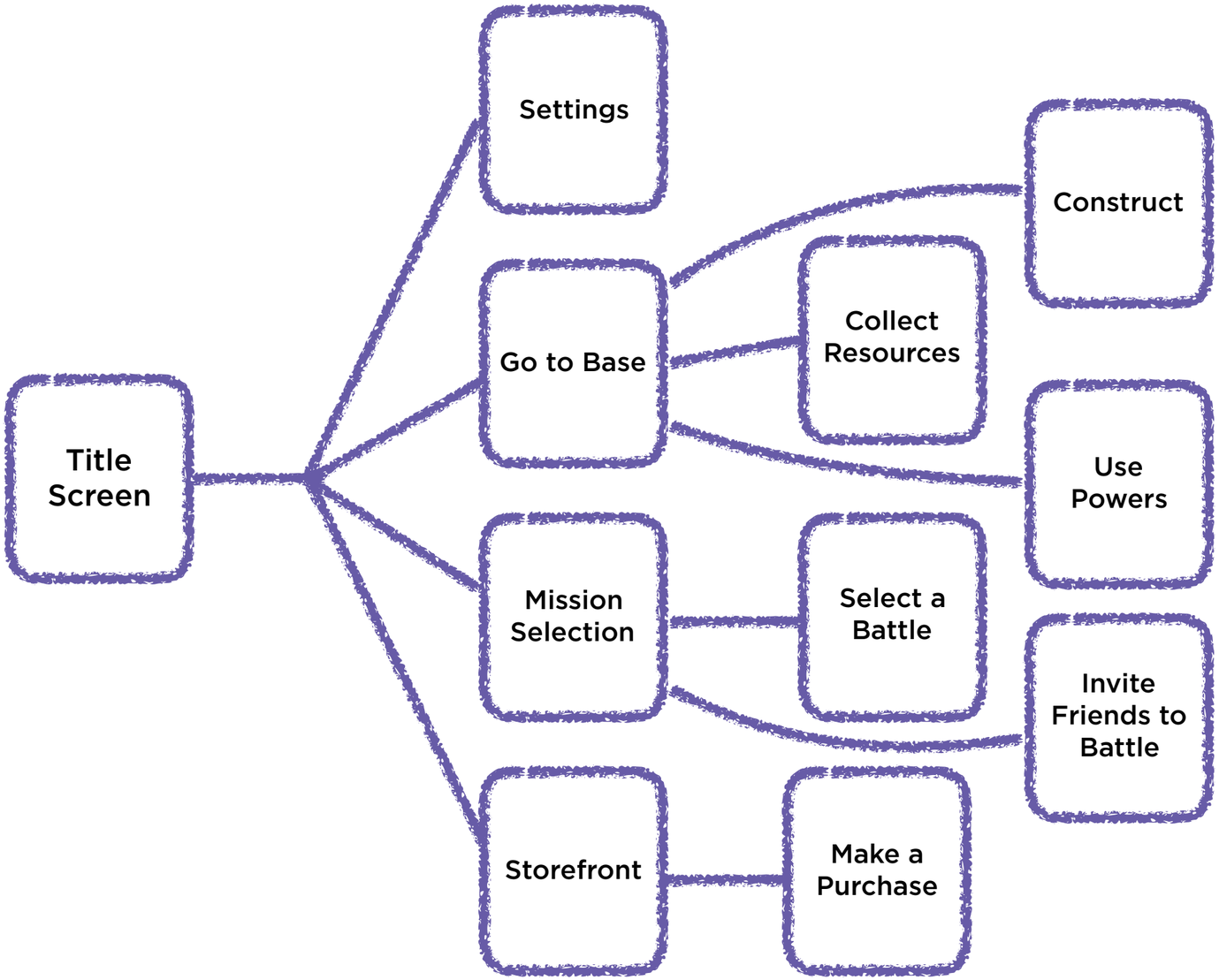
User Interface Flows

Simulates or visualizes how users interact with a system

Models range from simple flowcharts to full-blown simulations

May focus on specific functionality or represent an entire system/application

Creating a User Interface Flow



User Interface Flows

Tips for Usage

Most helpful for high-level usage early on

Useful to use and/or create during elicitation to better understand requirements

User Interface Flows

Relation to Requirements

Flows traceable back to requirements, but don’t represent requirements directly

Interface Models:
Wireframes + Display-Action-Response

Wireframes + Display-Action-Response

Often accompanies user interface flows

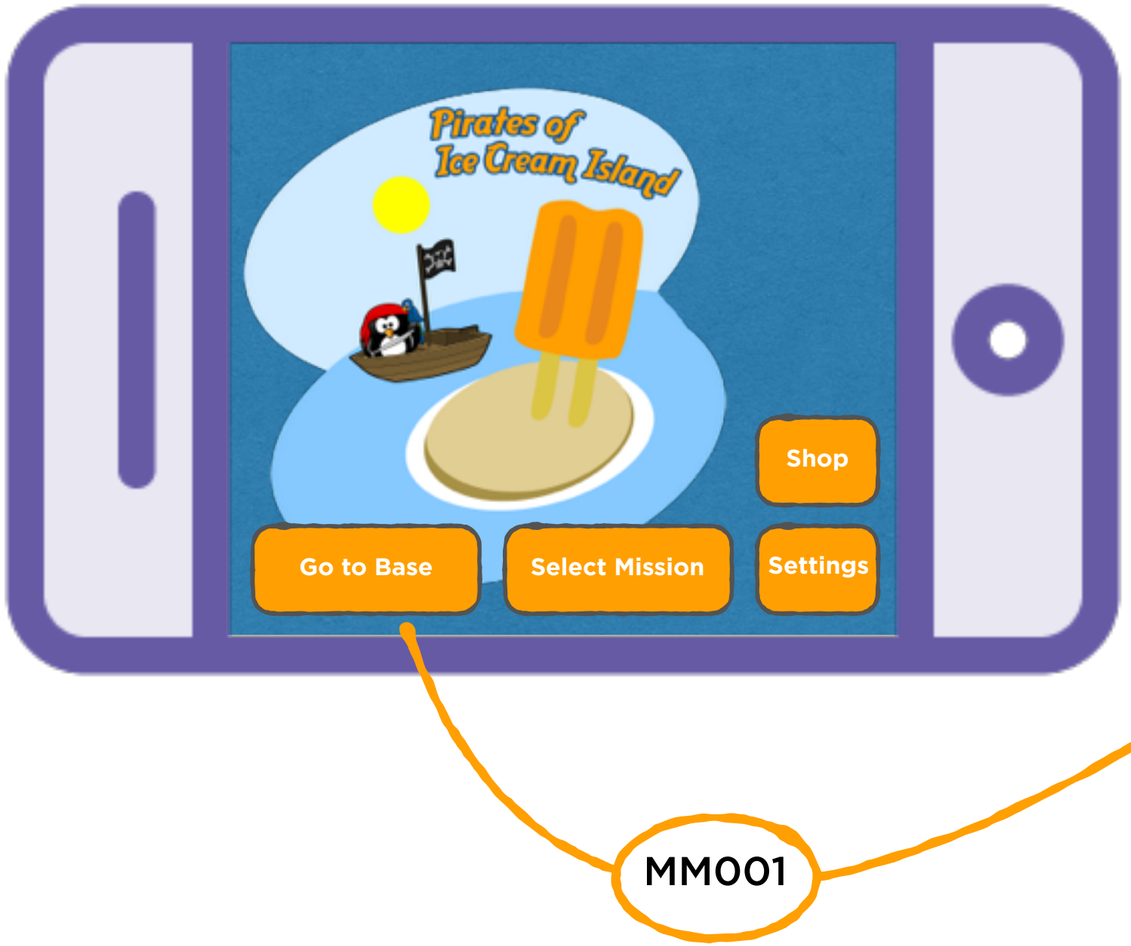
Outlines all user-facing elements

Includes descriptive table for each user-facing object and function

Business analyst or specialist may be responsible for reviewing wireframes

Critical for wireframes to meet requirements while following best practices for design and usability

Creating a User Interface Flow



UI Element: Go to Base Button		
UI Element Description		
Object ID	MM001	
Description	Touch Up Inside leads player to base	
UI Element Displays		
On Splash Screen	Button is displayed	
Button Depressed	Button changes to darker color while actively pressed	
Button Disengaged	Button color reverts to default while transition to next screen initiated	
UI Element Behaviors		
Precondition	**Action**	**Response**
On Splash Screen	Button Pressed Down	Color of button darkens
Button Depressed	Button Disengaged	Color reverts to default; transition to screen B1 begins

Wireframes +
Display-Action-Response

Tips for Usage

Offers a high level of detail about the precise functionality of user interfaces

Useful in cases where attention to detail, pre-planning is critical

Scope and formality vary based on project needs

Wireframes +
Display-Action-Response

Relation to Requirements

Shares information on requirements with user stories, user interface flows, and data dictionaries

Most visual incarnation of user-facing requirements, often with the greatest level of detail

Takeaways

Rule Models

Business Rules Catalogs: Organizes all business rules into a table

Rule types – eligibility, constraint, calculation, process, policy, etc.

Takeaways

Rule Models

Decision Trees: Visualized pathway, showing impact of various decisions throughout a process

Decision Tables: Show same options as decision trees; useful for large paths and when non-binary answers are needed

Takeaways

Data Models

Entity Relationship Diagrams: Shows relationship between data objects, often using crow's foot notation

Data Flow Diagrams: Visualizes connections between systems, users, and data

Takeaways

Data Models

Data Dictionaries: Includes various attributes about required data

State Tables & Diagrams: Depict how object states may change over time

Takeaways

Interface Models

Report Tables: Catalog of detailed requirements for a particular report

System Interface Tables: Outlines all requirements for specific system interfaces

Takeaways

Interface Models

User Interface Flow: Flowchart outlining how users may move through a UI

Wireframes + D-A-R: Depicts all user interface objects and includes comprehensive accompanying information

What's Next

Documenting Solution Requirements