

ECSA results

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These tables summarize the raw results of the case study on Piggymetrics.

1 Results

Table 1: TreeReaders used in the model extraction for Piggymetrics.

Table 1: Tree Readers		
Hierarchy	Value	Children
Directory	Folder/File's name	Sub-folders, files
Text file	Line of text	<i>none</i>
Nested text file	Text content	Scopes ({},[],etc.)
Xml file	Element/Attribute's name or value	Children elements, attributes
Yaml file	Node's name or value	Children nodes, value

Table 2: Operations on Tree nodes used in the model extraction for Piggymetrics.

Table 3: Comparison between the components manually extracted for Piggymetrics and those automatically extracted.

Table 4: A few of the generic detectors defined for Piggymetrics.

Table 5: All the defined detectors specific to Piggymetrics (but more accurately, specific to the Spring framework).

Table 6: A few of traces generated for the model extraction of Piggymetrics.

Table 2: Operations

Operation	Description
DeclareReader	Aspect can be explored with a Reader type
RegexRule	Node matches a regex expression
MultiRegexRule	Node matches a regex expression with multiples element
ConditionTrimmedRule	Node matches a trimmed string value
KeywordsRule	Node contains all the keywords in any order
FollowPathRule	Node's location is directly following a path
IdentifyPathRule	Node's location matches a path
ExactPathRule	Node's location matches a path (returns the node value)
DirectContainer	Node's immediate parent
FollowDirectContainer	Node's immediate parent (returns the node value)
RuleSingleContainer	Node is the highest parent containing a single instance
RuleSingle	An aspect with a list of values contains only one
RuleMerge	Values of many instances of an aspect merged into one
RuleSinglePair	An aspect with a list of pair values contains only one
GetFirst	First item of a pair value
GetSecond	Second item of a pair value
RuleContains	A list of values contains one
RuleDoesntContain	A list of values does not contain one
RuleReversed	The reverse of a pair of values

Table 3: Components in Pyggymetrics

Manually Created View	Automatically Created View
Client	client
Zuul API Gateway	gateway
Config Service	config
Account Service	account-service
Account Repository	account-mongodb
Statistics Service	statistics-service
Datapoint Repository	statistics-mongodb
Oauth2 Server	auth-service
User Repository	auth-mongodb
Notification Service	notification-service
Recipient Repository	notification-mongodb
Turbine Service	turbine-stream-service
Monitoring App / Hystrix Dashboard	monitoring
Eureka Registry Service	registry
Spring Cloud Sleuth / Slf4J	tracing.component
Exchange Rate Service	external

Table 4: Example of generic detectors

Input	Output	Rule
Root	Repository	readerType: Directory
Repository	XmlFile	regex: <code>^(?<name>[^\.]*)\.xml\$</code>
Repository	YamlFile	regex: <code>^(?<name>[^\.]*)\.yaml\$</code>
YamlFile	Yaml_Content	readerType: Yaml
Xml_PomFile	ArtifactId	path: project/artifactId
PomFile, ArtifactId	ServiceId	rule: RuleSingle

Table 5: Specific detectors in Pyggymetrics

Input	Output	Rule
LineTree_JavaFile	RegistryLink	trimmed: @EnableDiscoveryClient
LineTree_JavaFile	FeignLink	regex: <i>removed for excessive length</i>
LineTree_JavaFile	configuration_service	trimmed: @EnableConfigServer
LineTree_JavaFile	api_gateway	trimmed: @EnableZuulProxy
LineTree_JavaFile	monitoring_component	trimmed: @EnableTurbineStream
LineTree_JavaFile	monitoring_dashboard	trimmed: @EnableHystrixDashboard
LineTree_JavaFile	discovery_service	trimmed: @EnableEurekaServer
LineTree_JavaFile	oauth2_server	trimmed: "public class AuthApplication {"
Yaml_ConfigFile	Route	path: zuul/routes
Yaml_ConfigFile	DbLinkDeclared	exactPath: spring/data/mongodb
Yaml_YamlFile	OpenPassword	exactPath: spring/security/user/password
Xml_PomFile	Sleuth Tracing	exactPath: <i>removed for excessive length</i>
Xml_PomFile	Hystrix Stream	exactPath: <i>removed for excessive length</i>
Xml_PomFile	Hystrix Dashboard	exactPath: <i>removed for excessive length</i>
FileTree_JavaFile	no_csrf_protection	keywords: [csrf,disable]
FileTree_JavaFile	csrf_scope_all_requests	keywords: [authorizeRequests,anyRequest]
FileTree_JavaFile	http_basic_on	keywords: [authorizeRequests,httpBasic]
LineTree_JavaFile	circuit_breaker	trimmed: @EnableCircuitBreaker
FileTree_JavaFile	component_code_plaintext_sensitive_data	keywords: [setPassword]

Table 6: Example of traces

Element	Annotation	Location
gateway	csrf_scope_all_requests	/piggymetrics/auth-service/[...]/auth/config/WebSecurityConfig.java
gateway	csrf_scope_all_requests	/piggymetrics/config/[...]/config/SecurityConfig.java, line 22
gateway	load_balancer	/piggymetrics/config/src/main/resources/shared/gateway.yml, line 10
account-service	circuit_breaker	/piggymetrics/account-service/[...]/account/AccountApplication.java