Software Project Management
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Lecture – 10
Life Cycle Models - VI

Welcome to this lecture. In this lecture we will first discuss about Scrum which is a agile and very popular development model, many industries and projects now use the Scrum.

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And then we will just review what all lifecycle models we have discussed and we will look at how to select a lifecycle model for a given project and then if possible, if we still have some time will discuss some introductory discussion on project scheduling. Now let us look at Scrum.

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In the last lecture we had looked at Scrum which is one of the agile models and one important thing here is the Sprint. The Sprint is the fundamental process flow of Scrum. A Sprint is actually an iteration or a time box in which an increment is developed during the Sprint and is delivered to the customer. Usually it is a month long iteration in which some existing features might get improved or some new functionality may be implemented. From the product backlog the product backlog has all the story points are the features has to be developed are maintained in a product backlog and during Sprint planning the objectives for a Sprint is identified. This is called as a Sprint backlog. These are the objectives or the subset of features of the product backlog will be developed during 1 Sprint.

A Sprint as it continues every day the team meet and discuss what is their plan for every day and are there any problems that they are facing and after a month long iteration the Sprint is completed, the Sprint is reviewed for what has been accomplished and then it is delivered to the customer. One thing that the Scrum methodology or the Scrum model it requires that once the team members identify the subset of product backlog to be developed during a Sprint which forms the Sprint backlog there is no outside interference with the team. That means, that once they take up some items for implementation no changes to these items are allowed, otherwise it will create chaos, the Sprint will not converge, uncertainty and so on.

And that is the reason why no outside interference with the Sprint team is allowed during as with the Scrum team allowed during the Sprint.

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These are some of the important concepts in the Scrum framework. One are the various types of roles. In a Scrum team there are the product owner who is one of the team members the Scrum master who is another team member and the other team members. These are the different roles in a Scrum team a product owner Scrum master these are distinguished team members and then the other team members. In the Scrum framework some ceremonies or meetings that are required to be conducted one is the Sprint planning meeting, Sprint review meeting, Sprint retrospective meeting and the daily Scrum meeting. We look at this meetings.

In the Sprint planning meeting this is conducted just before a Sprint starts and here a subset of the product backlog is identified and the Sprint backlog is formed. The Sprint review meeting this is conducted at the end of the Sprint. Here the work that has been completed during the Sprint are reviewed. The Sprint retrospective meeting it is conducted at the end of the Sprint that is after the Sprint review meeting and before the next Sprint starts or the next Sprint planning meeting. And here any reflections on what could have been done, what is required to be done etcetera are discussed and the daily Scrum meeting it happens daily. Here the team members discuss among each other in a

short meeting that what is their plan are they facing any obstacles and also this is a way for the Scrum master to keep track of the progress of the project.

There are some artifacts which are mandated in the Scrum framework. One is the product backlog, here the items or the features that are not yet complete are maintained in the product backlog. This is a prioritized list of features to be implemented not yet complete. The Sprint backlog is a subset of product backlog which are to be completed during the Sprint. The burn down charts these are basically concise representations of the progress during a Sprint, the amount of the work to be done for project completion and so on. We will look at the burn down charts in the subsequent slides.

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The key roles are the product owner, development team, and the Scrum master. The product owner is a team member who represents the customer's interest, thinks on behalf of the customer. The development team typically 5 to 9 people with the cross functional skills; that means, each team member typically has multiple skills maybe a tester, a GUI developer, coding, database and so on.

The Scrum master also known as the project manager he is the team member who interfaces with the top management and any difficulties that arise he discusses with the customers and the top management to remove any difficulties. And, that is how insulates the team member from having to talk to the top management, the customers and so on and also if there are any outside interference during a Sprint he is the one who takes care.

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The product owner is the one who represents the customer. He liaises closely with the customer to get their perspective. The product owner defines the features that are required. New features may crop up some of the features which are identified may get deleted or modified, he decides on the release date of the features. Prioritizes the features according to the market value or the value to the customer, adjust the picture priority on every iteration if needed and finally at the end of a Sprint accepts or rejects the work results.

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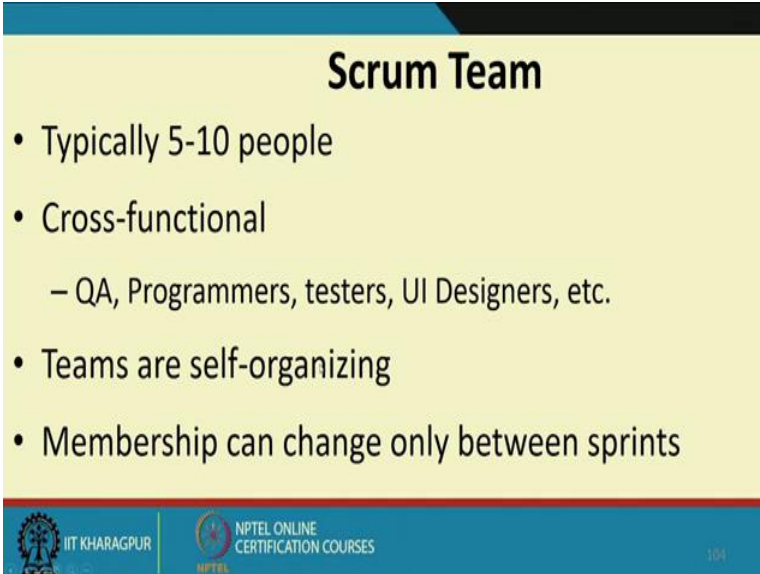
The Scrum master is essentially the project manager removes any obstacles that the team faces, ensures that the team is cohesive, fully functional, productive, close co-operation is ensured. It is responsibilities to ensure that all roles and functions there is a closer co-operation and also shields the team from external interference, interfaces with the customer top management. So, that the team members are relatively prevented from external interference.

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The team members typically 5 to 10 people they have cross functional expertise. For example, a team member may have quality assurance programming or maybe testing UI designing etcetera typically different functionalities and maybe multiple of them. The teams are self organizing that is they decide who will do which part of the work and what role they will assume and the membership of the team is not allowed to change during a Sprint. New members may be inducted some member may be replaced and so on, but for the process to be stable no changes are allowed during a Sprint.

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The ceremonies these are the meeting there are 4 important meetings that are mandated here. One is the Sprint planning meeting which occurs at the start of a Sprint. Here the Sprint backlog is formed from the product back log the features to be developed during the Sprint. The daily Scrum meeting it is a daily meeting during the Sprint. Every day during a Sprint the team members meet for a short time maybe 15 minutes typically, a stand up meeting otherwise the meeting may prolong it is intended to be very short meeting and they just discuss what are the items they are working on are they facing any obstacle and so on.

The Sprint retrospective meeting is conducted after the Sprint review meeting just to reflect on the things that have been done what could be improved to be taken up in the next Sprint and so on. The Sprint review meeting is undertaken at the end of the Sprint and here the work that has been achieved during the Sprint is reviewed along with the customer at the top management.

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The Sprint planning meeting it is undertaken just before a Sprint starts. The main objective of this Sprint planning meeting is to produce the Sprint backlog. Here the product backlog is examined and the product backlog is typically organized in a prioritized manner and the top priority features are picked and the product owner along with the team they negotiate what are the backlog items to be taken up so that it will meet the requirement of the customer and also it will meet the release goals.

The Scrum master the project manager he also participates during the Sprint planning and he ensures that the team agrees to realistic goals because it is a 1 month iteration and the work should be doable in roughly 1 month.

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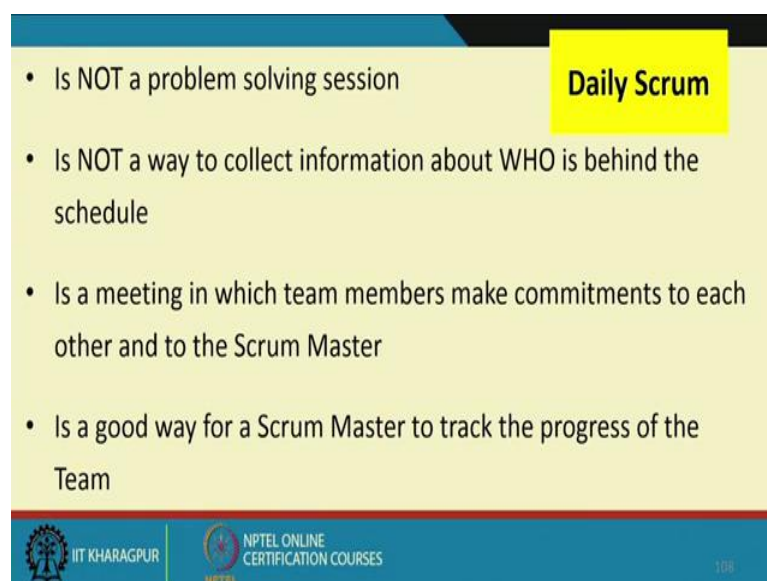
The daily Scrum meeting is done every day, typically at the start of the day it is very short meeting typically 15 minutes or so. It is a stand up meeting because if the team members sit down then the meeting may prolong stand up meeting and it is not a problem solving meeting, but then the meeting objective have to identify what the team members are working on just to update each other, are they facing any obstacle. Basically each team member answers 3 questions. What did the team the member achieve yesterday? What is the plan for today and are there any obstacles? These are only 3 things that each team member answers discusses.

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It is important to remember that the daily Scrum is not a problem solving meeting. The team members do not really ask for solution it just the it is a information sharing meeting and also it is not a blame fixing meeting that who is behind schedule why is he behind schedule etcetera. This is only information sharing. Here each team member informs what was achieved yesterday and what is the plan for today and are there any obstacles. The Scrum master or the project manager participates and as the discussion proceeds he picks up that what is the progress that has been achieved so far and this is a good way for the project manager to track the progress of the project.

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The Sprint review meeting this is undertaken at the end of the Sprint. Basically here the work that was accomplished during the Sprint are reviewed in presence of the management, the product owner, the team member and also customer representative intended to be a very short meeting and typically it is a demonstration of the features that have been just completed.

Typically these are on the computer they show that what can be achieved after the Sprint, which features have been implemented how does it work and so on and this is a informal meeting not like elaborate documents that are prepared and so on. That is not the case. It just a 2 hour preparation for the team members they just think about how to present the features that have been completed and that demonstrate those features.

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One of the most important artifact in the Scrum is the product backlog. The product backlog is a list of all the desired work for the project. The product backlog there are 2 types of items here. One are the user stories like let the user search and replace, store the item on the database, provide registration of the members and so on these are the story based items. The second category of items that are also present are the task based items.

The task based items are like improve exception handling because still now what was implemented is that the exception handling it works, but not that well and then an item in the product backlog will be introduced is that improve the exception handling.

So, some of the items here are basically the user stories or user requirements and the others are based on the items completed some actions to take on that the list is prioritized by the product owner based on the customer perspective.

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The product backlog is basically managed by the product owner. Typically maintains in the form of a spreadsheet and usually created during the Sprint planning meeting.
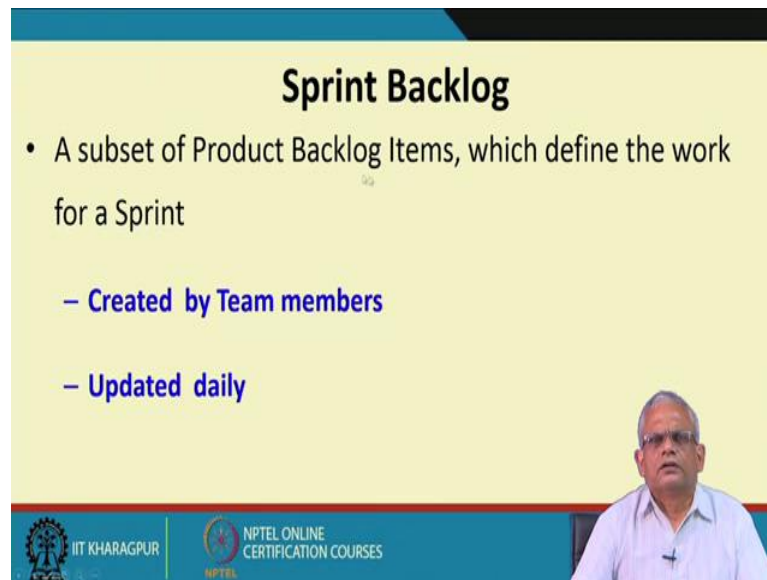
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So, this is a typical product backlog a spreadsheet. The priority is very high, high, medium and so on and here these are the item numbers and then a description some of our user stories and the others are some activities to be undertaken.
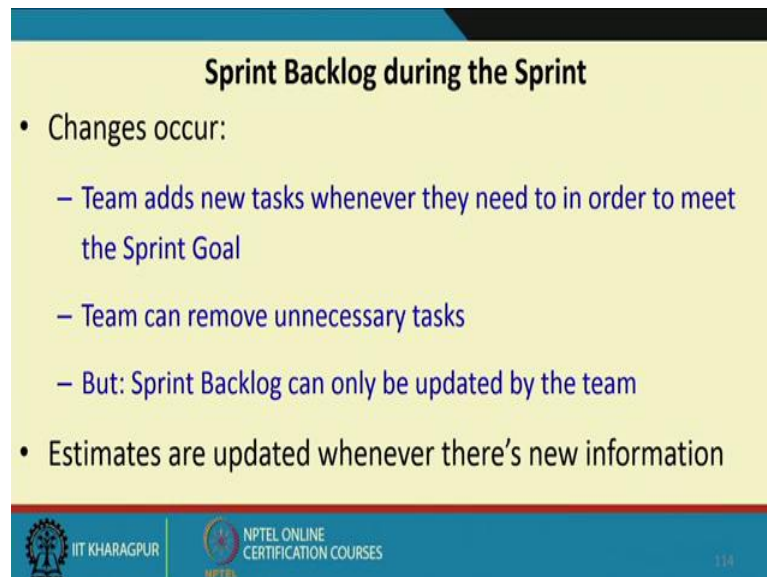
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The Sprint backlog is a subset of items to start with. This is created during the Sprint planning meeting. Basically the product owner along with the team members decide what are the items to take up for the next Sprint, but then it is updated daily because some activities may be noticed to be done and that is added to the Sprint backlog.

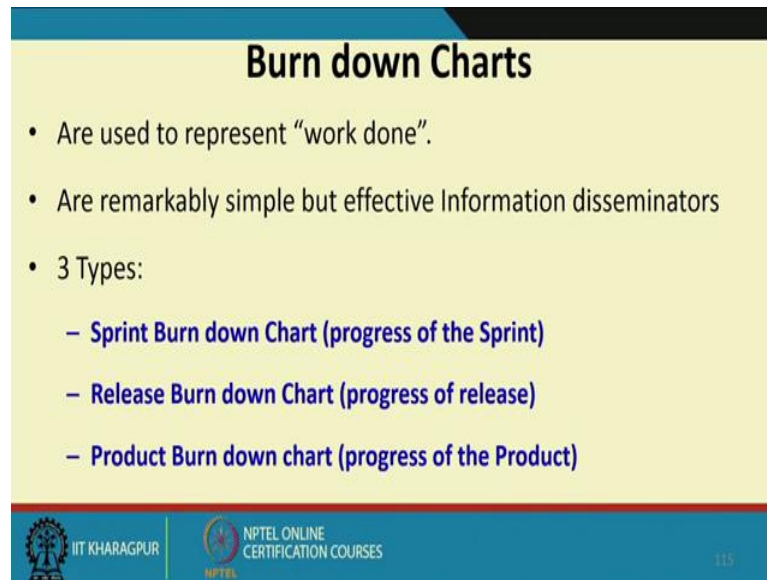(Refer Slide Time: 21:01)

The Sprint backlog changes during a Sprint. The team member can add new tasks in order to meet the Sprint goal. They can also remove unnecessary tasks, but then the thing is that the backlog is only updated by the team. Once the Sprint starts the Sprint backlog

is updated only by the team. The product backlog is updated by the product owner and also the estimates for the work different items and the Sprint backlog are updated whenever there is necessity.
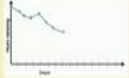
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Now, let us look at the burn down charts. This represent the progress achieved so far. There are 3 important types of burn down charts. One is the Sprint burn down chart which is during the Sprint how much progress has been achieved till a date. The release burn down chart; a release may consist of multiple Sprints and how much of this work for the release has been achieved. This is represented in a release burn down chart. The product burn down chart this is the overall progress towards the completion of the project.

First let us look at the Sprint burn down chart. This represents the progress achieved during the Sprint. Typically represents the hours remaining as the days progress as the Sprint starts some estimate of the number of hours of work is given and then as the days progress here a number of works reduces.

But then it can also increase because there can be a wrong estimation of the complexity of the work. It shows the time to release typically, the days are 30 days and at the end of the Sprint it should become 0. It is not a straight line everyday constant progress is not achieved there are various obstacles and also the estimates are revised as the Sprint progresses.
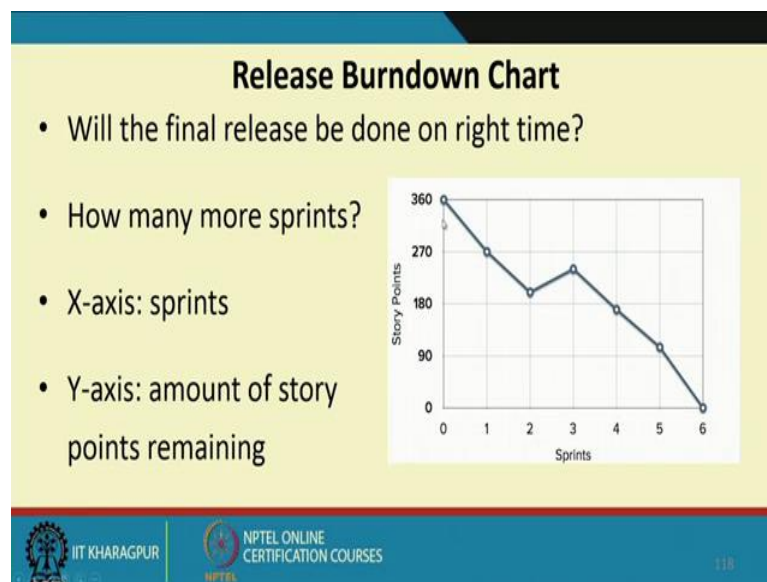
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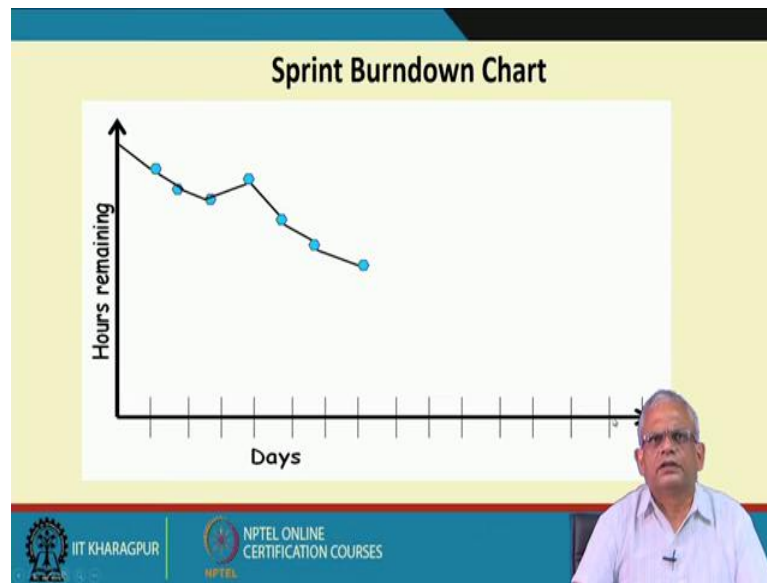
These are larger view of the Sprint burn down charts. For each day it is updated that total hours remaining initial estimation and then as the progress this progress this is updated and finally, at the end of the Sprint should become 0.
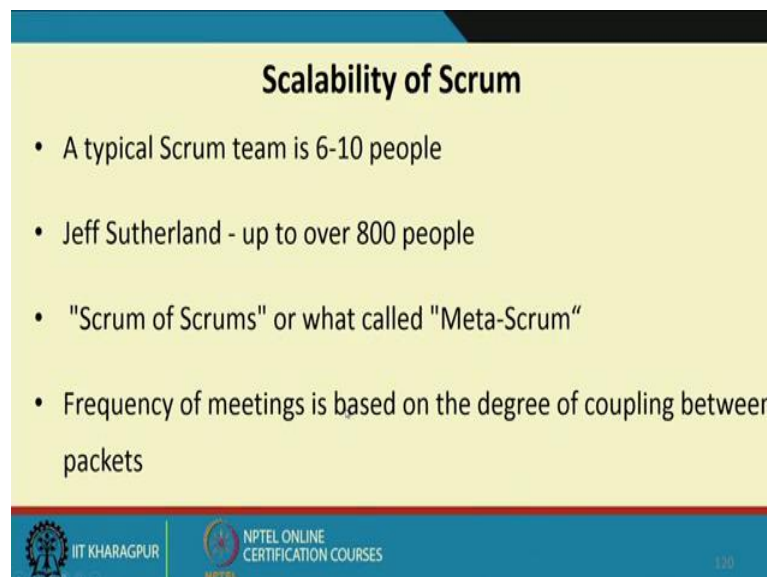
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This is the release burn down chart. Each release might consists of several Sprints and during a release several story points are implemented. Basically it represents how many more Sprints are required before all the required story points for the release are implemented.
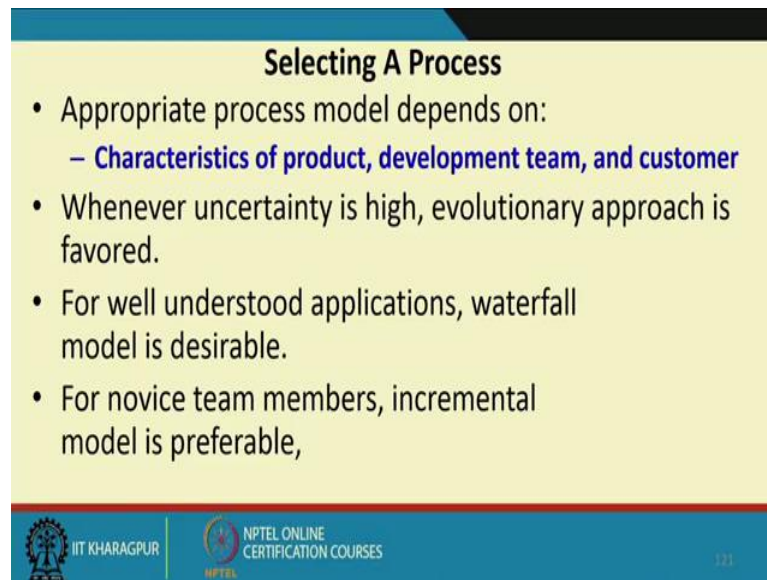
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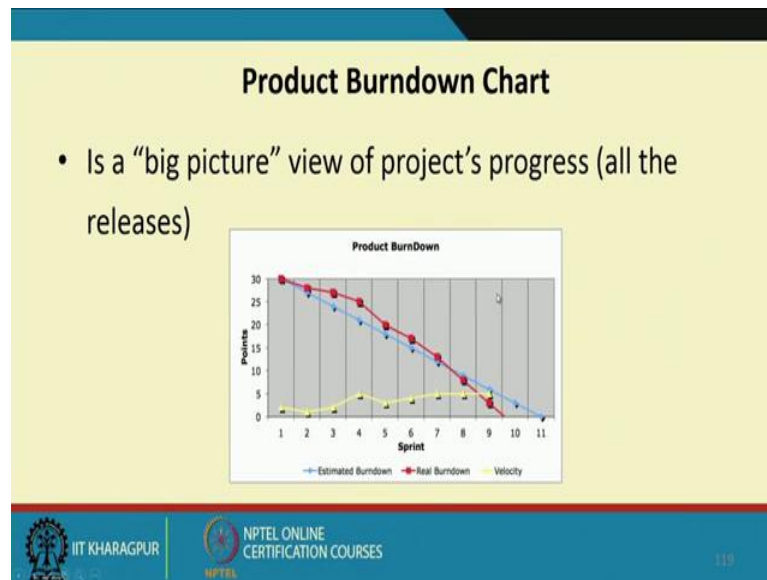
The product burn down chart gives the big overall picture. This is for completion of the project how many Sprints are been completed and how many are likely to be required and here 3 items are represented. The real burn down this gives the actual progress the estimated progress and then the velocity that is the story points completed per Sprint.

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The Scrum is typically for small projects 6 to 10 people, but then it has been also tried for larger projects involving hundreds of people and it is called as the Scrum of Scrums or meta Scrum will not be discussing this.

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But one important thing is that we discussed several development processes. We discussed several waterfall based processes. We discussed incremental, evolutionary, rad model and several types of agile models, but then given a project can we as the project manager say that what is the development lifecycle to be used. ok, but then it is not defined by the project alone. The lifecycle model to be used depends on both the characteristics of the product, the characteristics of the development team and also the characteristics of the customer. Based on an analysis of the characteristics of the product development team and the customer, the development lifecycle is decided.

If the uncertainty in the project is very high then typically the evolutionary approach is favored the features are identified to be completed as the project progresses. For very well understood applications the waterfall based models are desirable because these are the most efficient way to do it. And, the long term plan is made, strong management control, plan for the entire project is done, but if the team members are novice they do not have much experience on the projects and even similar types of projects. Then typically an incremental model is preferable where some small increments are planned and completed and that way the project builds up. With this will be completing this lecture and then we will take a estimation of the project and then scheduling of the project.

Thank you.