Web Hob Design Direction
Roadmap

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Document Background

This roadmap is one of the primary outputs from the Web Hob Design Direction project conducted by Tobias & Tobias in collaboration with the Yocto Project in September & October 2012. The general structure and narrative of the roadmap was first outlined in a text document shared with project stakeholders on Google Docs; this document is based on that narrative, presenting the roadmap and the rationale behind it in more detail.

Inputs

Direct inputs into the roadmap include:

- Stakeholder interviews
- The Interview Matrix which summarises those interviews
- The results of the Requirements Prioritisation exercise
- Comprehensive list of scenarios and the comments that were collected on them.

The roadmap has also been influenced to a large extent by the conversations with Yocto Project stakeholders that have taken place throughout the project, especially those about the strategic question of "On-Ramp vs Freeway".

Roadmap versus Project Plan

The roadmap is not a project plan.

While project plans typically make a set of assumptions and put forward a linear description of progress based on those, this roadmap accepts that there are various uncertainties and is intended to remain valid and workable in the face of them. This has an important practical implication for readers of this roadmap: **that Stages are not fixed in time.**

The objectives involved in completing one stage may, in some cases, be achievable within several weeks. Another stage might have objectives which take several release cycles to complete. Neither case should be seen to invalidate the roadmap. Estimations of development velocity have not been made as part of this roadmap - which is a key difference between it and a conventional project plan.

Another key difference stems from the degree of uncertainty that exists at this point. Uncertainty comes from two sources. One is the nature of the proposed Web Hob itself, whose diverse user base and potentially widespread application means that it may evolve in unpredictable directions over time. real-world usage is likely to identify new use cases.

The second source of uncertainty is the open source nature of the Web Hob sub-project. Contributions from the community may have an unpredictable influence on the velocity and direction of implementation.

The uncertainties discussed here are quite different from the "risks" usually documented in project plans: they are as likely to positively affect implementation timelines than to slow things down. No negative or pejorative connotations are intended when the word "uncertainty" is used in this document.

The roadmap has specific meanings for certain words used throughout.

Stages

Used to convey the grouping and sequential ordering of roadmap activities by time. Stages are not necessarily sequentially dependent, however: it is possible that activities in Stage 4, for example, could begin before others in Stage 3 have yet to complete. Where sequential dependencies exist the roadmap will this make this explicit. Stages are deliberately not aligned to milestone dates in this roadmap. Also, stages may be defined by achievement of strategic objectives as well as the implementation of certain features - this is another distinction between stages and releases.

Each stage will have an Extend or Enhance focus. These are similar to Intel's "Tick Tock" model; Extend is adding new functionality, Enhance is improving support & delivery of existing functionality.

Scenarios

Scenarios are short descriptions of tasks that users complete in, or with the help of Web Hob. The granularity level of these tasks can vary significantly, but the principle we have followed is that even a relatively small task is still a "scenario" even though it forms a part of a larger one. These are defined in a separate document and when they appear in the roadmap they will use the same numbering convention so they can be cross-referenced easily.

Contexts

Situations in which the Web Hob is likely to be deployed. There are three contexts: Public Web Hob, a public website hosted by the Yocto Project; Local Web Hob, on the user's own machine and probably run in a single-user model; and Team Web Hob, accessed usually by multiple users on a separate machine that is managed by and within the firewall of their organisation.

Minimal / Target

At each stage in the roadmap a certain number of Scenarios are supported by the application while others are not supported at all. A Scenario can be supported in one of two states. In "Minimal" state a scenario can be completed but in limited form, by a limited set of users, with considerable likelihood of bugs or errors, or with some chance the user will need to drop out of Web Hob into the command line at some points. In "Target" state these issues are largely resolved and the scenario should be supported in a satisfactory way for a large proportion of users.

In practise this means a scenario usually appears for the first time on the roadmap in Minimal state and then reach Target state at a later stage. Once a scenario receives Target-level support it may be refined further; Target does not mean the relevant features are frozen for good.

Objectives

There are some events and achievements along the roadmap which might not be definable in the language of scenarios or requirements, but are still important steps in the advancement of the roadmap. These are defined as Objectives and typically mark the end of a Stage.

Releases

Unlike roadmap stages, Releases are tied to fixed points in time and are expected to occur in April and October of each year. They are not often referred to in the roadmap but a key activity at the beginning of each implementation cycle will be to align roadmap stages with upcoming release dates.

Next Steps

The purpose of the roadmap is to describe the future states of the Web Hob and to support achievement of those states.

Following acceptance / approval of this roadmap the next priority will be to move into the first Implementation. This will involve scoping of the first two or three Stages and aligning their objectives with anticipated release dates.

While operating the roadmap there will be an oscillation between Planning and Implementation cycles. After an Implementation cycle ends, a Planning cycle will align the next Stage objectives with forthcoming release dates, and may involve changes to the roadmap itself.

ROADMAP CREATION

ROADMAP OPERATION

Initial Roadmap Planning

This Project

Roadmap & Release Alignment

Planning

Development & Deployment

Implementation
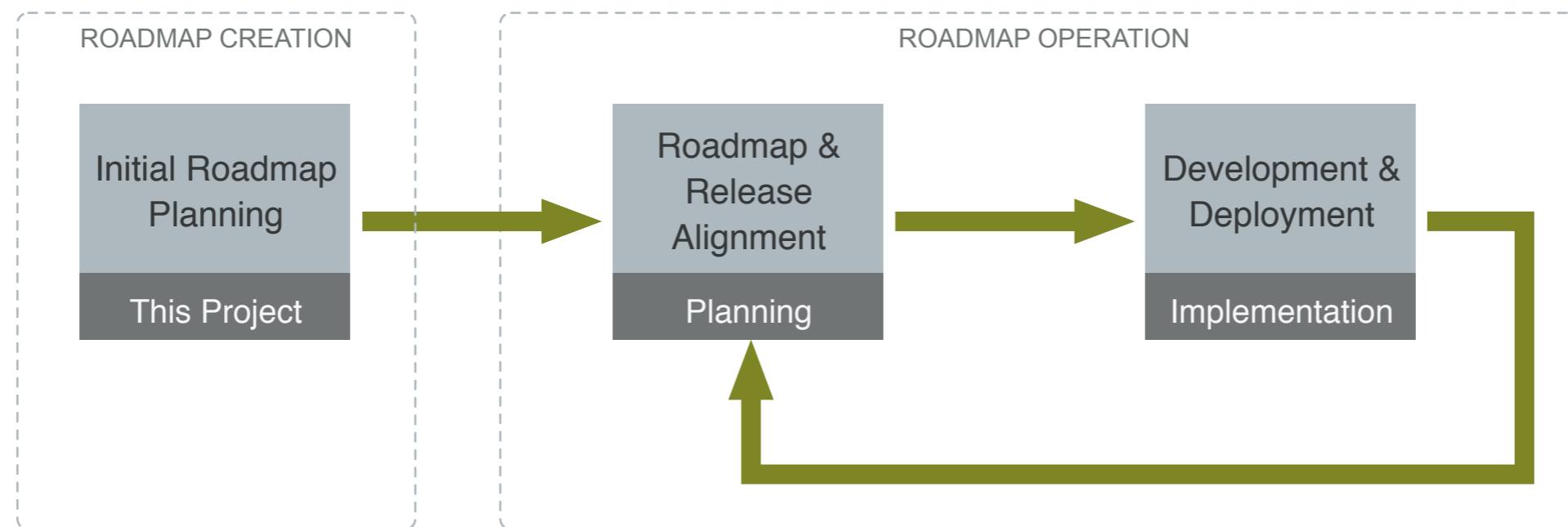
Roadmap: Overview

There is a central strategic concept behind this narrative which can be summarised as "Freeway First".

Freeway First

The strategic framework is based on the following sequence of hypotheses:

- The Web Hob will in time help introduce new users to the Yocto Project

- However for those new users to be constructively engaged by the Web Hob (and the Yocto Project in general) the Web Hob will need to be at an advanced stage of maturity

- It is unrealistic that the Web Hob will reach that level of maturity in its first incarnation

- Therefore it is sensible for the initial iterations of Web Hob to focus on use cases relevant to existing Yocto Project users

- This will allow the foundations to be laid for Web Hob, deliver value to users early on, and attract community contribution at an early stage.

Practical Implications

The roadmap is structured in an "inside-out" manner, where its core capabilities - specifying & executing builds and conducting image analysis - are implemented first, then refined and stabilised, and then rolled out as part of Public Web Hob.
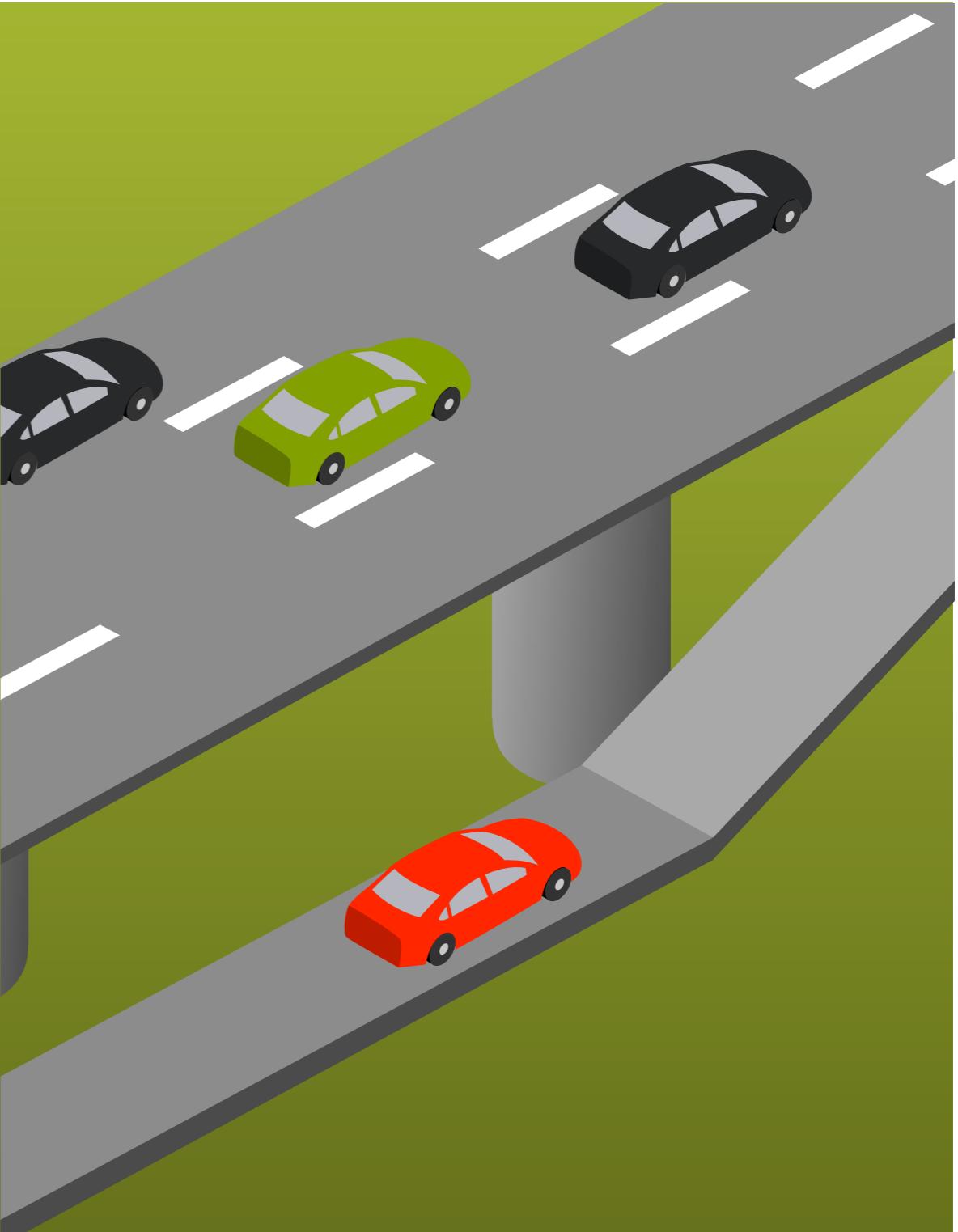
The following page contains a diagrammatic overview of the roadmap.

Stages

This overview is made up of eight stages. As mentioned earlier, there is no intention of these stages equating to specific release cycles or points in time - estimates of development velocity are beyond the scope of this roadmap.

High-Level Scenarios

The functionality of Web Hob at each stage is described in the form of scenarios and whether they have Minimal or Target levels of support. **The overview diagram does not show all scenarios.** It includes only the larger scenarios for the sake of legibility - to see which scenarios are grouped under these larger scenarios, see later in the document.

Minimal / Target / Refine

For each high-level scenario, it is assumed that continual improvements will be made in each release. These are not shown on the roadmap. However when significant enhancements are made to the features supporting a scenario, this is shown as "REFINE". Once a scenario has reached Target state it may undergo one or more REFINE cycles in later stages.
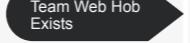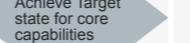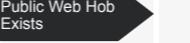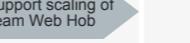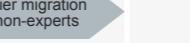
Objectives vs Supporting Activities

This overview diagram focuses on the objectives for a stage, not the activities carried out in support of that objective. To meet an objective associated with Stage 3, for example, design or development work may need to begin during Stage 2. Details of supporting activities should be finalised at the start of each Planning cycle.

Overview Diagram

		STAGES						
		ONE	TWO	THREE	FOUR	FIVE	SIX	SEVEN	EIGHT

		ONE	TWO	THREE	FOUR	FIVE	SIX	SEVEN	EIGHT
S10	Create Public Web Hob Account				TARGET				
S11	Manage PWH Account				MINIMAL		TARGET		
S05	Create Build		MINIMAL	TARGET	REFINE	REFINE	REFINE	REFINE	REFINE
S25	Export Project				MINIMAL	TARGET	REFINE		REFINE
S30	Show Build Metrics	MINIMAL		TARGET		REFINE			
S31	Error Messaging			MINIMAL	TARGET		REFINE		REFINE
S35	Finding/Viewing Builds	MINIMAL			TARGET			REFINE	
S40	Install Single-User Web Hob	MINIMAL					TARGET		
S45	Install Web Hob Server		MINIMAL			TARGET			
S55	Administering Accounts					MINIMAL		TARGET	
S70	Import Project				MINIMAL		TARGET		REFINE

	ONE	TWO	THREE	FOUR	FIVE	SIX	SEVEN	EIGHT
DIRECTION	EXTEND	EXTEND	ENHANCE	EXTEND	ENHANCE	EXTEND	ENHANCE	ENHANCE
OBJECTIVES	Local Web Hob Exists / Initial Release of Web Hob	Team Web Hob Exists	Achieve Target state for core capabilities	Public Web Hob Exists	Support scaling of Team Web Hob	Easier migration for non-experts	Completion of planned roadmap	
OTHER ACTIVITIES	Deploy Native Application	Public Web Hob Infrastructure Purchase	Public Web Hob Infrastructure Setup	Create PWH "intro" website / Implement analytics / High-profile PWH announcement	Research adoption & usage / Revisit & Revise Roadmap			

Roadmap stages are explored in greater detail in the subsequent pages. This page summarises the primary objectives and priorities of each stage.

Stage One

Create what is effectively the first iteration of Local Web Hob, a read-only application that is limited to carrying out build metrics and forensics.

Stage Two

Implement the second core capability of Web Hob for the first time - the build specification and creation process. Along with build metrics this will undergo continuous improvement throughout Web Hob's lifetime. Also implement support for multi-user operation, supporting the Team Web Hob context.

Stage Three

Improve the two core capabilities, making them more powerful and more robust. At the end of this stage these core Web Hob features should be mature enough that it is ready to be deployed on publicly available infrastructure.

Stage Four

The main objective of this stage is to launch Public Web Hob, so features supporting account creation and management appear for the first time. This stage culminates with the public announcement of PWH.

Stage Five

There will most likely need to be bug fixes and stabilisation activity following launch of PWH so additional scenario support at this stage is limited to supporting the scalability of Team Web Hob, possibly generalising some of the optimisations that were implemented in Public Web Hob.

Also in this stage a new Design Direction project should be carried out and a new roadmap produced.

Stage Six

Migration will be critically important at this point as new users adopting the Yocto Project via Public Web Hob will need to have a clear path to leaving the PWH infrastructure. This stage concentrates on the import and export processes so that migration is made as simple as possible.

Stage Seven

User account management and administration is improved here, with a possible emphasis on how builds are prioritised or user contributions to error support and bug reports.

Stage Eight

No additional scenario support is expected at this stage - it is focused on refining existing functionality based on insights into usage. By Stage Eight the new roadmap created in Stage Five will be in effect.

Roadmap: Stage Details

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Last modified: Fri Oct 26 2012
Author: Brendan Nelson

In line with the proposed **Freeway First** strategy, the scope of this stage is deliberately limited to a feature set which is of particular interest to "existing" users (e.g. those on the Freeway).

- The Yocto Project to focus effort on core Web Hob features without investing too much time on the packaging and presentation of those features: that will become a priority later.

- Assuming that existing, experienced users are more likely to contribute code back to the Web Hob project, launching with the features they will use has the benefit of encouraging their engagement early on and potentially accelerating implementation velocity.

- If the "native application" approach is agreed upon for the single-user or Local Web Hob, it should be followed from Stage One onwards. This will ensure the overall architecture is built around the concept of the native & web environments and avoid difficulties that would arise when trying to integrate the two later on.

- To reiterate a point made earlier in this document, the stages do not correspond to Yocto Project release cycles. If the Stage One objectives can be met rapidly. the Web Hob project should not wait until deployment in a Yocto Project release before proceeding to Stage Two.

		EXTEND
	<<	ONE
S30	Show Build Metrics	MINIMAL
S30.01	Identify Image	MINIMAL
S30.02	Define scope of analysis	MINIMAL
S30.03	Run analysis of image	MINIMAL
S30.05	View analysis overview	MINIMAL
S35	Finding/Viewing Builds	MINIMAL
S35.01	View list of projects/builds	MINIMAL
S40	Install Single-User Web Hob	MINIMAL
S40.01	Check prerequisities	MINIMAL
S40.02	Download / git clone Web Hob	MINIMAL
S40.03	Install single-user option	MINIMAL

As this is the first stage, all scenarios above are appearing for the first time and are in Minimal state.

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Along with reporting on build metrics, specifying and running builds is a core capability of Web Hob. This capability is the focus of Stage Two. Once this stage is complete the main foundations of Web Hob will be in place.

- Implementation of Create Build and related scenarios will be far from optimal at this point. Improvements and refinement of the build specification & execution tasks will continue throughout the lifecycle of Web Hob, but in this stage the basic feature set will make its appearance for the first time.

- Another objective at this stage is to enable installation of Web Hob as a server which will support the Team Web Hob context. This installation process will be markedly different from that of the single-user Web Hob as it must accommodate performance, security and other important concerns when setting up such platforms.

- For the reason listed above, *S45 Install Web Hob Server* may not be achievable in this stage, and may move to Stage 3. Alternatively it may be present but extremely limited at this stage. A decision on this will be taken when aligning the first round of roadmap stages with existing release plans.

- During this stage, arrangements should be made to procure and set up the hardware infrastructure that will eventually run Public Web Hob.

		EXTEND
	<<	TWO
S05	Create Build	MINIMAL
S05.01	Set up Project	MINIMAL
S05.02	Choose Hardware	MINIMAL
S05.x	Set Preferences	MINIMAL
S06	Specify Layer(s)	MINIMAL
S07	Specify base image and package(s)	MINIMAL
S05.05	Run Build	MINIMAL
S45	Install Web Hob Server	MINIMAL
S45.01	Configure team servers	MINIMAL
S45.02	Select team options and configure	MINIMAL

Stage Two is another "Extend" stage, with the focus on adding the capability of creating and running builds

Stage Three is the first "Enhance" stage. Its central goal is to improve the two core capability sets and generally make Web Hob more robust in preparation for the next stage.

- Many of the improvements to *S30 Show Build Metrics* and related scenarios should be informed by insight into actual usage, as that capability will have been in place since Stage One.

- The scenarios related to S05 Create Build will undergo improvements to capability and user experience. This will include the ability to customise packages and layers by editing files directly within Web Hob - see implementation notes for more details.

- Although this is an Enhance stage, some scenarios are supported for the first time. Two of these relate to notifications - one for completion of builds, another for completion of analysis. Others relate to error messaging, with useful error messages appearing during the build process for the first time.

- During this stage the Web Hob server should be deployed on to the PWH infrastructure. Essentially this will mean that a Yocto Project controlled Team Web Hob will exist, which will develop into the Public Web Hob in the following stage.

		ENHANCE
	<<	THREE
S05	Create Build	TARGET
S05.01	Set up Project	TARGET
S05.02	Choose Hardware	TARGET
S05.x	Set Preferences	TARGET
S06	Specify Layer(s)	TARGET
S07	Specify base image and package(s)	TARGET
S05.05	Run Build	TARGET
S05.06	Receive notification that build is done	MINIMAL
S30	Show build metrics	TARGET
S30.01	Identify Image	TARGET
S30.02	Define scope of analysis	TARGET
S30.03	Run analysis of image	TARGET
S30.04	Receive notification that analysis is done	MINIMAL
S30.05	View analysis overview	TARGET
S30.06	Explore detail of metrics	MINIMAL
S31	Error Messaging	MINIMAL
S31.01	View error logs	MINIMAL

The main focus of Stage Three is the robustness of build creation and analysis, so many of those scenarios reach target state here

This stage will most likely see the most intense development activity so far, as its main objective is launching Public Web Hob. This involves introducing supporting many new scenario groups for the first time, including Export, Import, and others relating to account management.

If the "Freeway First" strategy has proven effective there should be mature and robust set of core capabilities in place which can now be provided in a more widely accessible form, allowing the "On-Ramp" aspect of Web Hob to now become the central focus.

- By this stage infrastructure for Public Web Hob must be fully ready, so this stage should involve load testing of the platform. Concurrent builds must be able to run without the infrastructure falling over. This might involve optimisations to Bitbake and other components taking place during prior stages.

- Content authoring and design for a small website on the PWH infrastructure should also be carried out. This might include a Public Web Hob FAQ, about page, home page and possibly an online tutorial. This content should not be bundled with the downloadable Web Hob - similar pages should exist in the download but should be content-free.

- Export & Import are essential dependencies for PWH rollout. Without them PWH is effectively a sandbox.

- Although as a rule stages are not tied to fixed points in time, it is recommended that the launch of Public Web Hob should coincide with a conference and event at which it can be given a high-profile announcement and demo.

- Following completion of this stage the Yocto Project will need to devote resource to maintaining and supporting Public Web Hob.

		EXTEND
	<<	FOUR
S10	Create Public Web Hob Account	TARGET
S11	Manage PWH Account	MINIMAL
S25	Export Project	MINIMAL
S25.03	Edit Export Variables	MINIMAL
S25.05	Receive notification that export is ready	MINIMAL
S25.06	Download tarball	MINIMAL
S25.07	Delete project	TARGET
S31.02	Save error messages to database	MINIMAL
S31.03	File bug report	MINIMAL
S35	Finding/Viewing builds	TARGET
S35.01	View list of projects/builds	TARGET
S35.02	Copy build information into new project	MINIMAL
S35.03	Select Project from list	TARGET
S35.04	Select Build from list	TARGET
S70	Import Project	MINIMAL
S70.03	Specify path to Export tarball	MINIMAL
S70.08	Verify success of Import	MINIMAL
S05	Create Build	REFINE

Stage Four culminates in the release of Public Web Hob

With Public Web Hob having launched in the previous stage there is likely to be drain on developer time carrying out bug fixes or implementing backlog features - this is typical in the period following deployment of web applications. For this reason Stage Five is an "Enhance" stage with very few new scenarios supported.

- Migration (users taking projects from PWH and setting them up for user elsewhere) is a strategic priority - the easier the migration process, the less strain on the PWH web infrastructure, as users will take their work off of Yocto Project machines. To support this the Export scenario group is brought to target state.

- Also in support of the migration priority, the install process for Web Hob as a server is greatly improved.

- Scenarios involving user account administration are supported in a minimal state. These will help in support of Public Web Hob but will be of use to Team Web Hob administrators as well. Along with the improved installation process, this will make Team Web Hob an increasingly robust and scalable tool.

- In this stage there should also be significant refinements to *S05 Create Build* and *S30 Build Metrics* scenario groups, even though these previously reached Target state.

Design Direction

- With Public Web Hob live, this stage should also see a similar exercise to the current Design Direction project carried out. Usage of Web Hob in various contexts should be investigated using various means and users should be consulted. The roadmap should undergo significant revision and extension to stages beyond the 8 in this version.

		ENHANCE
	<<	FIVE
S25	Export Project	TARGET
S25.03	Edit Export Variables	TARGET
S25.05	Receive notification that export is ready	TARGET
S25.06	Download tarball	TARGET
S31.02	Save error messages to database	TARGET
S31.03	File bug report	TARGET
S45	Install Web Hob Server	TARGET
S45.01	Configure team servers	TARGET
S45.02	Select team options and configure	TARGET
S55	Administering accounts	MINIMAL
S55.01	Create a new user account	MINIMAL
S55.02	Edit or delete a user account	MINIMAL
S60	Administer team server	MINIMAL
S05	Create Build	REFINE
S30	Show Build Metrics	REFINE

Stage Five focuses mainly on raising maturity of existing features and supporting adoption and scaling of Team Web Hob

Assuming that Public Web Hob is functioning successfully as an "On-Ramp" by now, attracting usage and helping newcomers get to grips with the Yocto Project, the need to support migration will be critical. This Extend stage therefore involves *S70 Import Project* reaching Target state.

- With both Export and Import scenario groups at the Target state the risk of PWH infrastructure becoming clogged by lingering users will be significantly reduced.

- Another scenario group reaching Target state in this stage is *S40 Install Single-User Web Hob*. This is also mainly to aid migration. If the recommended native application approach is followed, this target state will be the Local Web Hob taking the form of an installable binary, and possibly incorporating the Import process as one of its steps.

- Although the Public Web Hob will technically support Import, it is not recommended that the feature is made available to normal users. It is conceivable that PWH administrators may sometimes use Import when resolving user issues but the focus should be on encouraging users to move away from PWH, not towards it.

- Refinements to S25 Export Project are carried out here. Refinements to S31 Error Messaging may see rollout of "community-sourced" error resolution content, as PWH should have been running for long enough that useful data has accumulated.

		EXTEND
	<<	SIX
S11	Manage PWH Account	TARGET
S40	Install Single-User Web Hob	TARGET
S40.01	Check prerequisites for WH	TARGET
S40.02	Download / git clone WH	TARGET
S40.03	Install single-user option	TARGET
S70	Import Project	TARGET
S70.03	Specify file path to Export tarball	TARGET
S70.04	View results of tarball analysis	MINIMAL
S70.05	Make any necessary config changes	MINIMAL
S70.08	Verify success of Import	TARGET
S05	Create Build	REFINE
S25	Export Project	REFINE
S31	Error Messaging	REFINE

In Stage Six the central goal is to make migration away from PWH straightforward even for less technical users

The only scenario group remaining to reach Target state, *S55 Administering Accounts*, does so in this stage. At this point planned scenarios in this version of the roadmap are complete, but the new roadmap produced during Stage 5 will now be in effect.

- Improvements to account administration may involve admin control over the algorithms for prioritising builds, rating the quality of error reports contributed by users, or other more advanced aspects of user behaviour.

- With Web Hob in a mature state in all contexts (Local, Team and Public) there should be a wealth of user insight following completion of each stage. The Refinement activities, which will take up an increasing proportion of developer time at this stage, should be informed by this.

		ENHANCE
	<<	SEVEN
S55	Administering Accounts	TARGET
S55.01	Create a new user account	TARGET
S55.02	Edit or delete a user account	TARGET
S60	Administer team server	TARGET
S70.04	View results of tarball analysis	TARGET
S70.05	Make any necessary config changes	TARGET
S05	Create Build	REFINE
S35	Finding / Viewing Builds	REFINE

This is the final stage in which planned scenarios reach Target state

Stage Eight: Supported Scenarios

The final stage listed in this roadmap, Stage 8 comprises purely Refinement activities. These focus on the areas which are expected to be in need of further improvement, even at this stage.

- The technical complexity of Export & Import, combined with their strategic importance in terms of supporting migration, means there will still be a need to improve and refine these scenarios.

- *S31 Error Messaging* is another scenario highly dependent on Bitbake and where there is likely to be an opportunity for improvement. In particular, incorporation of guidance and help from other users of the same WH instance, or of the global user community, is a feature that will benefit from optimisation over multiple cycles.

	ENHANCE
<<	EIGHT

S05	Create Build	REFINE
S25	Export Project	REFINE
S31	Error Messaging	REFINE
S70	Import Project	REFINE

Only Refinement activities are expected at this stage, although new use cases and priorities are likely to have emerged by now

Roadmap: Implementation Notes

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Author: **Brendan Nelson**

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Implementation Notes

Some commentary on implementation considerations for Stages 1-4 - through to the major milestone of launching Public Web Hob - is provided below.

STAGES			
ONE	TWO	THREE	FOUR
Approach this iteration of Web Hob as "read-only". This would be desirable as it would greatly reduce scope. A read-only and single-user WH would be simple to install. If the native application model is approached and implemented in this stage it will have benefits in the longer term. Consider the API layer at this stage. If Web Hob is to be API-driven it may be wise to put this in place at an early stage, so we can eat our own dog food (so to speak).	Supporting installation of multi-user WH (or WH Server) at this stage may or may not be achievable. It depends on whether the single-user iteration in Stage One was based on a native application or a web server model. If the former, the multi-user WH will need more work as the foundations will need to be constructed in this stage. But if the latter, the foundations will already be in place, so it may take less time to achieve the "Install WH Server" objective. Given that this roadmap recommends adopting the native application approach in Stage One, it may be the case that this objective is moved to Stage 3.	Implementing "Create New Build" at this point will mean that editing of source files is introduced. We recommend using existing browser-based editors such as ACE or CodeMirror. Essentially the WH UI will attempt to launch the user's default text editor when editing files, and will fall back to the browser based method if not operating in the native application model.	Resource management has implications for Team Web Hob as well, handling multiple Bitbake instances and calls, so work on this would need to begin early on. We presume that Bitbake needs to be told how many calls to use, but don't know whether it can currently dynamically allocate resources and so on. Preparing infrastructure for PWH before this stage is not just possible but highly recommended! We suggest that cycle of deployment to "as live" is up and running as early as possible in the process. Deployment can be almost completely automated for the web application. There are plenty of options for monitoring and analysis of web apps - e.g. New Relic and Scout for real-time monitoring, Kibana and Logstash for collection and analysis