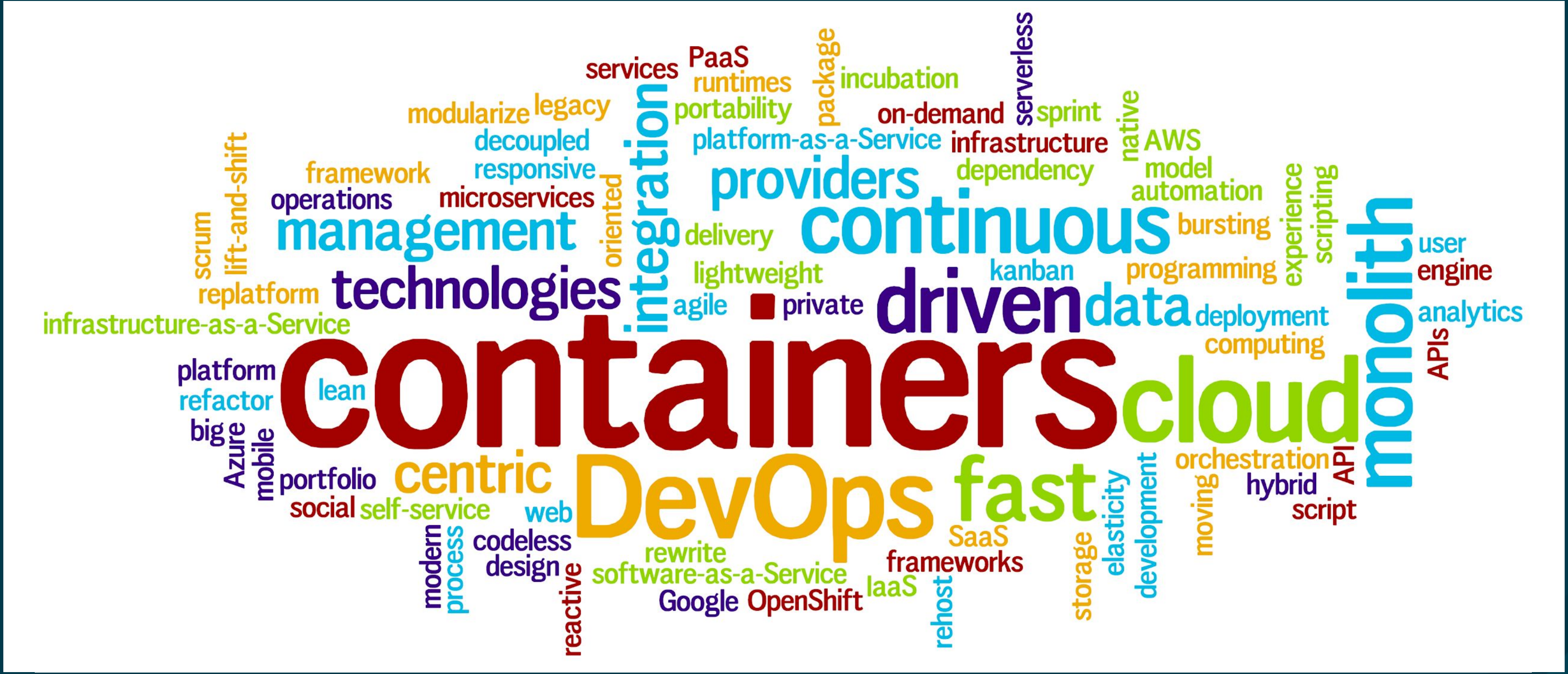
Application Modernization & Migration Tooling for Java Migrations

TECHNICAL INITIATIVES

How do we run and build applications in the new world?



THE CIO DILEMMA

Business Expectations become IT Challenges

Resources

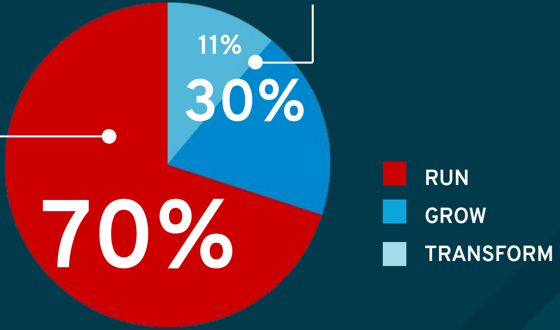
Time

Budgets

?

Maintain current portfolio

Innovation, Differentiation, Growth



Source: Graph created by Red Hat based on Gartner research. Potter, Kurt, Sanil Solanki, and Ken McGee, *Run, Grow and Transform the Business IT Spending: Approaches to Categorization and Interpretation.* Gartner G00308477, 27 June 2016

CORE PLATFORM MIGRATION

Source & target platforms

APPLICATION SERVER	ESB & INTEGRATION PLATFORMS	BPM & DECISION MANAGEMENT	APPLICATION INFRASTRUCTURE
Java EE workloads	Functional & data integration	Business rules & processes	Open hybrid cloud & containers
FROM: IBM WebSphere, Oracle WebLogic, Glassfish, Apache Tomcat, JBoss AS Community, Oracle Coherence	**FROM:** TIBCO, JCAPS, Sonic ESB, Mule ESB, Software AG WebMethods, Oracle ESB, IBM Message Broker, Cordys ESB	**FROM:** IBM WODM / ILOG, IBM BPM, Appian, TIBCO ActiveMatrix, Pega, Bonita, Oracle BPM Suite, Oracle Business Rules	**FROM:** Mainframe to Linux/Java, bare metal, Unix/Solaris/Windows to Linux, virtualization, hardware storage solutions
TO: JBoss Enterprise Application Platform, JBoss Web Server, JBoss Data Grid	**TO:** JBoss Fuse, JBoss Data Virtualization, JBoss AMQ	**TO:** JBoss BPM Suite JBoss BRMS	**TO:** Red Hat Enterprise Linux, Red Hat Virtualization, Red Hat Cloud and Containers (OpenShift, OpenStack, CloudForms), Ansible Tower, Red Hat Storage (Ceph, Gluster)

CORE PLATFORM MIGRATION

Application and web server migration

APPLICATION SERVER

Java EE workloads

FROM:
IBM WebSphere, Oracle WebLogic, Glassfish, Apache Tomcat, JBoss AS Community, Oracle Coherence

TO:
JBoss Enterprise Application Platform, JBoss Web Server, JBoss Data Grid

- **Low risk**
  - Hundreds of customers. Myriad of apps ported.
  - All potential issues already solved.
- **Excellent ROI**
  - Dramatical license cost savings
  - Low efforts (mainly testing)
- **Enables modern app dev**
  - Standard IT of 2017 vs. 1999 (skills, landscape)
  - Perfect to combine additional transformations

DEFINING YOUR OWN PATH

... to super-power your business and adopt a state-of-the-art IT landscape

CORE MIGRATION EXISTING & NEW WORKLOADS	APPLICATION SERVERS	ESB & INTEGRATION PLATFORMS	BPM & DECISION MANAGEMENT	APPLICATION INFRASTRUCTURE
MODERNIZATION INITIATIVES ENABLING BUSINESS VELOCITY	BETTER SOFTWARE ARCHITECTURE	AGILE INTEGRATION	STREAMLINE APPLICATION LIFECYCLE	CONTINUOUS INNOVATION

MOST WANTED ANSWERS

Approaching a large-scale application modernization

How do I ...

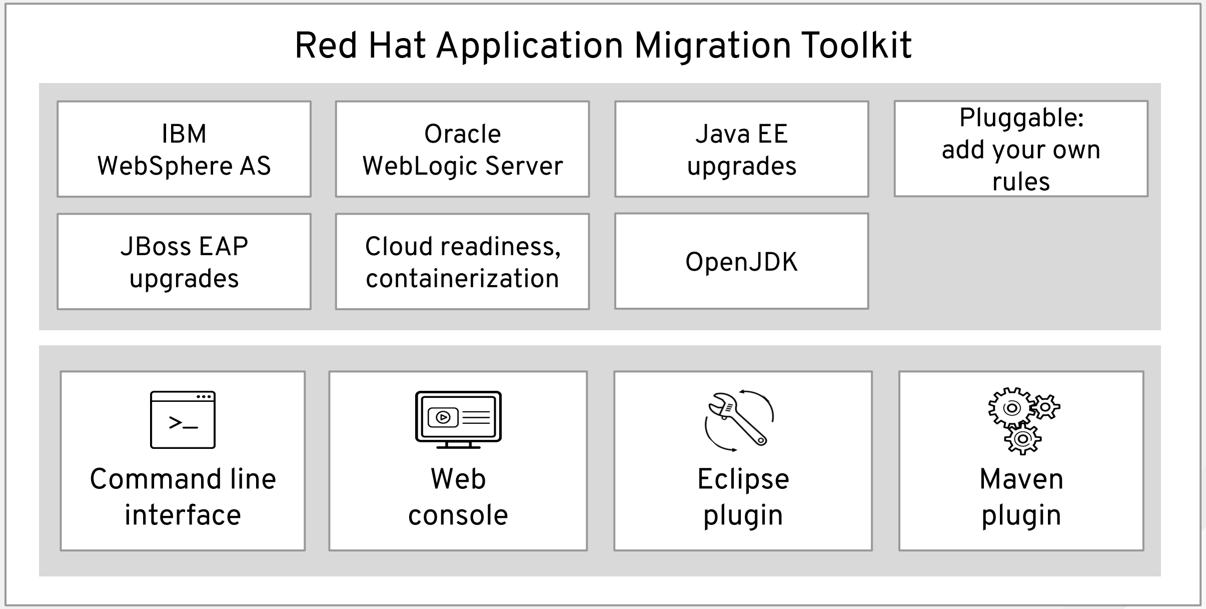
- predict the needed <u>man-days</u> and <u>ROI</u> upfront?
- identify and mitigate <u>risks</u>?
- implement best practices to save <u>cost</u> and <u>catalyze</u> the process?
- maximize my business <u>benefits</u>?

RED HAT® APPLICATION MIGRATION TOOLKIT

Catalyze large scale application modernizations and migrations

- Automate analysis
- Support effort estimation
- Accelerate code migration
- Bring workloads to OpenShift
- Free & Open Source
- Position with consulting

Homepage - Documentation



RHAMT COMMAND-LINE INTERFACE (CLI)

Overview

- **Decompiles** and **analyzes** Java application archives (JAR/WAR/EAR) or source code
- **Generates** top-down comprehensive HTML reports
- Features extensible **rule-based** patterns detection for mandatory and optional changes
- Aggregates and depicts the expected **level of effort** (LoE) in story points
- Supported transformations:

FROM

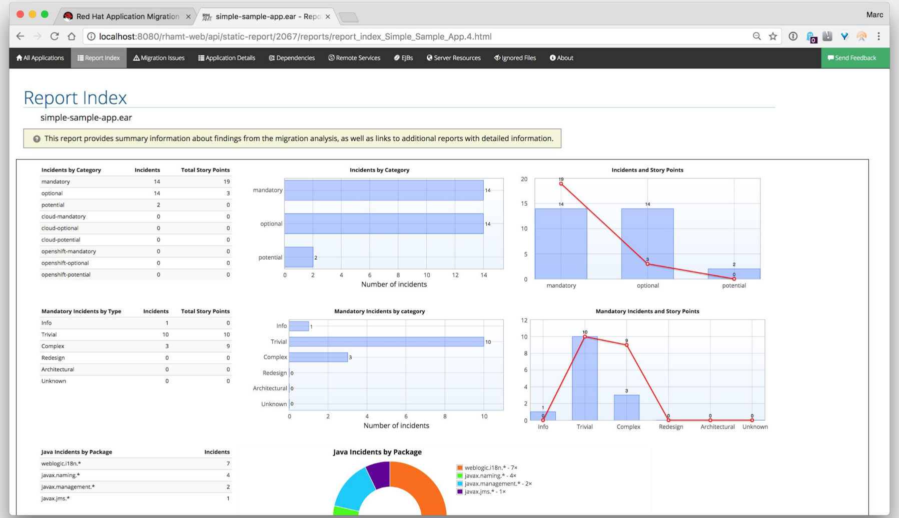
- Previous versions of Red Hat JBoss Enterprise Application Platform (EAP)
- Other containers (e.g. Oracle WebLogic and IBM WebSphere)

TO

- Red Hat JBoss Enterprise Application Platform (EAP) 6 / 7
- Red Hat OpenShift Container Platform (OCP)

RED HAT®
APPLICATION
MIGRATION TOOLKIT

Reports: issue type analysis and support for effort estimation


Red Hat Application Migration
simple-sample-app.ear - Repo
Marc
localhost:8080/rhamt-web/api/static-report/2067/reports/report_index_Simple_Sample_App.4.html
All Applications
Report Index
Migration Issues
Application Details
Dependencies
Remote Services
EJBs
Server Resources
Ignored Files
About
Send Feedback

Report Index

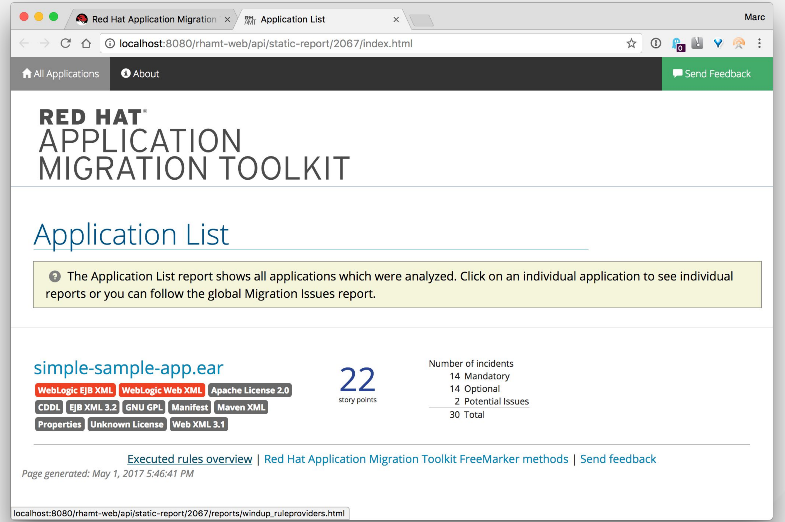
simple-sample-app.ear

This report provides summary information about findings from the migration analysis, as well as links to additional reports with detailed information.

Incidents by Category	Incidents	Total Story Points
mandatory	14	19
optional	14	3
potential	2	0
cloud-mandatory	0	0
cloud-optional	0	0
cloud-potential	0	0
openshift-mandatory	0	0
openshift-optional	0	0
openshift-potential	0	0

Mandatory Incidents by Type	Incidents	Total Story Points
Info	1	0
Trivial	10	10
Complex	3	9
Redesign	0	0
Architectural	0	0
Unknown	0	0

Java Incidents by Package	Incidents
weblogic.i18n.*	7
javax.naming.*	4
javax.management.*	2
javax.jms.*	1



Application List

The Application List report shows all applications which were analyzed. Click on an individual application to see individual reports or you can follow the global Migration Issues report.

simple-sample-app.ear

WebLogic EJB XML | WebLogic Web XML | Apache License 2.0 | CDDL | EJB XML 3.2 | GNU GPL | Manifest | Maven XML | Properties | Unknown License | Web XML 3.1

22 story points

Number of incidents
14 Mandatory
14 Optional
2 Potential Issues
30 Total

Executed rules overview | Red Hat Application Migration Toolkit FreeMarker methods | Send feedback

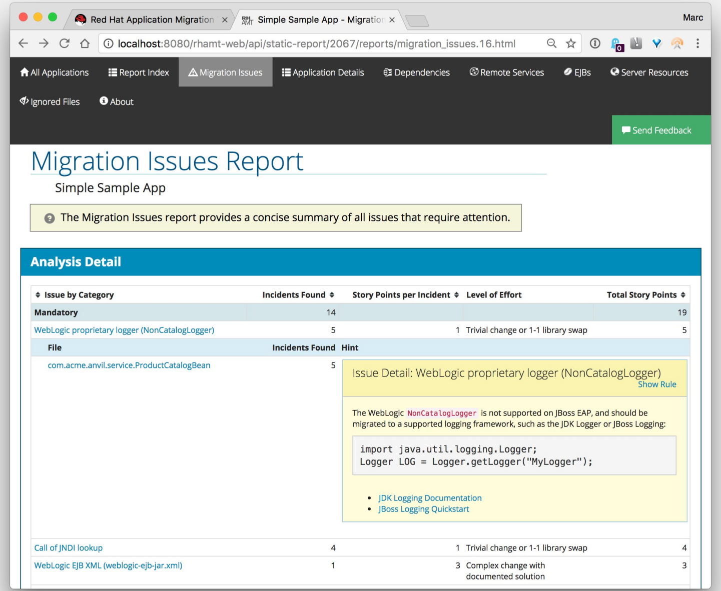
Page generated: May 1, 2017 5:46:41 PM

localhost:8080/rhamt-web/api/static-report/2067/reports/windup_ruleproviders.html

redhat.

RED HAT® APPLICATION MIGRATION TOOLKIT

Reports: examine hints and introspect application source code



Migration Issues Report

Simple Sample App

The Migration Issues report provides a concise summary of all issues that require attention.

Analysis Detail

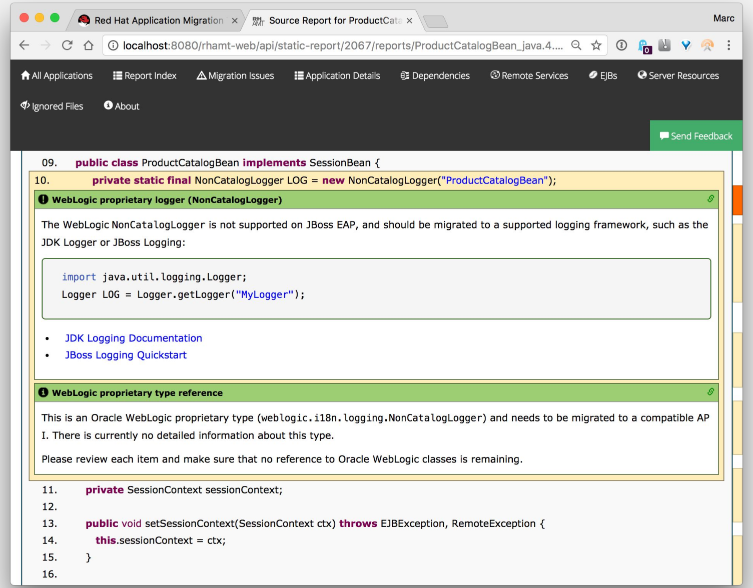
Issue by Category	Incidents Found	Story Points per Incident	Level of Effort	Total Story Points
Mandatory	14			19
WebLogic proprietary logger (NonCatalogLogger)	5	1	Trivial change or 1-1 library swap	5
File	**Incidents Found**	**Hint**		
com.acme.anvil.service.ProductCatalogBean	5	Issue Detail: WebLogic proprietary logger (NonCatalogLogger)		
Call of JNDI lookup	4	1	Trivial change or 1-1 library swap	4
WebLogic EJB XML (weblogic-ejb-jar.xml)	1	3	Complex change with documented solution	3

Issue Detail: WebLogic proprietary logger (NonCatalogLogger)
Show Rule

The WebLogic `NonCatalogLogger` is not supported on JBoss EAP, and should be migrated to a supported logging framework, such as the JDK Logger or JBoss Logging:

```
import java.util.logging.Logger;
Logger LOG = Logger.getLogger("MyLogger");
```

- JDK Logging Documentation
- JBoss Logging Quickstart



```
public class ProductCatalogBean implements SessionBean {
        private static final NonCatalogLogger LOG = new NonCatalogLogger("ProductCatalogBean");
```

WebLogic proprietary logger (NonCatalogLogger)

The WebLogic NonCatalogLogger is not supported on JBoss EAP, and should be migrated to a supported logging framework, such as the JDK Logger or JBoss Logging:

```
import java.util.logging.Logger;
Logger LOG = Logger.getLogger("MyLogger");
```

- JDK Logging Documentation
- JBoss Logging Quickstart

WebLogic proprietary type reference

This is an Oracle WebLogic proprietary type (weblogic.i18n.logging.NonCatalogLogger) and needs to be migrated to a compatible AP I. There is currently no detailed information about this type.

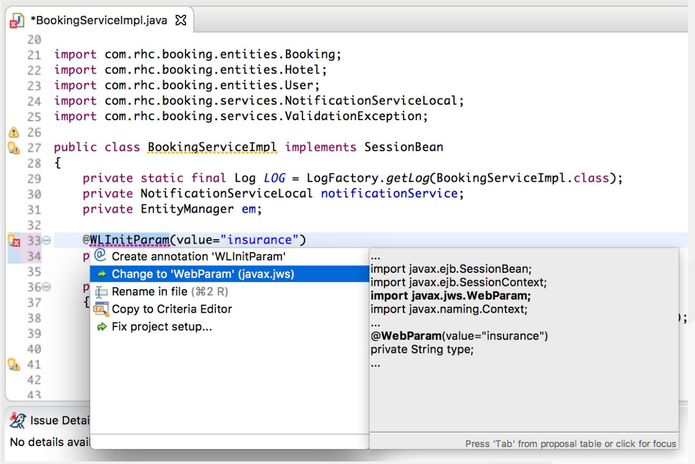
Please review each item and make sure that no reference to Oracle WebLogic classes is remaining.

```
    private SessionContext sessionContext;

    public void setSessionContext(SessionContext ctx) throws EJBException, RemoteException {
      this.sessionContext = ctx;
    }

```

RHAMT ECLIPSE PLUGIN

Overview - Task list, inline hints, support for code changes

- **Executes** the RHAMT analyzer in Eclipse and Red Hat JBoss Developer Studio
- Leverages **automatic** code **replacement** when possible
- **Highlights** and marks issues
- Provides **guidance** to fix the issues



*BookingServiceImpl.java

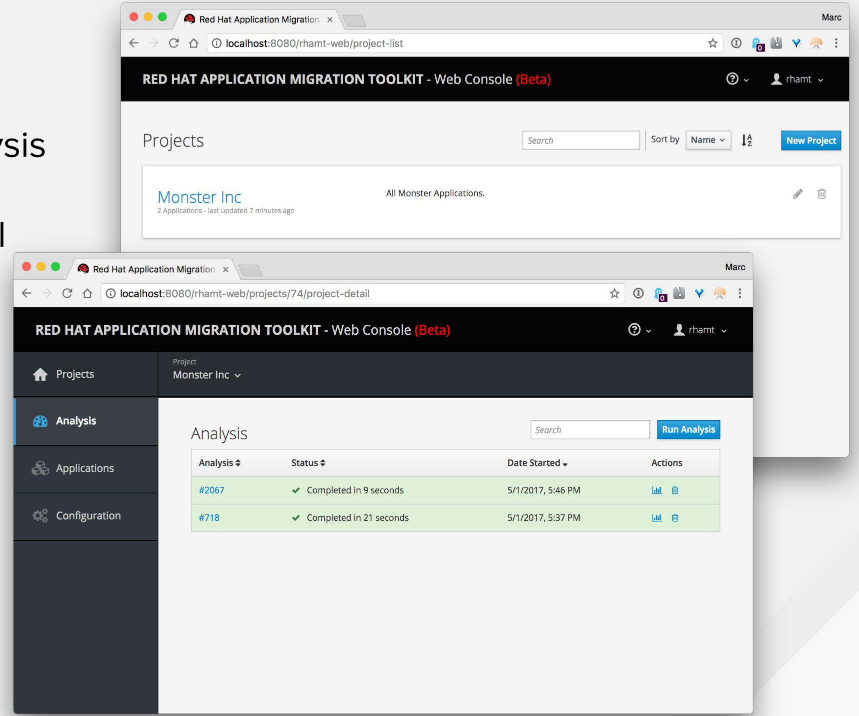
```

import com.rhc.booking.entities.Booking;
import com.rhc.booking.entities.Hotel;
import com.rhc.booking.entities.User;
import com.rhc.booking.services.NotificationServiceLocal;
import com.rhc.booking.services.ValidationException;

public class BookingServiceImpl implements SessionBean
{
    private static final Log LOG = LogFactory.getLog(BookingServiceImpl.class);
    private NotificationServiceLocal notificationService;
    private EntityManager em;

    @WLInitParam(value="insurance")
    p

    p
    {
```

```
...
import javax.ejb.SessionBean;
import javax.ejb.SessionContext;
import javax.jws.WebParam;
import javax.naming.Context;
...
@WebParam(value="insurance")
private String type;
...
```

RHAMT WEB CONSOLE

Overview

- Central **SaaS** for **on-demand** application analysis
- Improved **user experience** with access control
- Cloud **scale**
- OpenShift and ad-hoc **distributions**



Red Hat Application Migration
localhost:8080/rhamt-web/project-list

RED HAT APPLICATION MIGRATION TOOLKIT - Web Console (Beta)

Projects

Monster Inc
2 Applications - last updated 7 minutes ago
All Monster Applications.

Red Hat Application Migration
localhost:8080/rhamt-web/projects/74/project-detail

RED HAT APPLICATION MIGRATION TOOLKIT - Web Console (Beta)

Project
Monster Inc

Analysis

Analysis	Status	Date Started	Actions
#2067	✓ Completed in 9 seconds	5/1/2017, 5:46 PM	
#718	✓ Completed in 21 seconds	5/1/2017, 5:37 PM	

AUTOMATED APPLICATION ANALYSIS

Coverage of the toolkit

Some detected patterns ...

- Proprietary libraries
- Proprietary configurations
- Service locators
- Web services
- EJB descriptors
- Deprecated Java code
- Transaction managers
- Injection frameworks
- Thread pooling mechanisms
- Timer services
- WAR/EAR descriptors
- Static IP addresses

Support tasks like ...

- Migrate to non-proprietary code
- Estimate migration effort
- Identify potential risks
- Discover dependencies
- Upgrade/standardize frameworks
- Find deprecated code and resources
- Make applications cloud ready
- Create organization-wide standards

NEW

TECHNOLOGY DETECTION & APP GROUPS

View	Connect	Store	Sustain	Execute

Java EE technologies

View

- **Web** – JSF, JSP, Servlet, web.xml, WebSocket
- **Rich** – applet, JNLP

Connect

- **Messaging** – JMS queue, JMS topic, JMS con. factory
- **HTTP** – JAX-RS, JAX-WS
- **Bean** – Stateless (SLSB), Stateful (SFSB), Message (MDB), Managed Bean
- **Other** – JCA, JNI, Mail, RMI

Store

- **Database** – JDBC datasource, JDBC XA datasource
- **Persistence** – Persistence units, JPA entities, JPA named queries

Sustain

- **Clustering** – JPA / Web session / EJB
- **Security** – Security realm
- **Transactions** – JTA

Execute

- **Processing** – Batch, CDI, JSON-P

Embedded frameworks

View

- **MVC** – Spring-MVC, Struts, Wicket, GWT
- **Markup** – HTML, CSS, JS

Connect

- **Web Service** – Axis, CXF, XFire
- **REST** – Jersey, Unirest, …

Store

- **Caching** – ehcache, infinispan
- **Object Mapping** – Hibernate, Hibernate OGM, Eclipse Link

Sustain

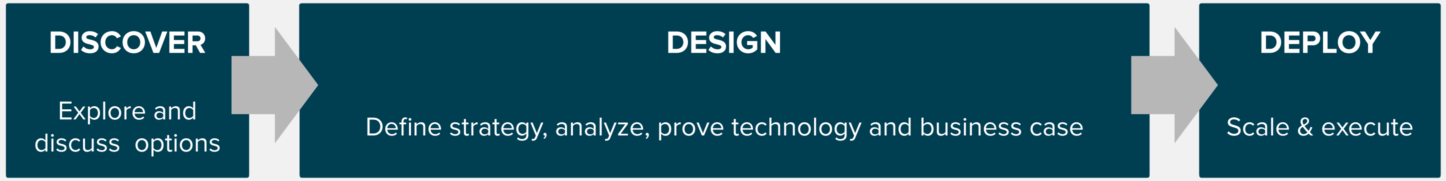
- **Logging** – log4j
- **Security** – ESAPI
- **Test** – JUnit / …

Execute

- **Inversion of Control** – Spring / AspectJ
- **Rules & Processes** – Drools / JBPM / iLog
- **Integration** – Camel / Teiid
- **3rd party** – Liferay / Oracle Forms / …

METHODOLOGY

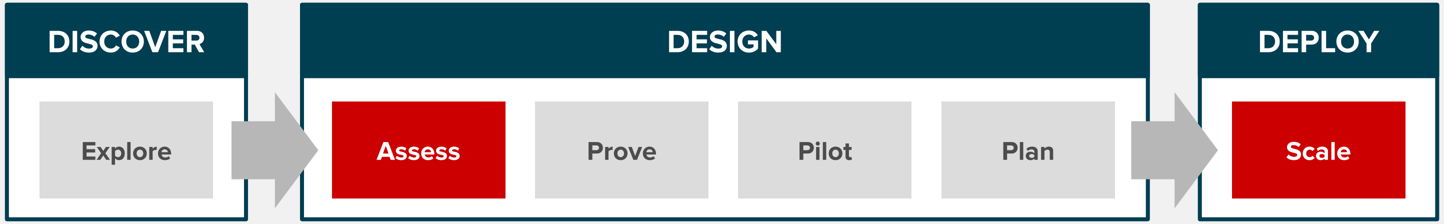
Iterative, managed service, factory scale up


DISCOVER
Explore and discuss options
DESIGN
Define strategy, analyze, prove technology and business case
DEPLOY
Scale & execute

- Standard, proven, modular, repeatable, pragmatic methodology
- Step by step, low risk and highly efficient: no “big bang”
- Scale up with partners or customers’ internal staff

METHODOLOGY

Red Hat Application Migration Toolkit usage

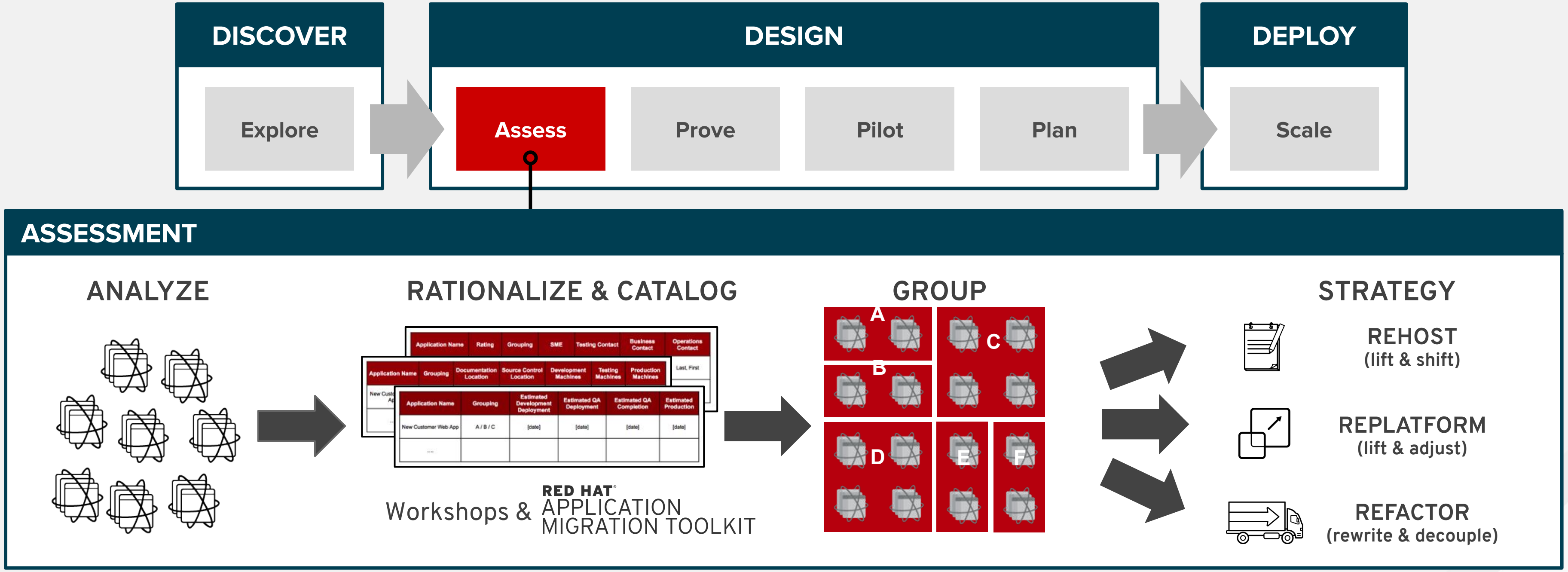


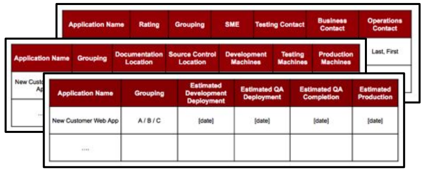
Two core use cases for the RHAMT
during an application modernization / migration project:

- Application analysis and potential issues identification during the **assessment**
- Conduct identified pre-emptive changes during the effective **migration** to make

METHODOLOGY

Red Hat Application Migration Toolkit usage





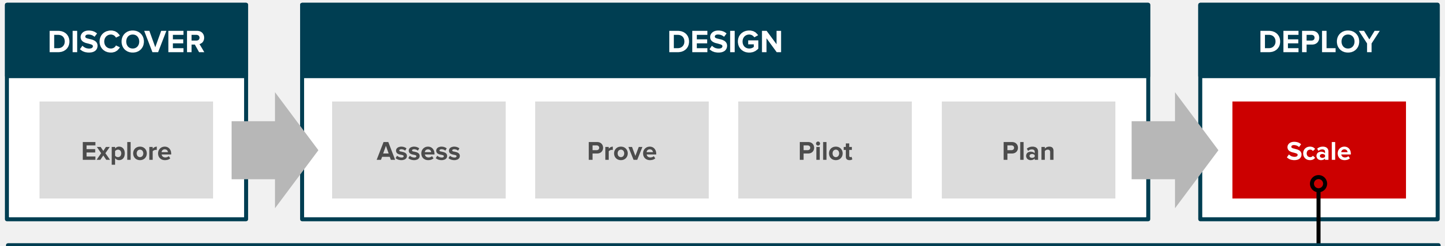
Application Name	Rating	Grouping	SME	Testing Contact	Business Contact	Operations Contact
						Last, First

Application Name	Grouping	Documentation Location	Source Control Location	Development Machines	Testing Machines	Production Machines
New Custo Ap						
...						

Application Name	Grouping	Estimated Development Deployment	Estimated QA Deployment	Estimated QA Completion	Estimated Production
New Customer Web App	A / B / C	[date]	[date]	[date]	[date]
....					

METHODOLOGY

Red Hat Application Migration Toolkit usage



EXECUTE AND SCALE ITERATIVELY

HOW & WHAT:

- Based on execution strategy and rollout plan: enter “factory mode” and execute at scale.
- Migrate in iterations (typically two weeks), document findings to improve next sprint.
- In parallel: coaching / mentoring / skills / support.
- Continuously validate against plan.

WHY:

- Iterative model in combination with migration tooling inherently increases speed in each iteration.
- No “Big Bang”, but iteratively deliver value with each sprint.
- Minimize project execution risk.
- Enforce governance and continuous improvement.