Agile Estimation

What's the Point?

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FY20 Joint Information Technology
and Software Cost Forum

Ian Brown, CFPS

ibrown@Galorath.com

Agenda

- Two Key Estimation Maxims

- "Typical" Agile Estimation

- A General Hypothesis…And Some Challenges

- A Supplemental (Alternative?) Approach

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TWO KEY ESTIMATION MAXIMS

Two maxims are critical to effective estimation on software development projects

Any approach to estimation must *facilitate communication* when changes to the project can possibly impact cost and schedule of delivery

- Need to be able to explain the consequences to cost and schedule *when* requirements and/or development conditions change
- Communication, expectation management, and customer buy-in are critical to project success

Size matters!

- Software should be estimated based on some sort of sizing methodology and metric
- Estimating in level of effort (hours) does not enable effective communication
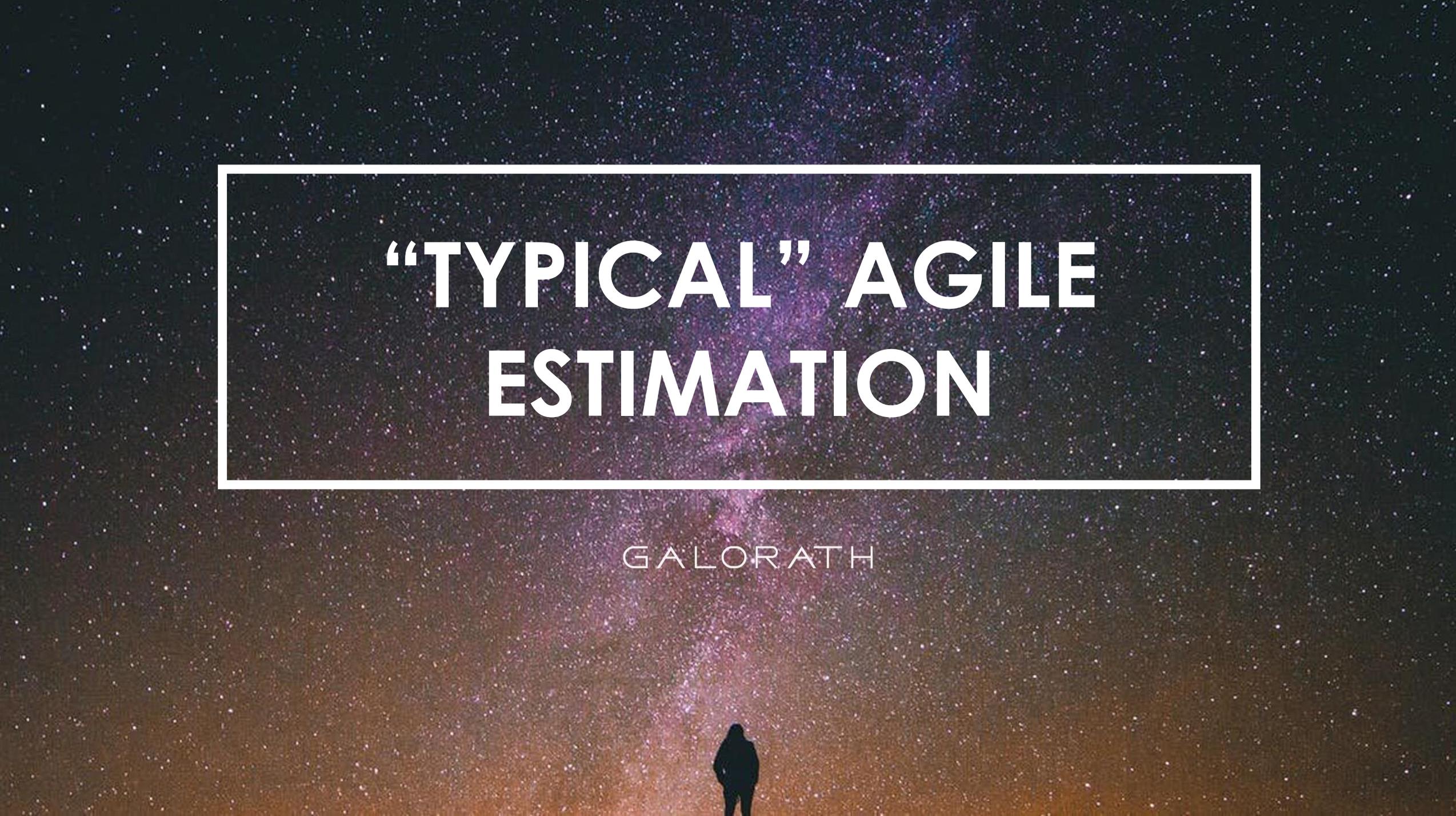
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"Typical" Agile estimation is probably a unicorn

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- Agile estimation methods vary widely

- Adopted and adapted by Agile teams

T-Shirt Sizing

Ordering Protocol

Story Points

Bucket System

Affinity Mapping

Ideal Days

Dot Voting

Big/Small/Uncertain

- Two concepts are consistently key to effective Agile estimation
  - Collaboration
  - Iteration

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Let's focus on story points

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User Story Backlog

```
User Story     →  Initial story point  →  Discussion and  →  Derive estimate
Backlog           estimates               reconciliation      based on velocity
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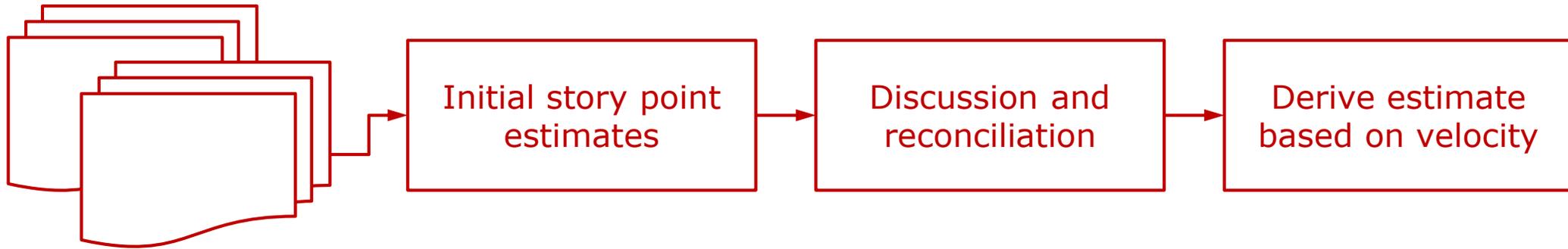
- User stories are short descriptions of a desired function or feature written from an end-user perspective
  - Often expressed as, "As a user of this system, I want X feature so that I can accomplish Y"
  - Serves as the basis (requirements) for what software functionality will be built
- Story points help teams assess the relative difficulty of the work they need to accomplish
  - Typically starts with a "reference" story that serves as the basis of comparison to all other stories
  - No "standards" for story points and they are determined on a team-by-team basis

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Collaboration and iteration are essential to this Agile estimation approach

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- Planning poker provides opportunity for everyone on the product team to have input to size estimates based on their roles, perspectives, and experiences
  - Teams often apply Fibonacci or other numerical sequences
  - Discussion and iteration helps the team consider potential risk areas and develop a collective agreement about what stories to include in a sprint

- Estimating story points and applying velocity metrics can reduce biases and natural tendencies that typically occur when estimating level of effort in hours
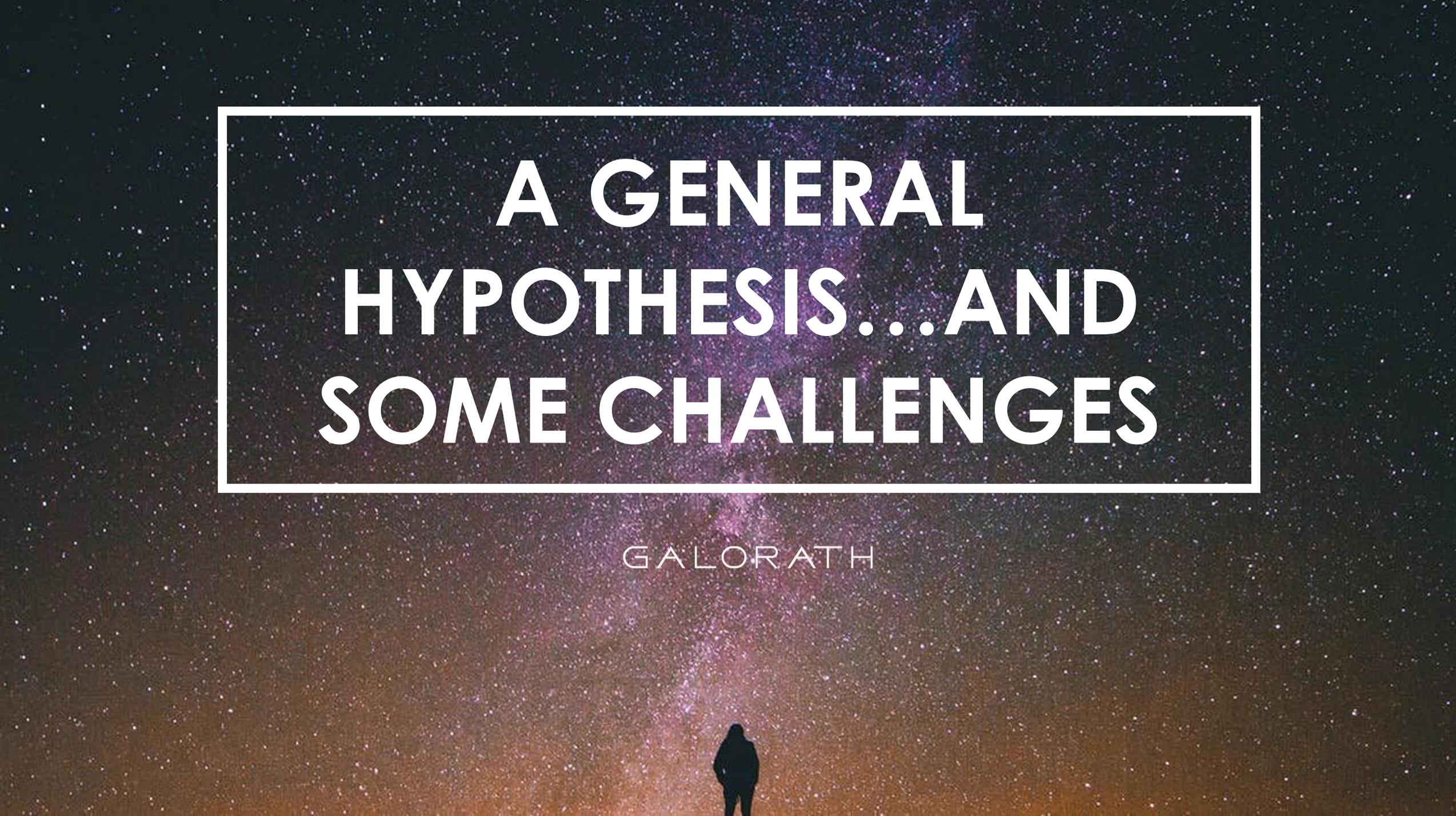
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A GENERAL HYPOTHESIS…AND SOME CHALLENGES

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Hypothesis: In general, story point estimation works well for Agile teams for planning sprints

1 IMMEDIATE FEEDBACK

The immediacy of feedback of data from the previous sprint during retrospectives provides the opportunity for lessons learned to be applied right away

2 CALIBRATION

The relative nature of story points allows teams to tailor and calibrate the size unit to their own situation

3 COLLABORATION and ITERATION

Collaboration and iteration with all stakeholders, including the customer/product owner encourages communication and expectation management

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Challenges

BUDGETING

Generation of estimates to establish initial project budgets

NEW SCRUM TEAM

Formation of a new development team with no history together

IT PORTFOLIO MANAGEMENT

Establishment of organizational portfolio management with consistent metrics across projects

ASSUMING VELOCITY = PRODUCTIVITY

Team comparisons, improvement goals, etc.
Be prepared for inflated story point estimates and other fiction

BENCHMARKING

Cannot perform any kind of reasonable benchmarking analysis either within the organization or against industry data

ESTIMATING IN HOURS

Using points as a proxy for hours is no different than estimating in hours and eliminates the benefits of using relative sizing
Example: 1 story point equates to 4 hours of work

DIFFERING STORY POINT DEFINITIONS

Customers may have an alternate idea of what a story point is or should be
Without an established "standard" for story point, this disconnect can be a real possibility
Can be a source of serious miscommunication and misunderstanding
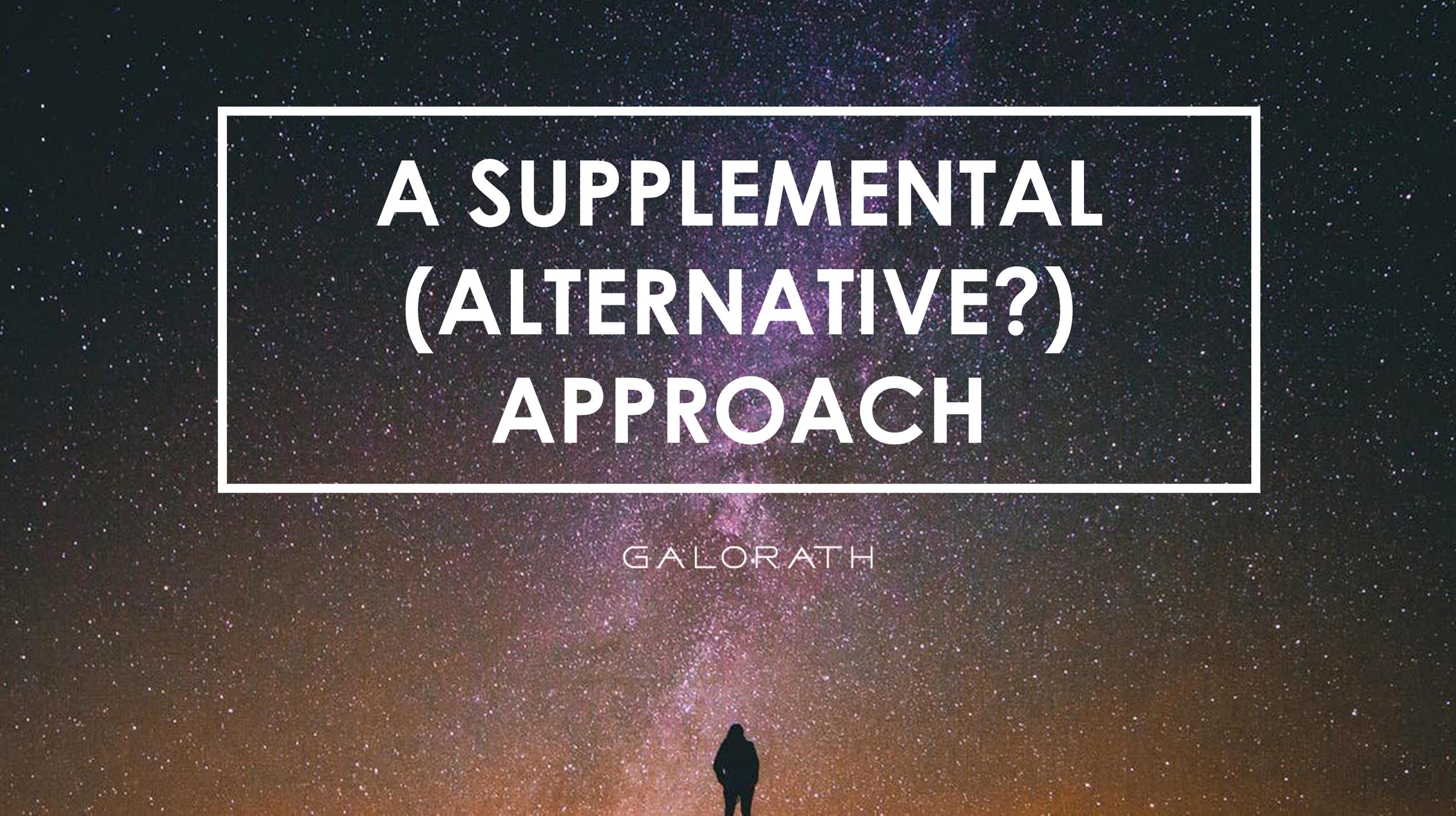
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A SUPPLEMENTAL (ALTERNATIVE?) APPROACH

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Let's talk about an estimation approach designed to help overcome story point challenges

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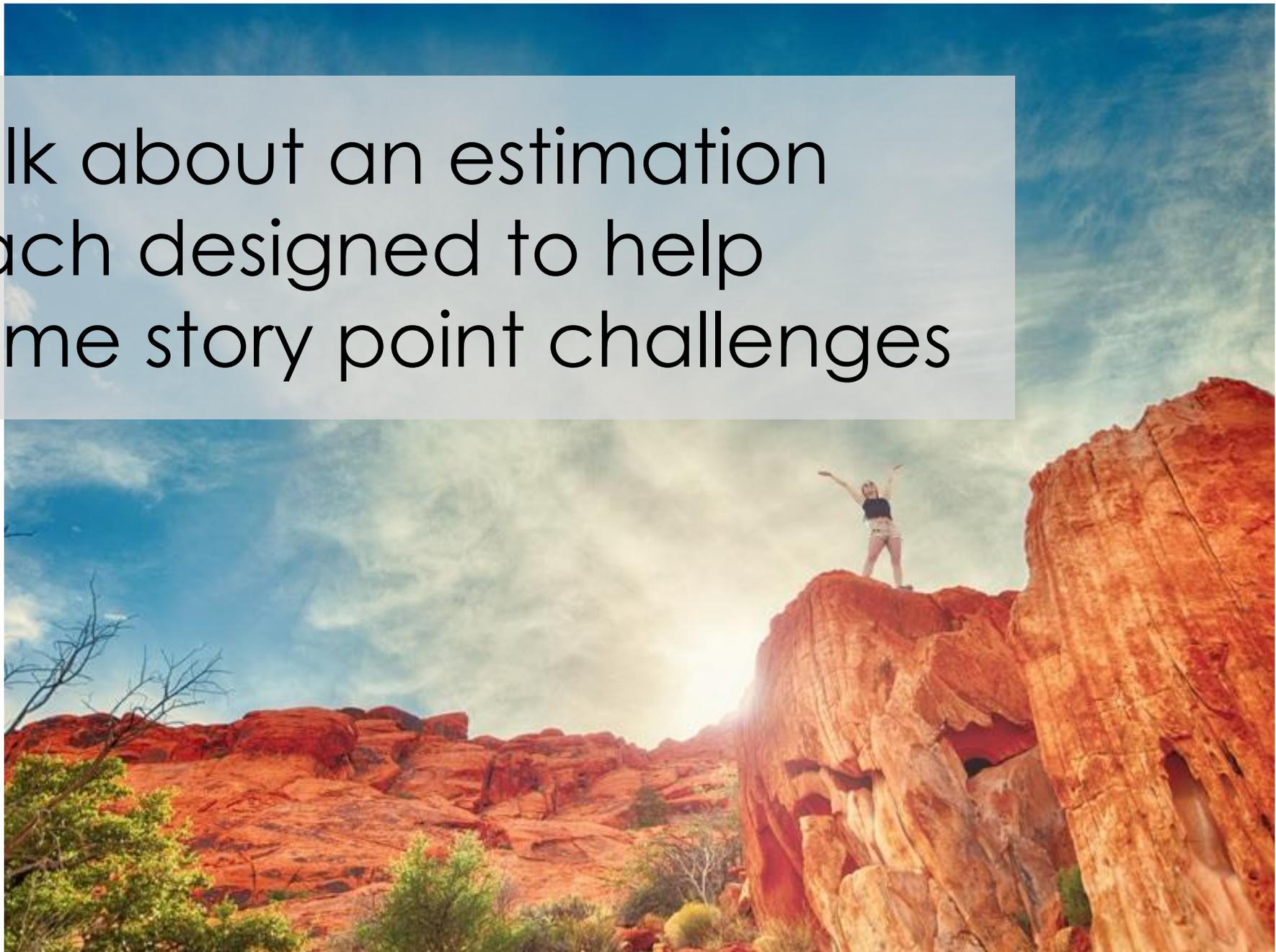
This methodology can either supplement or replace Agile story point estimation for sprint planning

Supplement

- If your team needs a more effective way to develop defendable initial project estimates or a set of consistent metrics

Replace

- If you find that your team has difficulty applying story point estimation consistently or is subject to some of the pitfalls that can happen

So…if only there was an industry standard software sizing measure that is based on functionality described from the users' perspective…

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The function point standard established and maintained by the International Function Point Users Group is exactly that

> Measures software size based on the functional requirements requested by and provided to the user

> Counting rules documented in the *Counting Practices Manual*

> Accepted as a standard size measure by ISO (20926:2009)

Function Point Counting Practices Manual

Release 4.3.1

The International Function Point Users Group

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Basic methodology: identify data and transaction functions, assess the complexity, and apply the FP matrix

- Data function complexity determined by the number of data elements and logical data subgrouping

- Transaction function complexity determined by the number of data elements and files referenced

- The IFPUG FP matrix identifies how many function points each identified function receives

	Low	Average	High
Internal Logical File	7	10	15
External Interface File	5	7	10
External Input	3	4	6
External Output	4	5	7
External Inquiry	3	4	6

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The real problem with function points: perception

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The term "function points" can evoke a visceral negative reaction from many people, especially Agile enthusiasts

- **Perception:** *Function points take too much time and effort*

- **Perception:** *Requirements must be fully defined to effectively apply function points*

- **Perception:** *Function points don't offer the flexibility we need to estimate in an Agile environment*

- **Perception:** *Function points are not granular enough to apply in an Agile environment*

G A L O R A T H

1 **INTERNAL DATA**
Managed by the application

2 **EXTERNAL DATA**
Referenced by the application but managed by some other application

3 **INPUTS**
Add, change, delete internal data

4 **OUTPUTS**
Reports, calculations based on internal or external data

5 **INQUIRIES**
Search and retrieval of internal or external data
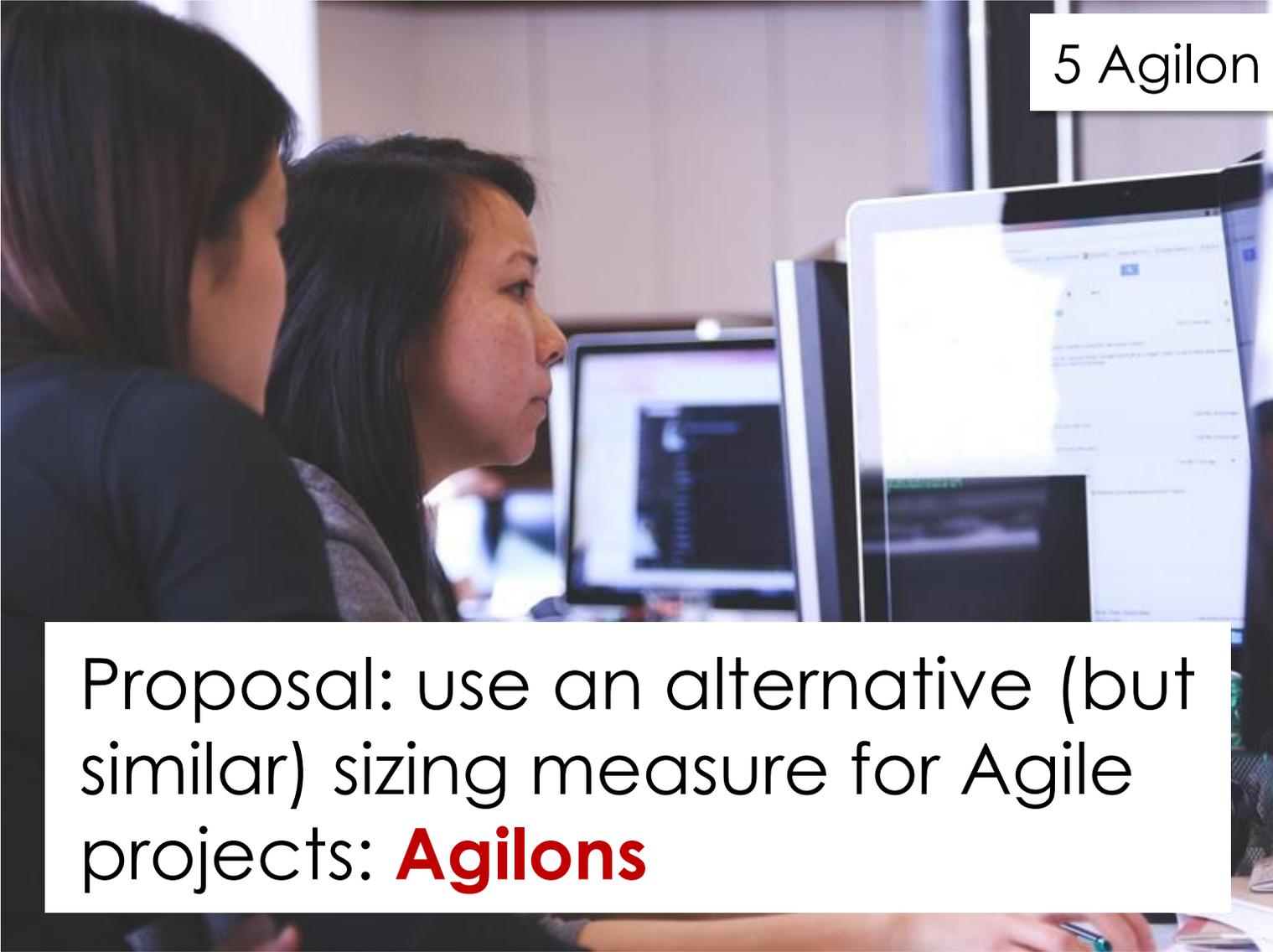
Proposal: use an alternative (but similar) sizing measure for Agile projects: **Agilons**

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AGILONS: Other Thoughts

COMPLEXITY

Low, Average, High complexity generally determined by how complex the team thinks the particular story will be; consider number of expected data elements, difficulty of function, etc.

USER STORY CROSS CHECK

Provides a good litmus test for user stories as well: if a user story can be applied to more than one type of Agilon, it probably should be broken down into simpler stories (concept of elementary process or minimum viable product)

VELOCITY

Velocity can be measured in Agilons per sprint

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Standard Agilon Matrix

	Low	Average	High
Internal Data	7	10	15
External Data	5	7	10
Input	3	4	6
Output	4	5	7
Inquiry	3	4	6

Not too dissimilar from…a Fibonacci sequence?

As a customer I would like to have the ability to search for and reserve a hotel room in order to spend the night in another city.

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For simplification, let's assume "average" complexity for any identified Agilons

- User story seems to have multiple Agilon types that need to be decomposed

  - Hotel data (Internal Data - 10 Agilons)

  - Search for hotel room (Inquiry – 4 Agilons)

  - Reserve hotel room (Input – 4 Agilons)

- Total of 18 Agilons

- If my team's velocity is around 18 Agilons per sprint, we're good to go…

- If not, perhaps we need to decompose the user story a bit

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So how does this approach really address the challenges of story point estimation?

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- **Initial budgets** – estimates can be fully documented and explained, even in the absence of requirements, and then facilitate communication

- **Formation of a new Agile team** – standardized sizing metric, combined with good historical data or a parametric model, can provide estimates that stakeholders can understand and be more comfortable with

- **Organizational metrics** – a standardized size measure empowers consistent productivity and quality metrics across an organization, offering real possibilities for improvement

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