RCTab Cloud Subscription Management System

FOSDEM'24 – HPC, Big Data & Data Science Devroom
David Llewellyn-Jones
3rd February 2024
About the Team

1. Research Computing Platforms

2. Currently: Tomas Lazauskas, Iain Stenson, Ese Ben, Joe Palmer, David Llewellyn-Jones

3. Previously: Oscar T Giles, Pam Wochner
The Cloud

1. Why is Cloud useful in research?
2. Users want access but costs can escalate fast
3. Cloud is moving into the HPC space
4. Attractive to users without a Linux background
# Subscriptions

The Alan Turing Institute (turing.ac.uk)

- **Add**
- **Advanced options**

<table>
<thead>
<tr>
<th>Subscription name</th>
<th>Subscription ID</th>
<th>My role</th>
<th>Current cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCTab</td>
<td>ea2d03d4-89de-4f3c-a039-4a2229094b4b</td>
<td>Account admin</td>
<td>£135.92</td>
</tr>
<tr>
<td>Research Compute Platforms</td>
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<td>£234.21</td>
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<td>Reservations</td>
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<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>Account admin</td>
<td>£96.01</td>
</tr>
</tbody>
</table>

- **Search for any file**

Filter: 34 of 84

My role = all
Status = all
Add filter
RCTab

1. Track spending on Azure
2. Manage budgets
3. Notify users of spending
4. Turn off subscriptions
Welcome David Llewellyn-Jones

Your actual usage may be higher than the values you see here. You should always verify your Azure usage on the Azure portal, which you can do by clicking on the value in the Total Cost column and then choosing Amortized cost metric on the Azure portal.

Azure subscriptions

View budgets and usage for all your Azure subscriptions

<table>
<thead>
<tr>
<th>Subscription ID</th>
<th>Subscription Name</th>
<th>Expiry Date</th>
<th>Status</th>
<th>Approved</th>
<th>Allocated</th>
<th>Total Costs</th>
<th>Remaining</th>
</tr>
</thead>
<tbody>
<tr>
<td>ea2d03d4-89de-4f3c-a039-4a2229094b4b</td>
<td>RCTab</td>
<td>2024-04-01</td>
<td>Enabled</td>
<td>£3400.00</td>
<td>£3400.00</td>
<td>£1711.52</td>
<td>£1688.48</td>
</tr>
<tr>
<td>8f9d0941-6220-4467-b875-edbd1952e9a</td>
<td>RCTab-test</td>
<td>None</td>
<td>Disabled</td>
<td>£0.00</td>
<td>£0.00</td>
<td>£0.00</td>
<td>£0.00</td>
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<tr>
<td>dc21d235-eb0b-4285-9bd1-6bfcf31b8335</td>
<td>RCTabManualTestCase1</td>
<td>2022-02-15</td>
<td>Disabled</td>
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<td>£0.00</td>
<td>£0.00</td>
<td>£0.00</td>
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<tr>
<td>135a862a-87b7-4129-8b64-773e0159ac7</td>
<td>RCTabManualTestCase2</td>
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<td>£0.00</td>
<td>£0.00</td>
</tr>
<tr>
<td>b45986be-c94d-4ca3-9df1-311e968a55f</td>
<td>RCTabTesting1</td>
<td>2023-10-14</td>
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<td>£0.00</td>
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<td>92492a18-268c-44ec-a67f-8471bb5adf61</td>
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<td>£23.26</td>
<td>£23.26</td>
<td>£0.00</td>
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<td>73905c90-9db8-4ebe-a4dd-3a2c9fe45007</td>
<td>RCTabTestSub2</td>
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<td>Disabled</td>
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<td>£0.00</td>
<td>£0.00</td>
</tr>
<tr>
<td>b8963ae3-17d7-4325-8632-21360485e0c9</td>
<td>testing-rctab-controller</td>
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<td>Disabled</td>
<td>£0.00</td>
<td>£0.00</td>
<td>£0.00</td>
<td>£0.00</td>
</tr>
</tbody>
</table>

Showing 1 to 8 of 8 entries (filtered from 313 total entries)
### RCTab

**ea2d03d4-89de-4f3c-a039-4a2229094b4b**

<table>
<thead>
<tr>
<th>Expiry Date</th>
<th>Status</th>
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</table>

#### Useful cost analysis views

The following links will take you to useful cost analysis views for this subscription.

- Past spending views will explain accumulated costs, including cost by resource. Current spending views show costs for a present period and give an estimation of future costs.

#### Past spending

- Monthly cost by resource for the past six months
- Daily cost by resource for the past thirty days

#### Current and projected spending

- Cost by resource this month
- Cost by resource this year

### The following tabs provide additional information.

- Approvals and Allocations
- Finance and Cost Recovery
- Users with access
- Usage

### Details of subscription approvals and allocations

#### Approvals

<table>
<thead>
<tr>
<th>Ticket</th>
<th>Starts</th>
<th>Ends</th>
<th>Amount</th>
<th>Created On</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2307-007</td>
<td>2023-07-04</td>
<td>2023-09-05</td>
<td>£1000.00</td>
<td>2023-07-04</td>
</tr>
<tr>
<td>C2307-007</td>
<td>2023-08-30</td>
<td>2024-01-05</td>
<td>£2400.00</td>
<td>2023-08-30</td>
</tr>
<tr>
<td>C2401-007</td>
<td>2024-01-04</td>
<td>2024-04-01</td>
<td>£0.0</td>
<td>2024-01-04</td>
</tr>
</tbody>
</table>

#### Allocations

<table>
<thead>
<tr>
<th>Ticket</th>
<th>Amount</th>
<th>Created On</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2307-007</td>
<td>£1000.00</td>
<td>2023-07-04</td>
</tr>
<tr>
<td>C2307-007</td>
<td>£2400.00</td>
<td>2023-08-30</td>
</tr>
<tr>
<td>C2307-007</td>
<td>£0.0</td>
<td>2024-01-04</td>
</tr>
</tbody>
</table>
Manage Azure subscriptions

Options:
- --help  Show this message and exit.

Commands:
- add  Add an existing subscription to the billing system and...
- allocate  Allocate credits a subscription.
- allocations  List all allocations for a subscription.
- approvals  List all approvals for a subscription.
- approve  Approve credits for a subscription.
- cost-recovery  Recover costs for a given month.
- finance  Manage subscription finance
- set-persistence  Change the persistence of a subscription.
- summary  Get a summary of approvals, allocations and costs for...

(shell) flypig$ rctab sub approve --subscription-id "01234567-89ab-cdef-0123-456789abcdef" \
> --ticket "D1151-221" --amount 500 --date-to 2025-01-01 --allocate
Converting to Open Source

1. Private internal project for 3 years
2. Code audit before making public
3. Check for secrets; unused functionality; style
4. Using Gitleaks, Vulture and a lot of grep
5. Approx 25% removed, 25% refactored
6. Two repos, two deployments during switch
Infrastructure as Code

1. Deployed using Pulumi
2. Why not Terraform, PowerShell or Kubernetes?
View in Browser (Ctrl+O): https://app.pulumi.com/researchcomputeplatforms/RCTab/temp/previews/1e5951b8-8ff0-470d-951c-667c8cf56801

<table>
<thead>
<tr>
<th>Type</th>
<th>Name</th>
<th>Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>pulumi:pulumi:Stack</td>
<td>RCTab-temp</td>
<td>create</td>
</tr>
<tr>
<td>tls:index:PrivateKey</td>
<td>status-app-key</td>
<td>create</td>
</tr>
<tr>
<td>tls:index:PrivateKey</td>
<td>usage-app-key</td>
<td>create</td>
</tr>
<tr>
<td>tls:index:PrivateKey</td>
<td>controller-app-key</td>
<td>create</td>
</tr>
<tr>
<td>azure-native:resources:ResourceGroup</td>
<td>rctab-central-logging-myorg-temp-</td>
<td>create</td>
</tr>
<tr>
<td>azure-native:resources:ResourceGroup</td>
<td>rctab-usage-myorg-temp-</td>
<td>create</td>
</tr>
<tr>
<td>postgresql:index:GrantUser</td>
<td>create_scheme_grant_user</td>
<td>create</td>
</tr>
<tr>
<td>azure-native:web:WebApp</td>
<td>c-function-myorg-temp-</td>
<td>create</td>
</tr>
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<td>create</td>
</tr>
</tbody>
</table>

Outputs:
- `getStartedEndpoint-turingrc/rctab-controller:1.latest`: output<string>
- `getStartedEndpoint-turingrc/rctab-status:1.latest`: output<string>
- `getStartedEndpoint-turingrc/rctab-usage:1.latest`: output<string>

Resources:
- + 38 to create

Do you want to perform this update? [Use arrows to move, type to filter]
  yes
  no
  details
Open Source From the Start

Why not Open Source from the start?

1. Reduces risks
2. Initially a purely internal project

Why switch it to Open Source?

1. A lot of refactoring work had already been done
2. It solves a problem other institutions face
3. Critical mass of generalisability and benefit
Conclusions

1. Managing Cloud costs at an institutional level is challenging
2. RCTab provides a battle-worn solution
3. We expected a competitor solution, but there just wasn’t and still isn’t
4. Opening the source was time-consuming but worthwhile
Further info

**RCTab repo**  https://github.com/alan-turing-institute/rctab

**RCTab docs**  https://rctab.readthedocs.io/

**REG**  https://www.turing.ac.uk/work-turing/research/research-engineering-group