Yoda
Agile Project Management with GitHub

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Introduction

Yoda was developed during 2017/2018 at **Hewlett Packard Enterprise** to support **Agile Project planning** and execution for development of a new innovative product.

GitHub was already in place for **source code versioning** and **issue tracking** (for both bugs and new features).

The ambition was to **enhance GitHub** to become an **all-in-one solution** for Agile Project **Planning** and **Execution**.

Yoda **augments GitHub** by adding **estimates** and **sprint planning** to issues. Further, Yoda brings various tools for **issue-reporting** and **management**.

Yoda was **Open-Sourced** using an **MIT license** in January 2018.

Content

- Agile Project Management
- Stories, Features, Epics, … in GitHub (issues)
- Sprints in GitHub (milestones)
- Story point estimation in Github Issues
- GitHub issue labelling convention
- Yoda Reporting Tools
  - Issue Time Statistics, CFD, Issue Exporter
- Yoda Agile Project Management Tools
  - Burndown Chart, Velocity Chart, Kanban Board
- Other Yoda tools
  - Milestone Manager, Label Manager, Admin, Task Copy
- Yoda Architecture

Agile Project Management

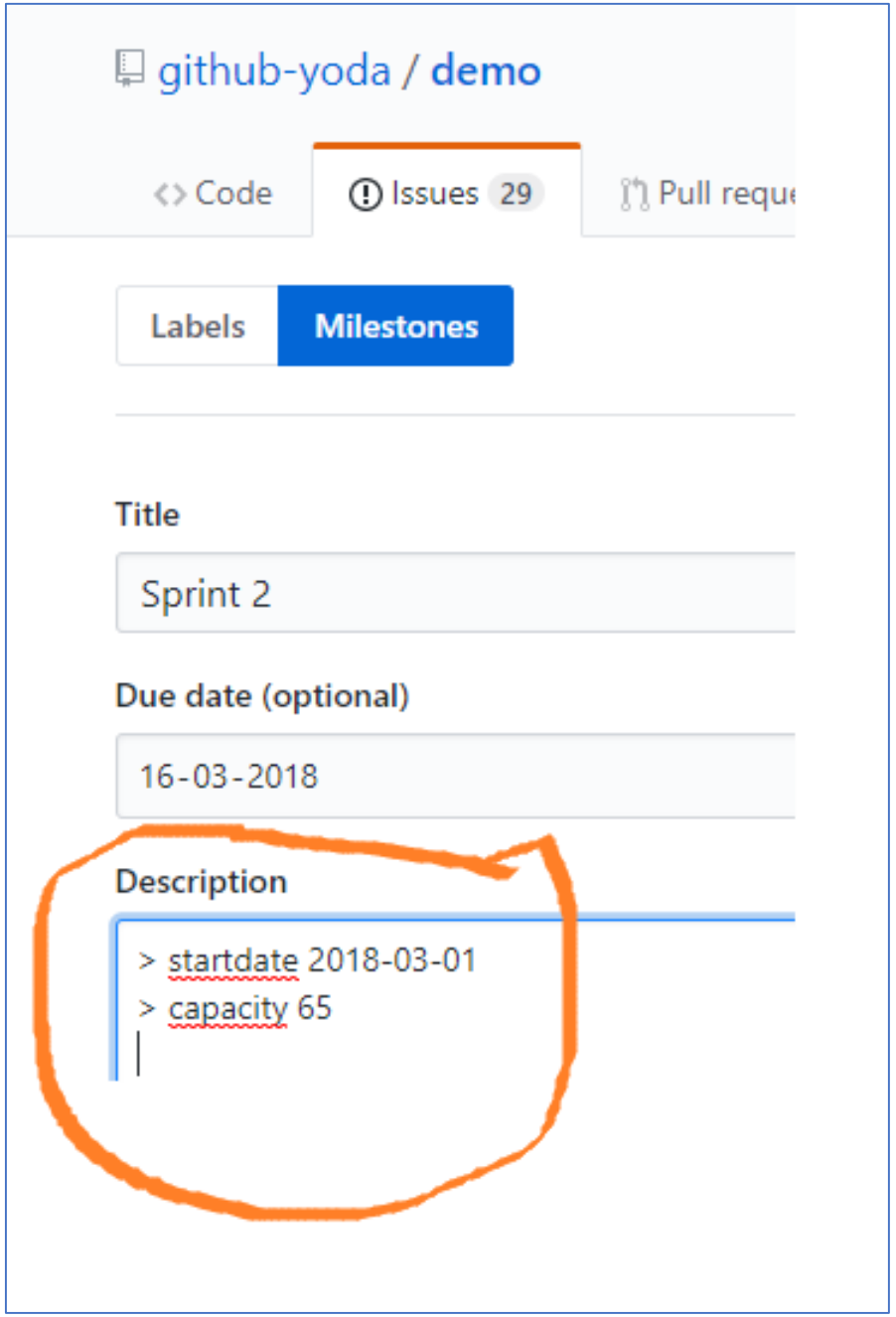
- **Agile** project management is becoming an industry **de-facto standard**
- Project- and product-**development** happens as a series of **sprints**.
- Software is **released** either at the end of each sprint, or every *n'th* sprints as a **product increment.**
- Sprints address (user) **stories**, which are estimates using **story points**.
- Often **SCRUM** methodology drives development.
- Different frameworks, e.g. **SAFe** (Scaled Agile Framework) add descriptions at higher level than (user) stories to capture required functionality (**Epics**, **Capabilities, Features**).

(User) Stories, etc. in GitHub

- GitHub **issues** can be used to represent (User) **Stories** – and as well Epics, Capabilities, and Features
- GitHub Issues bring many **relevant features** for this, e.g.
  - Web UI, Markdown, graphics, discussions, assignments, labels, lists, file attachments, references, milestones, etc.…
- GitHub **issue references** can be used to link descriptions (e.g. stories *x* and *y* required to implement Epic *z* gives references *x*<->*z* and *y*<->*z*).

Sprints in Github

- A **sprint** defines a time period (typically 2-4 weeks) in which a number of (user) **stories** (as broken down into tasks) are delivered.
- **Yoda** uses Github **milestones** for sprints
  - Milestones already have an end/due date.
  - Yoda expects to have as well a sprint **start date**
  - Optionally, a team sprint capacity figure (in story points)
- Milestones with matching **titles across repositories** are considered to be part of the **same sprint.**
  - This allows **multi-repository** sprint **planning** and **tracking**

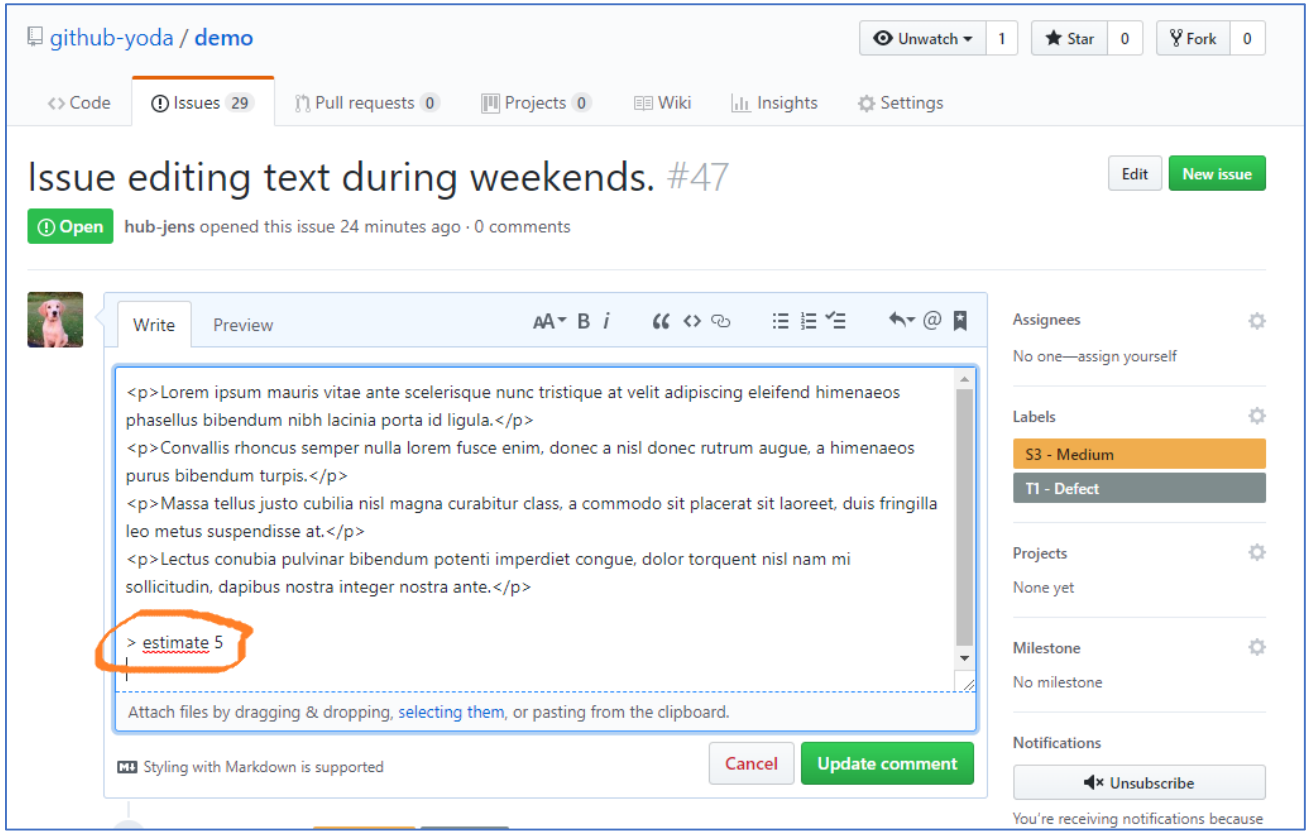


Story point estimation in Github Issues

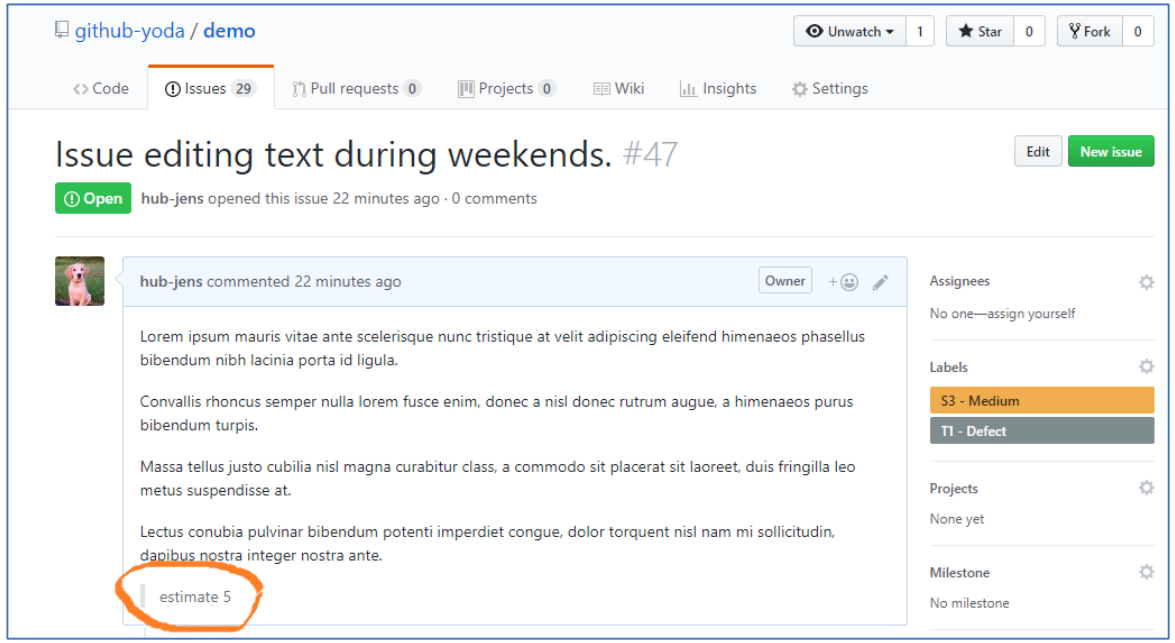
- Github issues for (User) Stories **do not have** a dedicated **field** to store estimates (story points).
  - Similarly, no **features** exists for **summing up estimates** (into milestones, projects, etc.)
  - This seems an **obvious omission** from GitHub
- Instead Yoda introduces **two options** for handling **estimates** into issues:
  1. As s**pecial text** “> estimate (story points)”, in the body (first comment) of the issue
  2. Using pre-defined fixed **story point labels**.
- If using labels, suggest to create labels with **Fibonacci-like** values (1,2,3,5,8,13,20,40) as typically done for Story Points.
- Yoda considers as well the **remaining effort** for an issue. If not provided, the **remaining effort** is assumed to be **equal** to the **estimate** while the issue is **open,** and **zero** when it is **closed**.
  - If using option 1 above (estimate into issue body), it is possible to specify as well one or more explicit remaining values using a ”> remaining YYYY-MM-DD (story point value)” syntax.

Estimate example (body text)

Markdown ”> estimate (story point)” format)



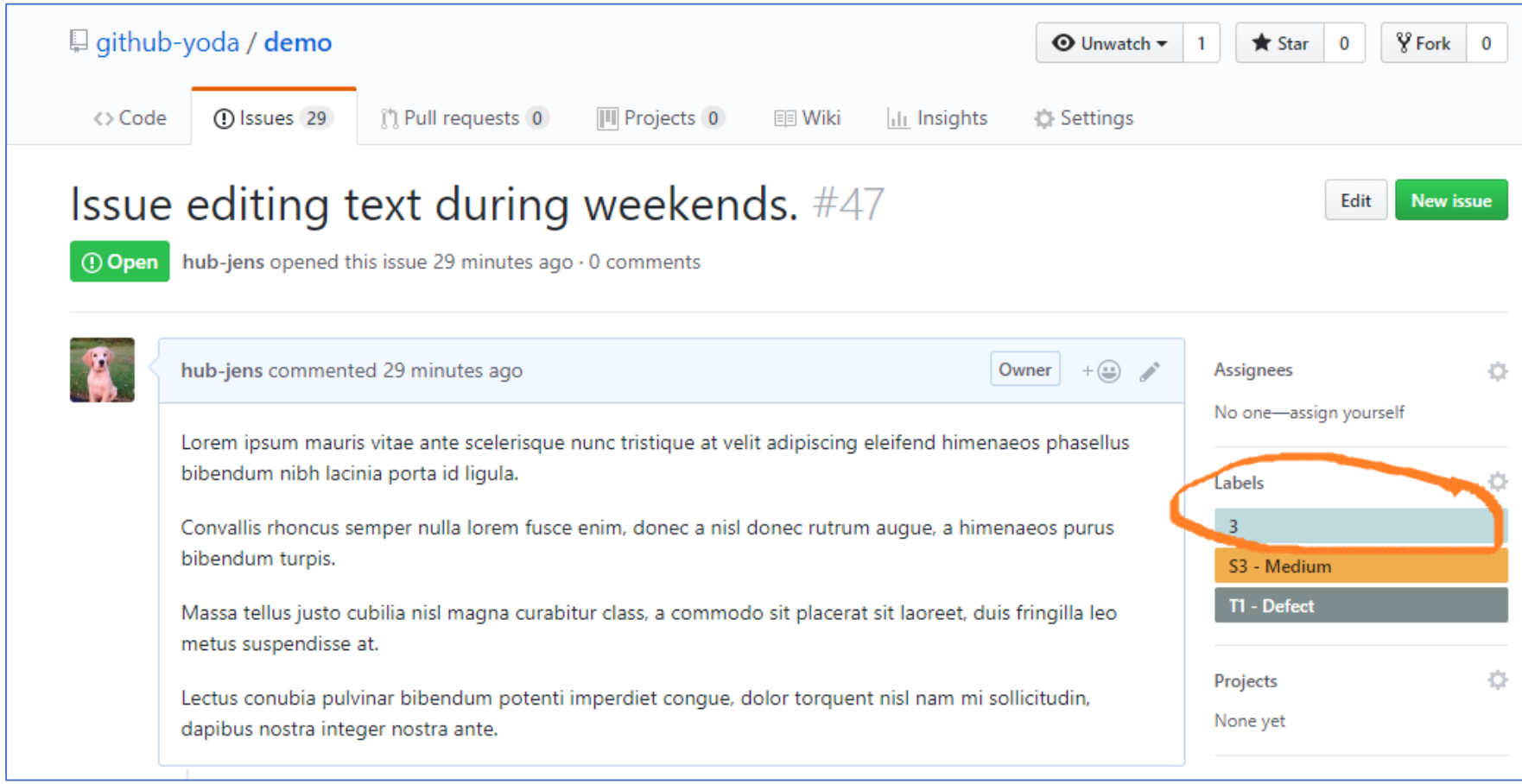
Resulting preview/HTML



Estimate example (using labels)

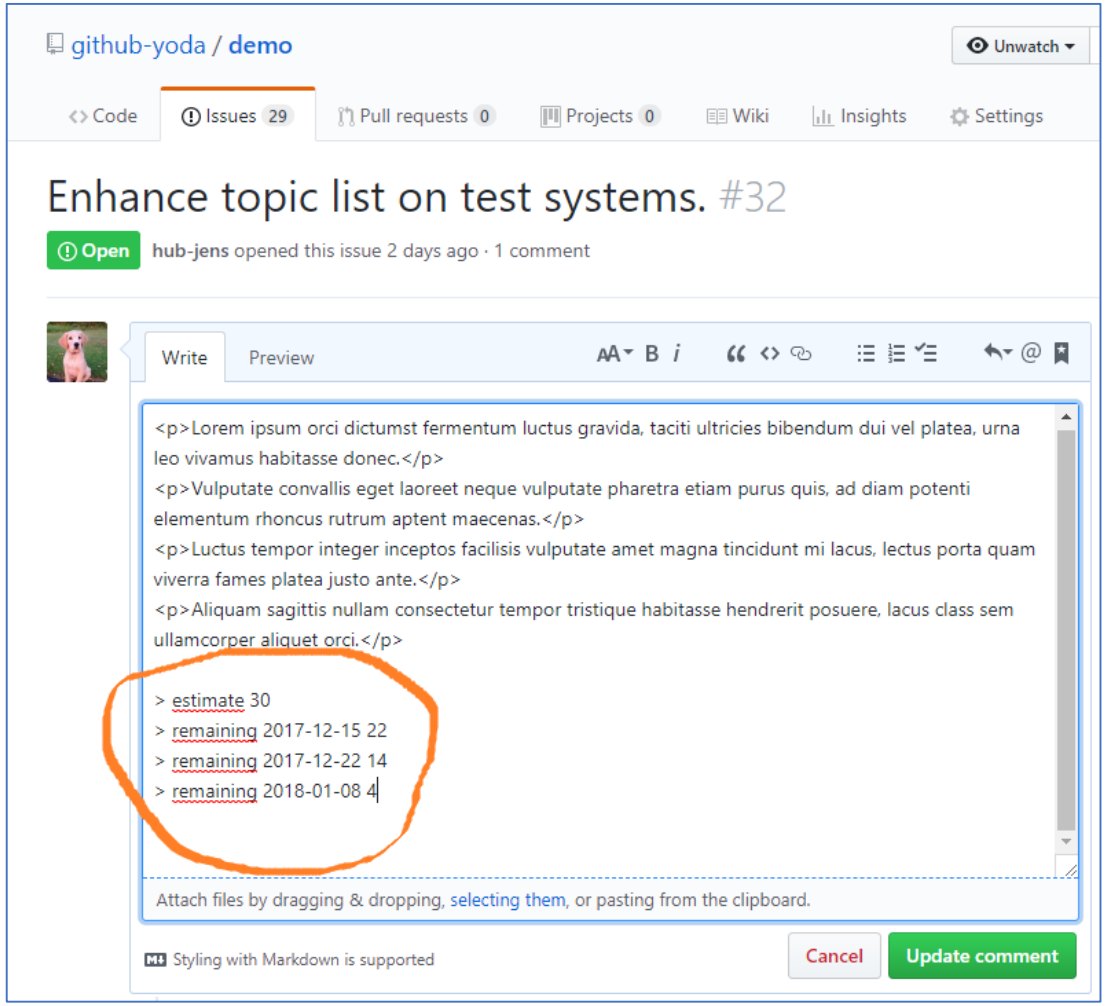
Fibonacci Labels

Issue with label estimate

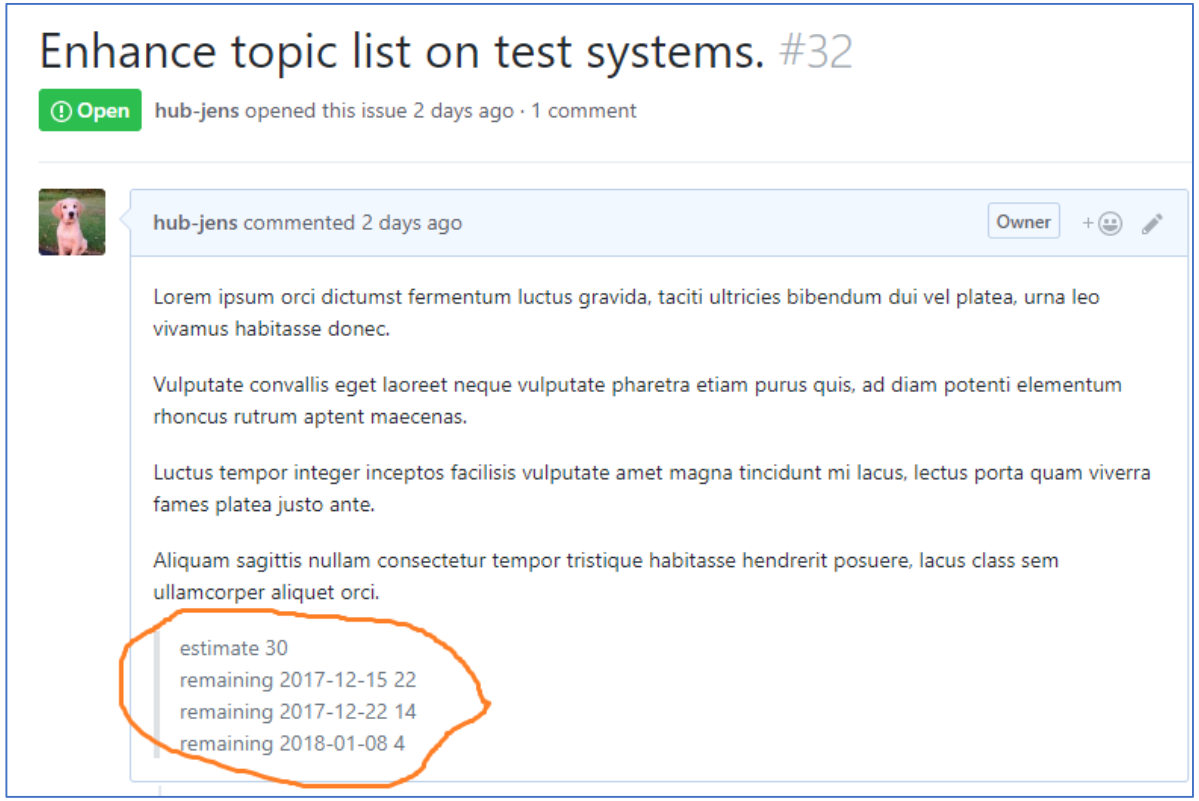


Remaining example

Markdown ”> remaining YYYY-MM-DD (story point)” format)



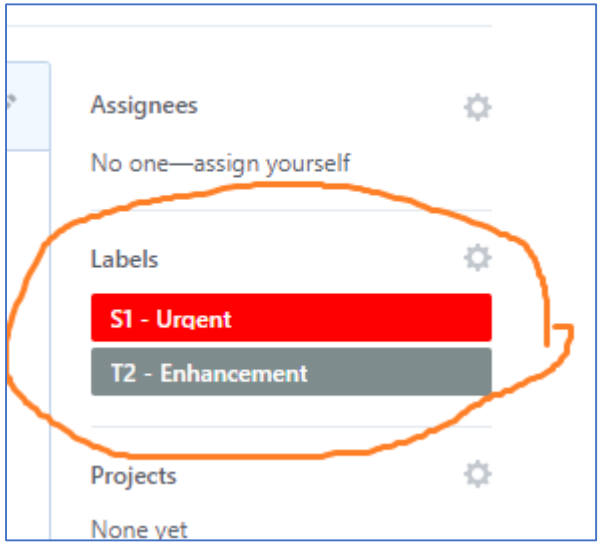
Resulting preview/HTML



GitHub issue labelling convention

- To get maximum benefit from Yoda, it is important to be **consistent** on the **use of labels**. This is best done by having a **labelling** convention.
- Suggestion for a labelling convention is to assign to issues:
  - A **type label** (e.g. Defect, Enhancement, Tasks).
  - A **severity label** (e.g. Urgent, High, Medium, Low).
  - **Note:** These labels are mutually exclusive by convention not enforced by Github.
  - Optionally, use a prefix (e.g. T or S) for different label enumerations.

Example



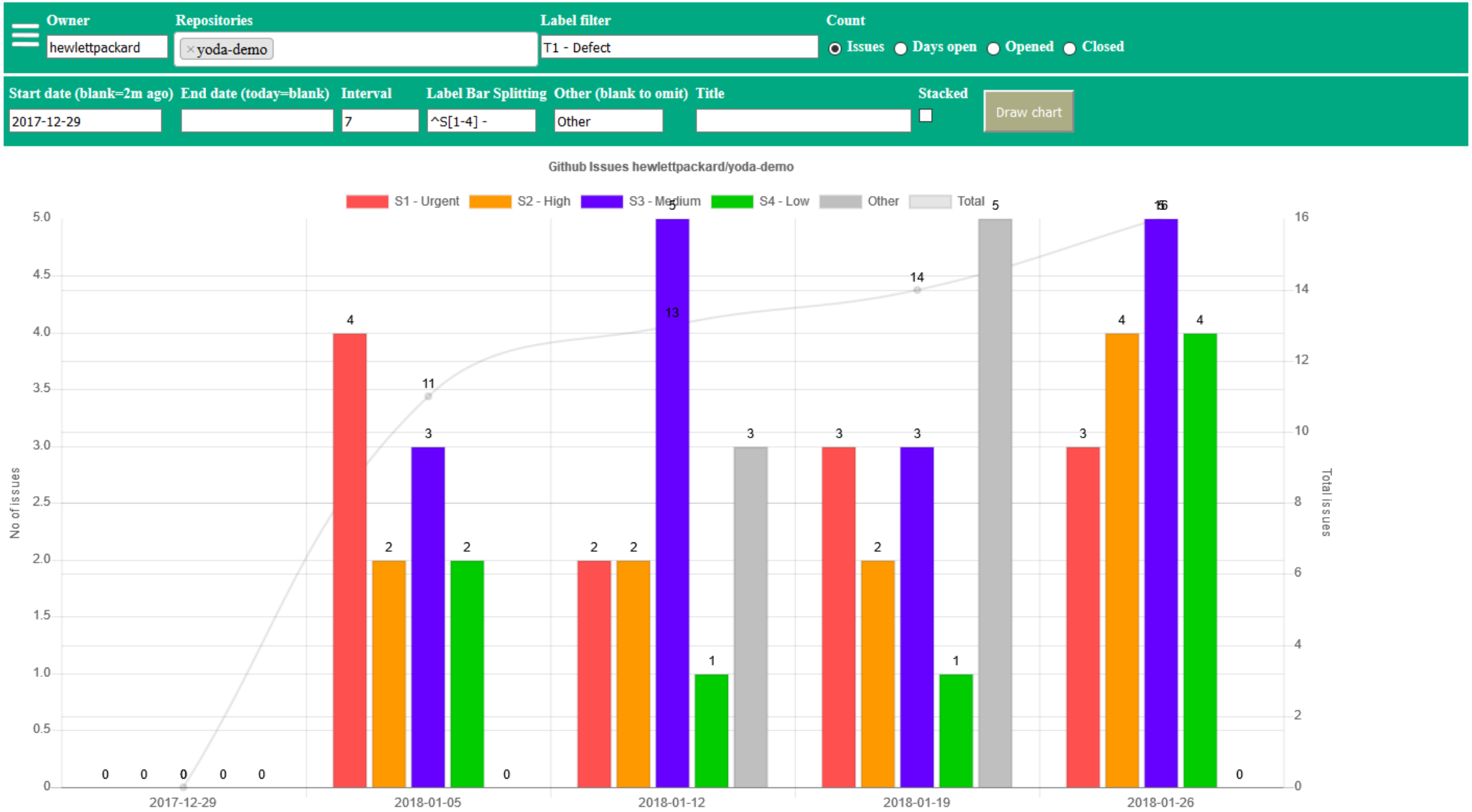
Yoda Reporting Tools

Issue Time Statistics, CFD, Issue Exporter

Issue Time Statistics

- This report shows open GitHub **issues over time** in a **bar-chart**
- **Scope** can be issues in the **entire organization**, or **one-** or **multiple** repositories
- Issues can be **split** into different **bars** based on **labels** (e.g. Severity)
- Issue **label filters** can be applied
- **Start-** and **end-dates,** reporting **interval**, etc. can be adjusted
- Optionally, number of **opened** or **closed** reports during an interval can be **reported** instead of # of open issues.

Example: Issue Time Statistics



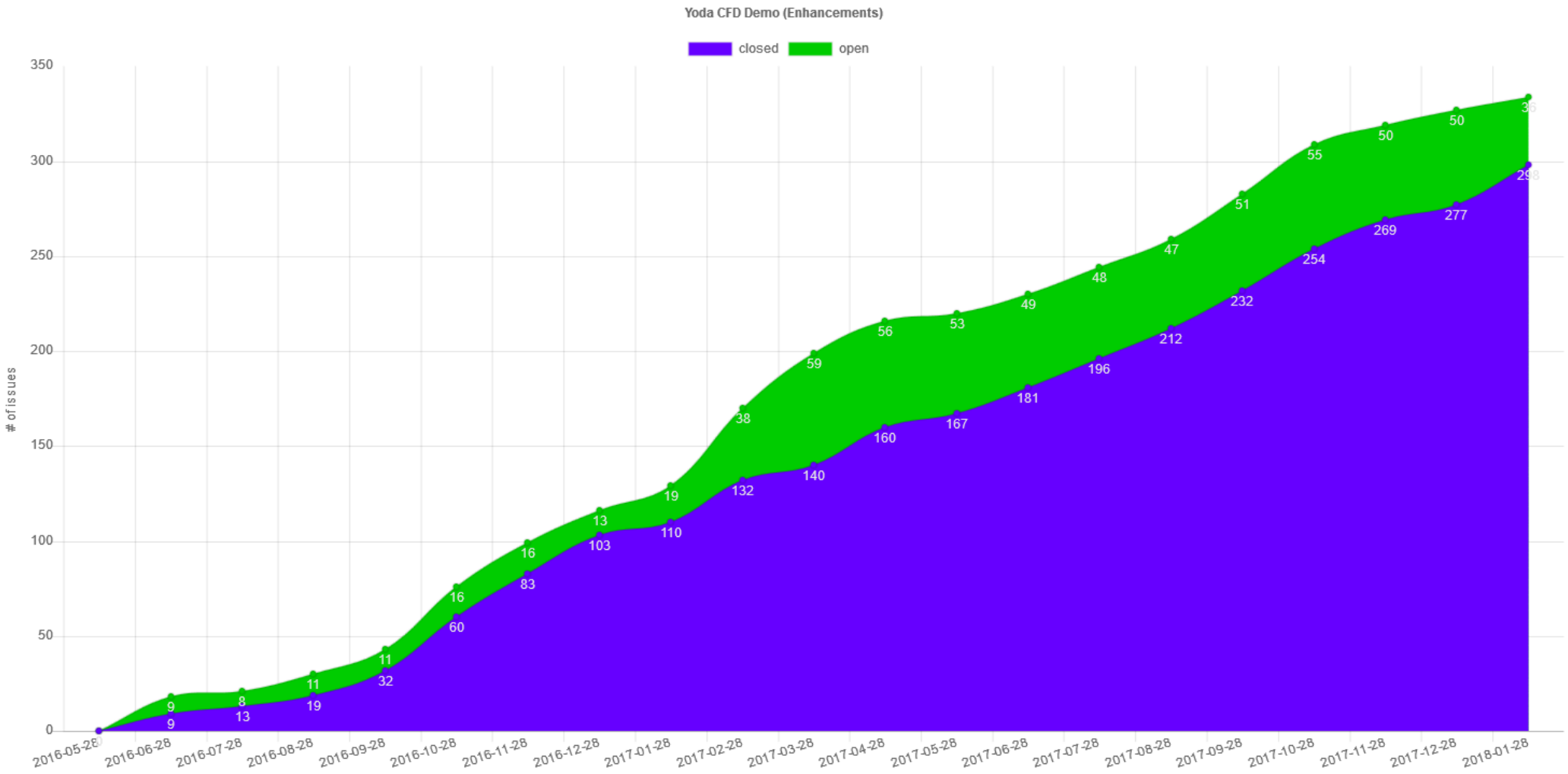
CFD (Cumulative Flow Diagram)

- A **CFD** shows **cumulative** number of **issues over time** split by state (open/closed)
  - **Normally** CFD charts may consider **more than just two states** (e.g. Open, In design, in development, in test, done/closed).
  - As GitHub only has two issue states (open and closed). **Yoda CFD only** uses these **two states**.
- **Scope** can be issues in the **entire organization**, or **one-** or **multiple** repositories
- Yoda can also draw the related **lead-time graph**.
  - This shows the **average** number of **days** an issue remained in the **open state**.

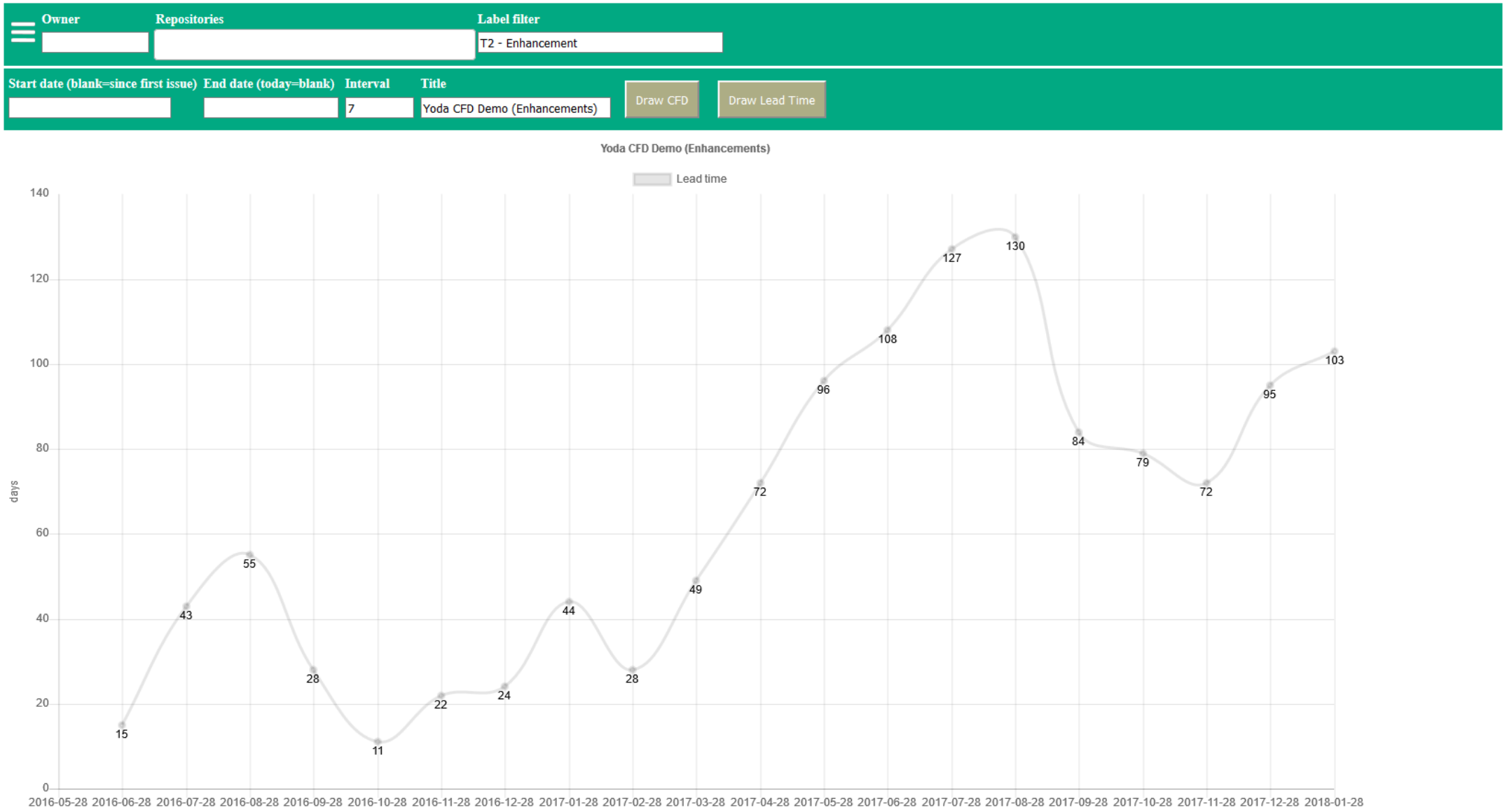
CFD Example

Owner | Repositories | Label filter: T2 - Enhancement

Start date (blank=since first issue) | End date (today=blank) | Interval: 7 | Title: Yoda CFD Demo (Enhancements) | Draw CFD | Draw Lead Time



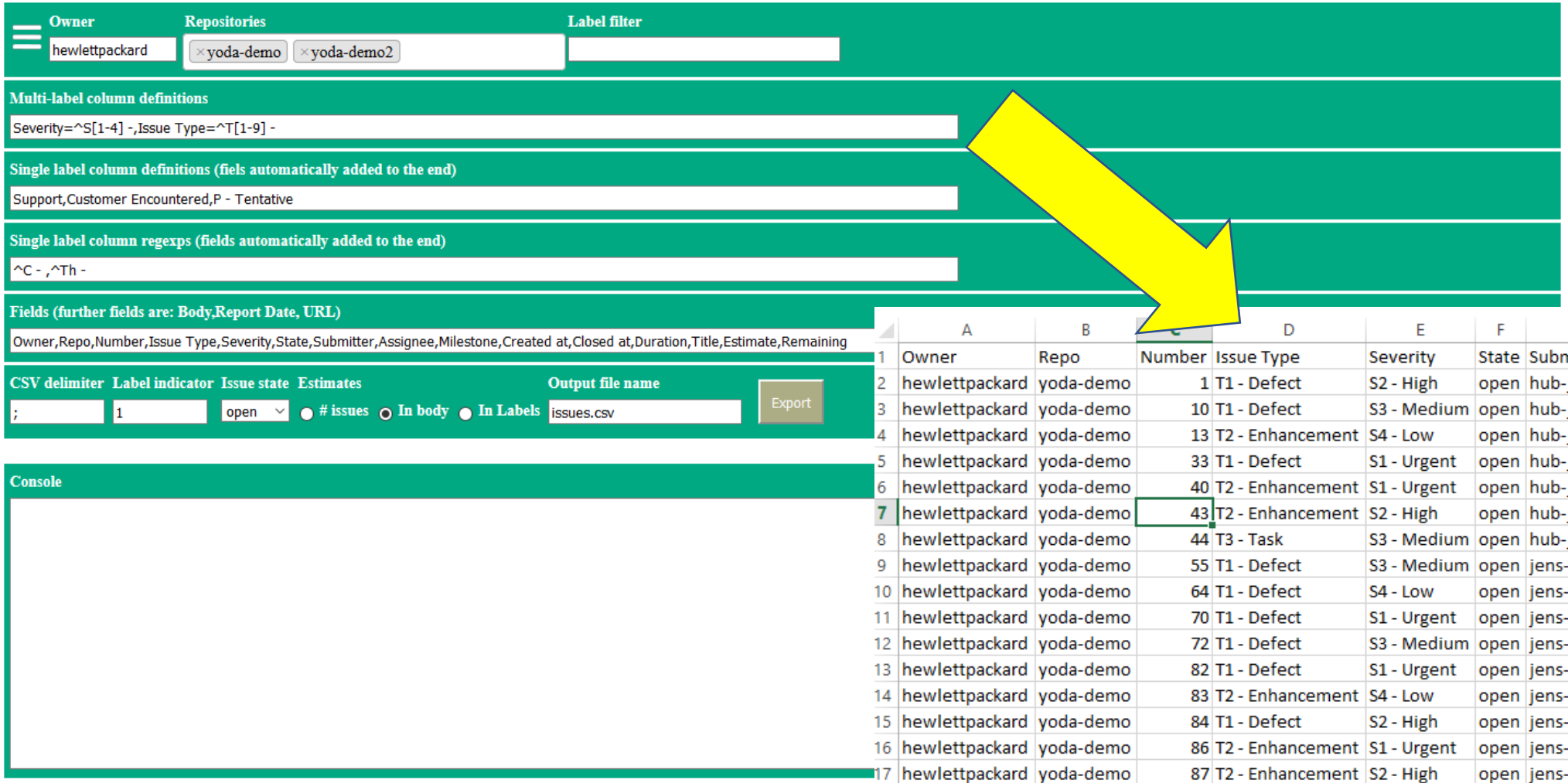
Lead Time Example



Issue Exporter

- Yoda Issue Exporter can **export issues** (all or filtered) to a **CSV file**, which can e.g. be **imported** into **Excel**.
- Exporter can export from a **single repo**, **multiple repositories** or across all repos for an **entire** GitHub **Organization**.
- Set of exported **fields** are **highly configurable**.
- The use of a good **labelling convention** helps (e.g. as the tool supports merging Severity labels into a **single column**).

Issue Exporter Example



	A	B	C	D	E	F	G	H	I	J
1	Owner	Repo	Number	Issue Type	Severity	State	Submitter	Assignee	Milestone	Created at
2	hewlettpackard	yoda-demo	1	T1 - Defect	S2 - High	open	hub-jens		Sprint 2	04-01-2018
3	hewlettpackard	yoda-demo	10	T1 - Defect	S3 - Medium	open	hub-jens		Sprint 2	04-01-2018
4	hewlettpackard	yoda-demo	13	T2 - Enhancement	S4 - Low	open	hub-jens		Sprint 2	04-01-2018
5	hewlettpackard	yoda-demo	33	T1 - Defect	S1 - Urgent	open	hub-jens			06-01-2018
6	hewlettpackard	yoda-demo	40	T2 - Enhancement	S1 - Urgent	open	hub-jens			08-01-2018
7	hewlettpackard	yoda-demo	43	T2 - Enhancement	S2 - High	open	hub-jens		Sprint 2	08-01-2018
8	hewlettpackard	yoda-demo	44	T3 - Task	S3 - Medium	open	hub-jens		Sprint 1	08-01-2018
9	hewlettpackard	yoda-demo	55	T1 - Defect	S3 - Medium	open	jens-markussen			09-01-2018
10	hewlettpackard	yoda-demo	64	T1 - Defect	S4 - Low	open	jens-markussen		Sprint 1	11-01-2018
11	hewlettpackard	yoda-demo	70	T1 - Defect	S1 - Urgent	open	jens-markussen		Sprint 1	11-01-2018
12	hewlettpackard	yoda-demo	72	T1 - Defect	S3 - Medium	open	jens-markussen			11-01-2018
13	hewlettpackard	yoda-demo	82	T1 - Defect	S1 - Urgent	open	jens-markussen			15-01-2018
14	hewlettpackard	yoda-demo	83	T2 - Enhancement	S4 - Low	open	jens-markussen			15-01-2018
15	hewlettpackard	yoda-demo	84	T1 - Defect	S2 - High	open	jens-markussen			15-01-2018
16	hewlettpackard	yoda-demo	86	T2 - Enhancement	S1 - Urgent	open	jens-markussen			15-01-2018
17	hewlettpackard	yoda-demo	87	T2 - Enhancement	S2 - High	open	jens-markussen			16-01-2018
18	hewlettpackard	yoda-demo	90	T2 - Enhancement	S2 - High	open	jens-markussen			16-01-2018
19	hewlettpackard	yoda-demo	91	T2 - Enhancement	S4 - Low	open	jens-markussen			16-01-2018
20	hewlettpackard	yoda-demo	95	T1 - Defect	S3 - Medium	open	jens-markussen			23-01-2018
21	hewlettpackard	yoda-demo	96	T1 - Defect	S4 - Low	open	jens-markussen			23-01-2018

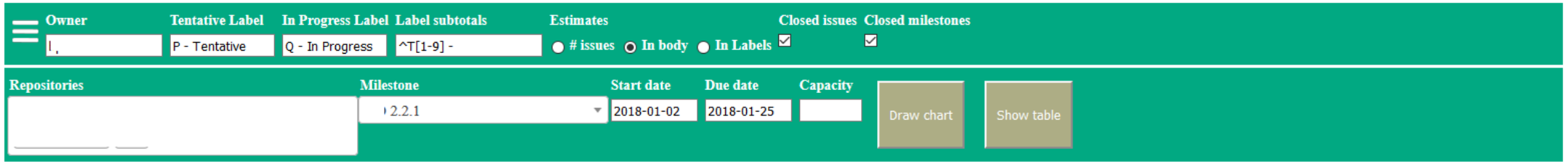
Yoda Agile Project Management Tools

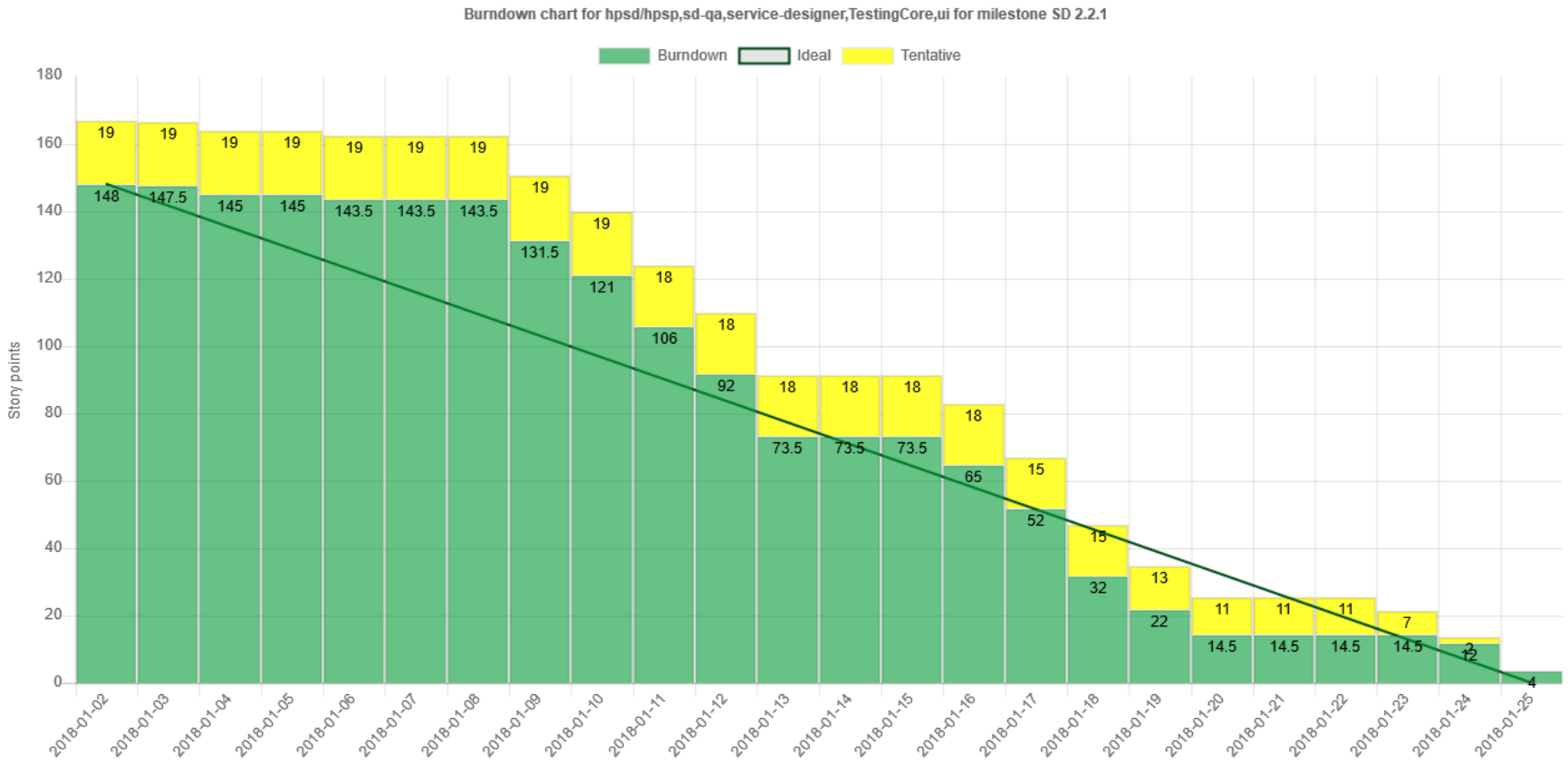
Burndown Chart, Velocity Chart, Kanban Board

Burndown Chart

- A **Burndown Chart** is a **bar chart** showing the **remaining effort** over time for a given **sprint**
- An **ideal burndown** line is drawn for comparison
- Yoda uses **remaining estimates** (see earlier) for this purpose.
- **Scope** can be issues **one-** or **multiple** repositories. This allows **cross-repository planning** and **tracking**
- It is possible to attribute some issues as **tentative** (aka **stretch goal**). These will be drawn in Yellow on top of committed issues
- Yoda Burndown tools further includes a **table view** containing the relevant sprint **issues** and their **planning data**.

Burndown Example





Burndown Table Example

Owner: hewlettpackard | Tentative Label: P - Tentative | In Progress Label: Q - In Progress | Label subtotals: ^T[1-9] - | Estimates: # issues / In body / In Labels | Closed issues ☑ | Closed milestones ☐

Repositories: yoda-demo | Milestone: Sprint 1 | Start date | Due date | Capacity | Draw chart | Show table

Issue Id (10)	Assignee	Tentative?	Type	Issue Title	Estimate	Remaining	# Tasks	# Tasks done	Tentative	State
yoda-demo/42			T3 - Task	Unknown error updating topic list in Chrome browser.	6	0	0	0	0	closed
yoda-demo/44			T3 - Task	Problem editing text in Chrome browser.	3	3	0	0	0	open
yoda-demo/45			T3 - Task	[Sprint 1] Refill coke machine for developers	0	0	2	0	0	closed
yoda-demo/48			T3 - Task	[Sprint 1] Clear log files ahead of new sprint.	1	0	3	2	0	closed
yoda-demo/58			T1 - Defect	Issue drawing with mouse during weekends.	4	0	0	0	0	closed
yoda-demo/59			T2 - Enhancement	Discontinue system view on test systems.	4	0	0	0	0	closed
yoda-demo/64			T1 - Defect	Enhance boot process in editor.	7	7	0	0	0	open
yoda-demo/69			T1 - Defect	Issue updating topic list in Chrome browser.	5	0	0	0	0	closed
yoda-demo/70			T1 - Defect	Issue updating topic list during weekends.	5	5	0	0	0	open
yoda-demo/75			T2 - Enhancement	Allow boot process in editor.	6	0	0	0	0	closed
Grand Total					**41**	**15**	**5**	**2**	**0**	**10**
Subtotal	open				**15**	**15**	**0**	**0**	**0**	**3**
Subtotal	closed				**26**	**0**	**5**	**2**	**0**	**7**
Subtotal	In progress				**0**	**0**	**0**	**0**	**0**	**0**
Label subtotals										
Subtotal			T1 - Defect		**21**	**12**	**0**	**0**	**0**	**4**

Velocity Chart

- A **velocity chart** compares the team **velocity across** different **sprints**
- Over time, a velocity chart will **help teams** to set the **correct capacity** for upcoming sprints
- **Scope** can be issues **one-** or **multiple** repositories. This allows **cross-repository planning** and **tracking**
- Yoda does this by reporting per sprint
  - number of **story points** completed
  - story points **per day**
  - story points **vs.** predefined sprint **capacity**

Velocity Chart Example

Kanban Board

- A **Kanban Board** shows **sprint activities** across various states, thus allowing an intuitive view of progress
- **GitHub** natively supports Kanban Boards as part of **projects**, where issues can be placed in configurable columns
- **Yoda** does not use this mechanism, but instead supports **Kanban Board** views of issues based on **issue labels** (e.g. Severities, defined Sub-states, issue types)
- **Issues** may be further **filtered** based on **milestones**, **labels**, and **assignee**
- Yoda Kanban boards can include **issues** from **multiple repos** inside the same organization.
- **Drag and drop** between columns **change labels** and can close (or reopen) issues
- **Note**: While Yoda Kanban boards provides label and state (open/closed) consistency, GitHub projects do not. Here issue to column is manually maintained.

Kanban Board Example

Owner: hewlettpackard
Columns: [Defect]open:T1 - Defect,[Enhancement]open:T2 - Enhancement,[T…
Closed milestones ☐ Closed issues ☑ Locked ☑ Estimates: # issues / In body / In Labels

Repositories: yoda-demo, yoda-demo2
Milestones (filter): Sprint 1, Sprint 2
Labels:
Assignees:

Defect 4 (18/18)

Issue updating topic list during weekends.
yoda-demo#70 Sprint 1 *unassigned* (5)
S1 - Urgent | T1 - Defect

Enhance boot process in editor.
yoda-demo#64 Sprint 1 *unassigned* (7)
S4 - Low | T1 - Defect

Problem updating topic list during startup.
yoda-demo#10 Sprint 2 *unassigned* (4)
S3 - Medium | T1 - Defect

Null pointer exception while trying to open web page
yoda-demo#1 Sprint 2 *unassigned* (2)
S2 - High | T1 - Defect

Enhancement 2 (2/2)

Unknown error editing text in editor.
yoda-demo#43 Sprint 2 *unassigned* (1)
S2 - High | T2 - Enhancement

Problem editing text on Mondays.
yoda-demo#13 Sprint 2 *unassigned* (1)
P - Tentative | S4 - Low | T2 - Enhancement

Task 1 (3/3)

Problem editing text in Chrome browser.
yoda-demo#44 Sprint 1 *unassigned* (3)
S3 - Medium | T3 - Task

Other

Closed 22 (69/69)

~~**Allow boot process in editor.**~~
yoda-demo#75 Sprint 1 *unassigned* (6)
S1 - Urgent | T2 - Enhancement

~~**Issue updating topic list in Chrome browser.**~~
yoda-demo#69 Sprint 1 *unassigned* (5)
T1 - Defect

~~**Discontinue system view on test systems.**~~
yoda-demo#59 Sprint 1 *unassigned* (4)
S1 - Urgent | T2 - Enhancement

~~**Issue drawing with mouse during weekends.**~~
yoda-demo#58 Sprint 1 *unassigned* (4)
S2 - High | T1 - Defect

~~**[Sprint 1] Clear log files ahead of new sprint.**~~
yoda-demo#48 Sprint 1 *unassigned* (1)
Q - Recurring | S2 - High | T3 - Task

~~**[Sprint 1] Refill coke machine for developers**~~
yoda-demo#45 Sprint 1 *unassigned*
Q - Recurring | S1 - Urgent | T3 - Task

~~**Unknown error updating topic list in Chrome browser.**~~
yoda-demo#42 Sprint 1 *unassigned* (6)
S4 - Low | T2 - Task

Other Yoda tools

Milestone Manager, Label Manager, Admin, Task Copy

Milestone Manager

- In support of managing **sprints** as a **set of milestones** across **different repos**, Yoda includes a **milestone manager**
- The milestone manager can **create milestones** automatically across several repositories
- Also, the tool can **synchronize sprint milestones** across repositories (updating e.g. due date in sync)

Milestone Manager Example

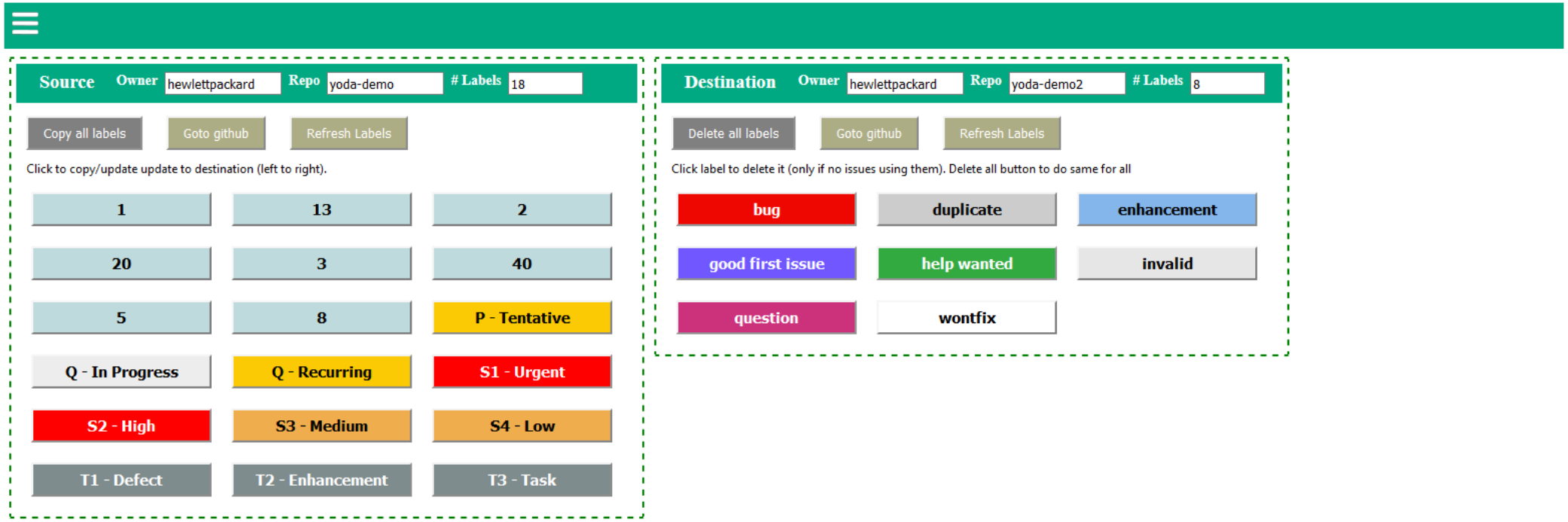
Owner: hewlettpackard
Repositories: yoda, yoda-demo, yoda-demo2
Milestone(s): Sprint 1
Closed milestones
Refresh

Repository	Milestone	State	Description	Start Date	Due Date	Burndown Date	Capacity (total 50)	Actions
All								Create milestone
yoda-demo	Sprint 1	open	Yoda sprint demo #1	2018-01-14	2018-02-28		50	Copy/Update
yoda-demo2	Sprint 1	open	Yoda sprint demo #1	2018-01-14	2018-02-28			Copy/Update

Label Manager

- In support of managing **labelling conventions** across **different repos**, Yoda includes a **label manager**
- The label manager can **copy labels** (all or some) from **one repo** to **another**.
- Label manager does **not allow deletion** of labels that are **in use**
- **Hint**: When creating a new repo, press ”Delete all labels” to get rid of the standard GitHub labels. Next press ”Copy all Labels” to get label definitions from your favorite repo.

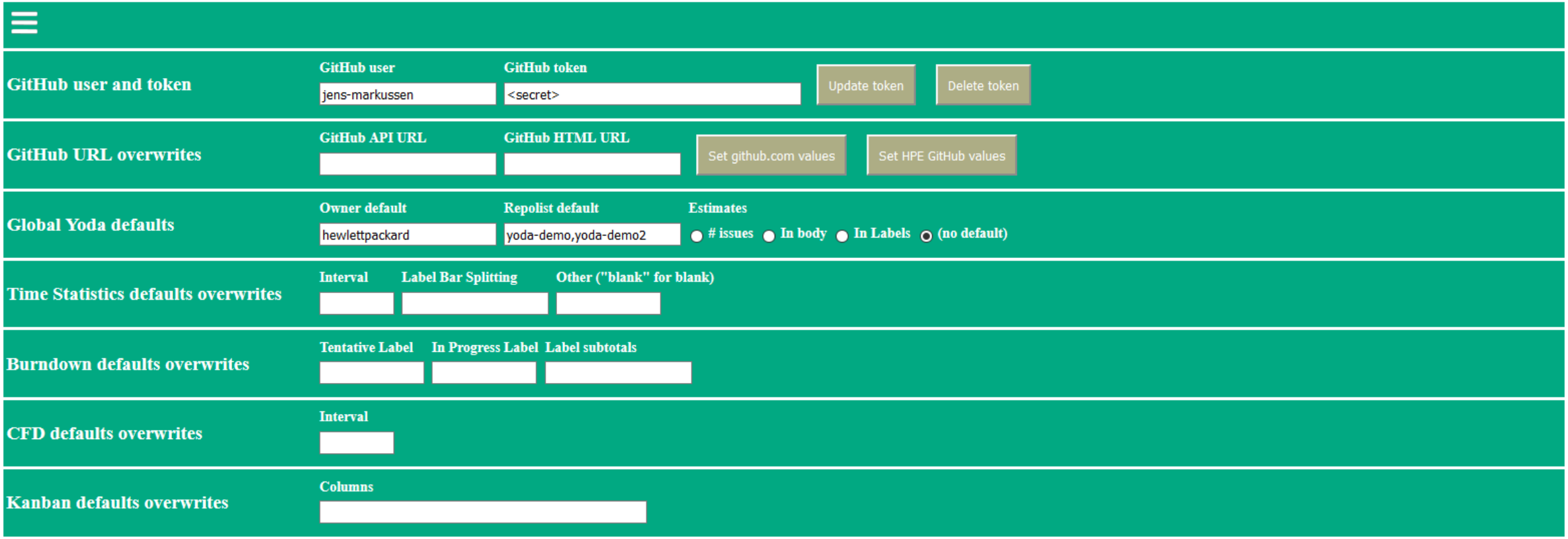
Label Manager Example



Admin

- The Yoda **admin tool** allows the user to **store** various **defaults** into the **browser settings** (localStorage)
- Most notably, the **GitHub userId** and personal **access token** should be set here.

Yoda Admin Example



Task Copy

- When executing **successive sprints**, you may have **recurring tasks** that you need to execute for **every sprint**.
- These **tasks** should naturally be handled (including estimates) as GitHub **issues**.
- The **task copy tool** allows you to copy such tasks **from one sprint** (milestone) **to the next**.
- If such recurring issues include **tasks lists** (GitHub notation ”– [x] text”), **check boxes** will be **cleared** in preparation for the next sprint (so ”- [x]” will become ”- [ ]”

Task Copy Example

Owner: hewlettpackard
Repositories: ×yoda ×yoda-demo ×yoda-demo2
Milestone(s): ×Sprint 1
Closed milestones ☐
Refresh

Repository	Milestone	State	Description	Start Date	Due Date	Burndown Date	Capacity (total 50)	Actions
All								Create milestone
yoda-demo	Sprint 1	open	Yoda sprint demo #1	2018-01-14	2018-02-28		50	Copy/Update
yoda-demo2	Sprint 1	open	Yoda sprint demo #1	2018-01-14	2018-02-28			Copy/Update

Yoda Architecture

Yoda Architecture

- Yoda has a very **simple architecture** based on a few **key principles**:
  1. **All data** will be kept **in GitHub** – no auxiliary database will be used
  2. Yoda **executes** exclusively in the **browser**. Yoda has **no backend**, apart from GitHub.
  3. Yoda **communicates** with GitHub using the **standard API** (version 3)
  4. Yoda tools are written using only **HTML** and **JavaScript**
  5. Yoda uses various **JavaScript libraries**, which are all pulled from the Internet at cdn.com.
- Other **key features:**
  - Yoda can run against any the default **github.com** instance or against any **GitHub Enterprise** instance.

Thank You