HUMAN CONNECTIONS IN A DIGITAL WORLD

SITECORE® SYMPOSIUM 2019

Netflix Next with Sitecore Cortex

Presented by:
Deepthi Katta
Richard Leiva

Date:
November 6, 2019

VERNDALE

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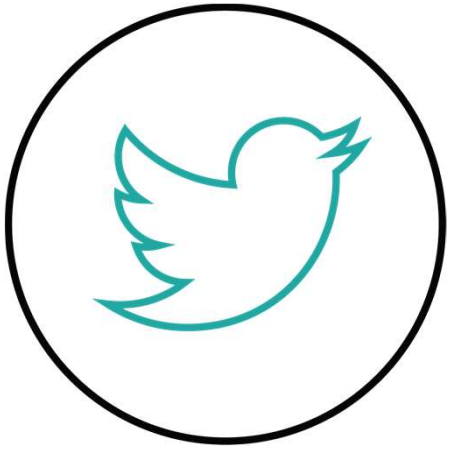
Richard Leiva

- Sitecore MVP
- Working with Sitecore for the past five years
- Senior Software Engineer at Verndale
- Sitecore User Group sessions in Ecuador
- Co-organizer of the Sitecore User Group Ecuador



@RichardLeivaA

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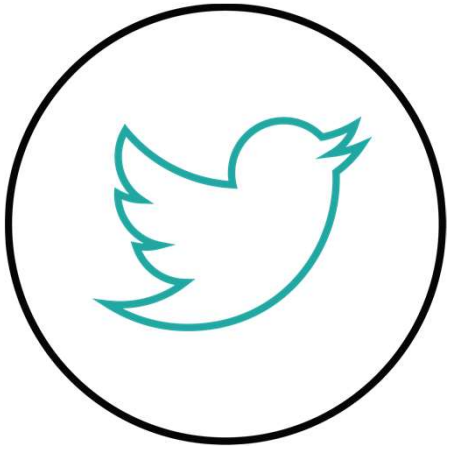
Deepthi Katta

- Decade of experience in Software Development
- Sitecore MVP for two years
- Sr Technical Architect at Verndale
- Strive to deliver quality solutions
- Core values: Passion, Fun, and Pride
- Challenge accepted!



@DipSindol

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NETFLIX with Sitecore Lens

Placing the Power Pieces

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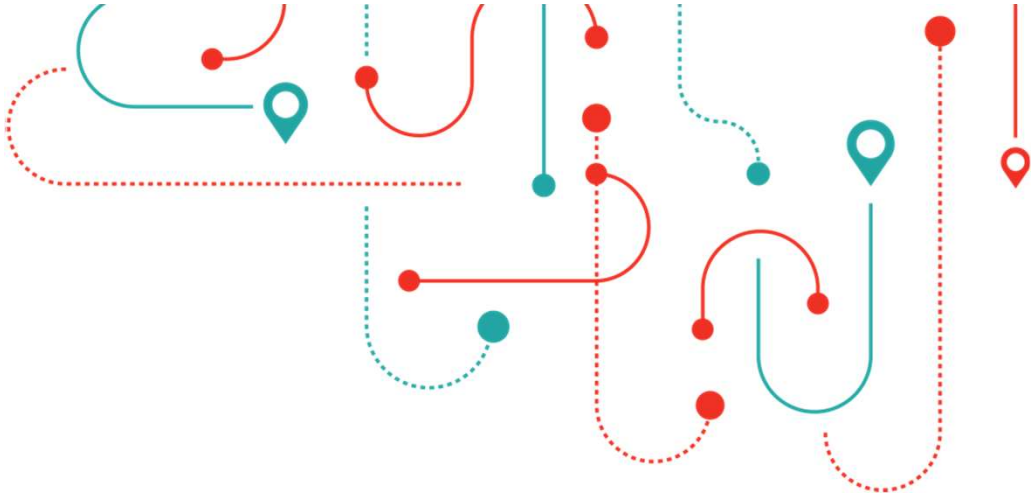
What's Next?

Agenda



01 Netflix through Sitecore Lens

02 Audience and goals

03 Sitecore Cortex

04 Where exactly do we fit?

05 Demo

06 What's next?

07 Questions

08 Thank you

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Netflix through Sitecore Lens

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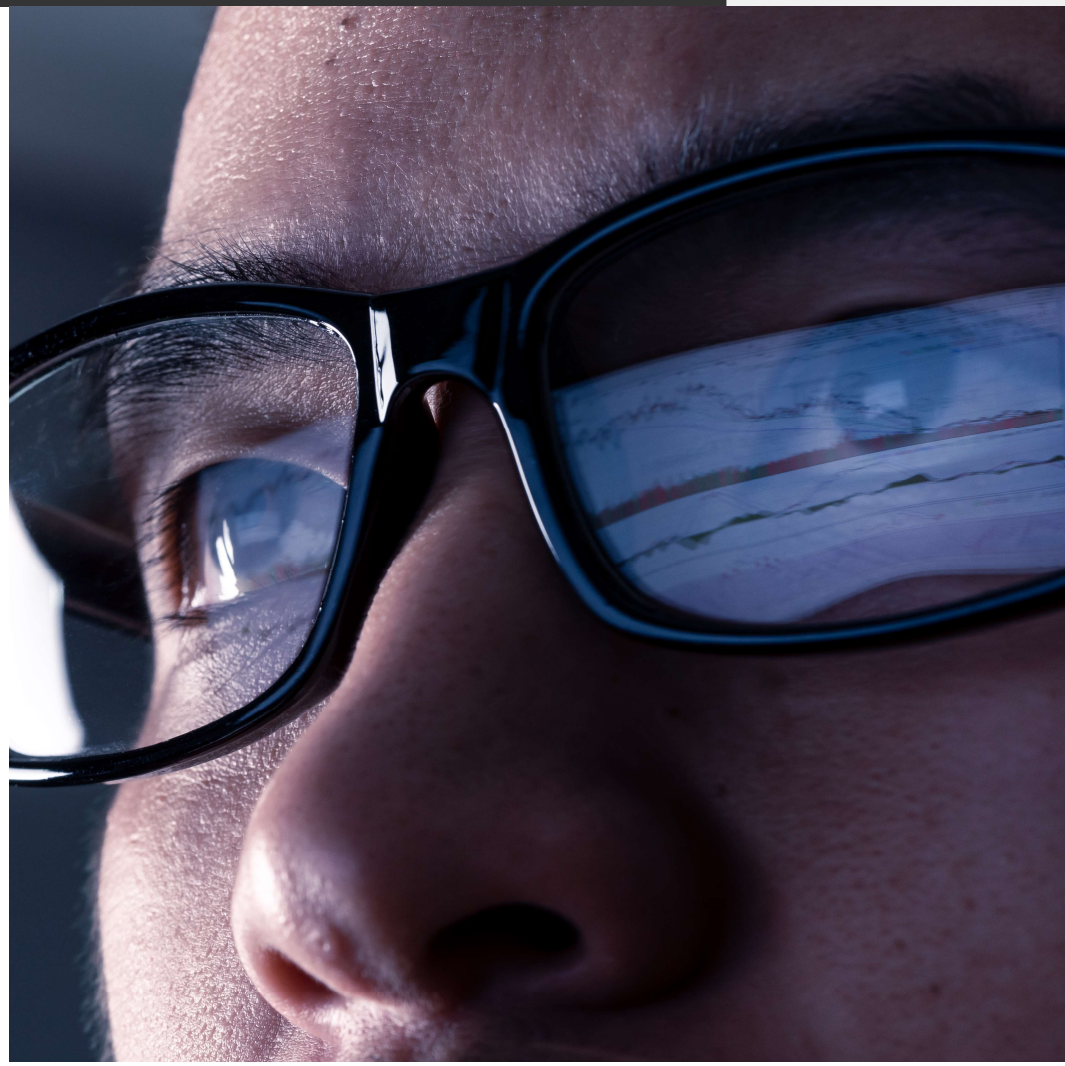
Netflix with Sitecore Lens



Most of us here use Netflix, day-in and day-out of our lives.

Ever looked at mundane daily fragments of technical bits with your Sitecore lens on?

You will be surprised, and so were we. Let's find out more about what happens next.

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“Sitecore Lens is hypothetical way of saying — look through your technical fantasies, goals, mundane technology bits with Sitecore vision/cap on.”

Richard/Deepthi

Passionate Sitecore Engineers

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Vision, thoughts, questions

Can I make a Sitecore application or module, that:

- Makes an effort to understand me
- Projects my potential favorites
- Pulls the catalog info
- Is this even doable?

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Motto

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“No problem can be solved until it is reduced to some simple form.

The changing of a vague difficulty into a specific, concrete form is a very essential element in thinking.”

J. P. Morgan

American Financier and Banker

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Answer:
Wait for it or take a guess ☺

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Audience & goals

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Bloomers / Enthusiasts

Marketers / Decision Makers

Developers / Ninjas

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Sitecore Cortex

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Sitecore Cortex – Basics

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Sitecore Cortex is a data processing engine made up of:

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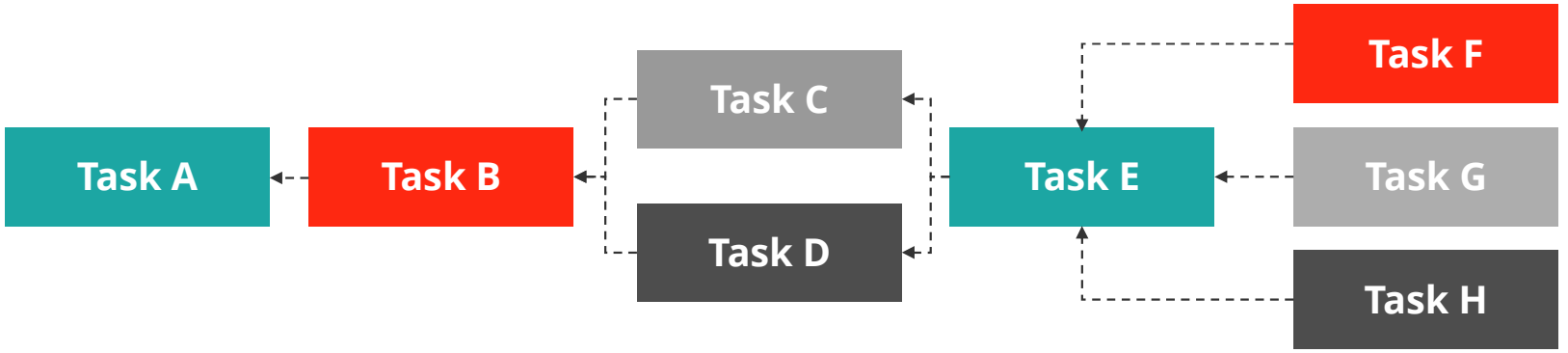
Task Manager & task chaining



- The Task Manager registers tasks that are picked up by agents.
- These individual tasks can be chained together to create complex processing jobs.

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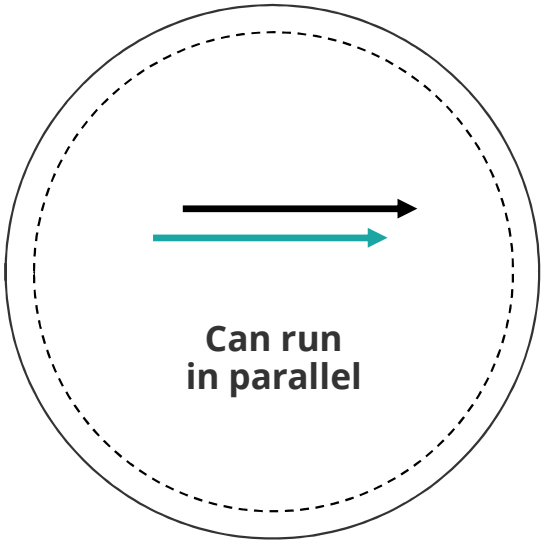
Agents

Agents pick up the tasks registered in the Task Manager and delegate them to workers



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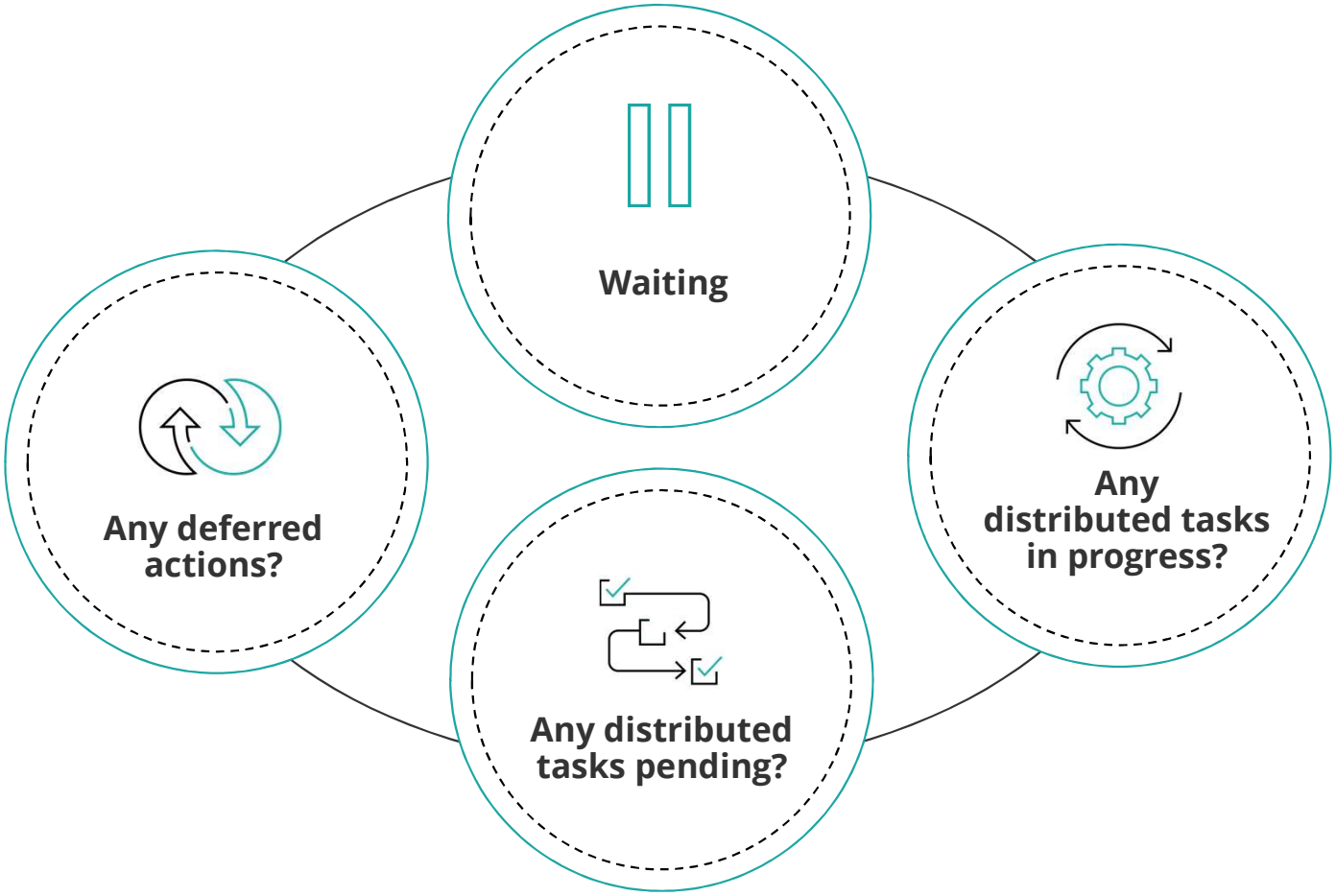
Task agent



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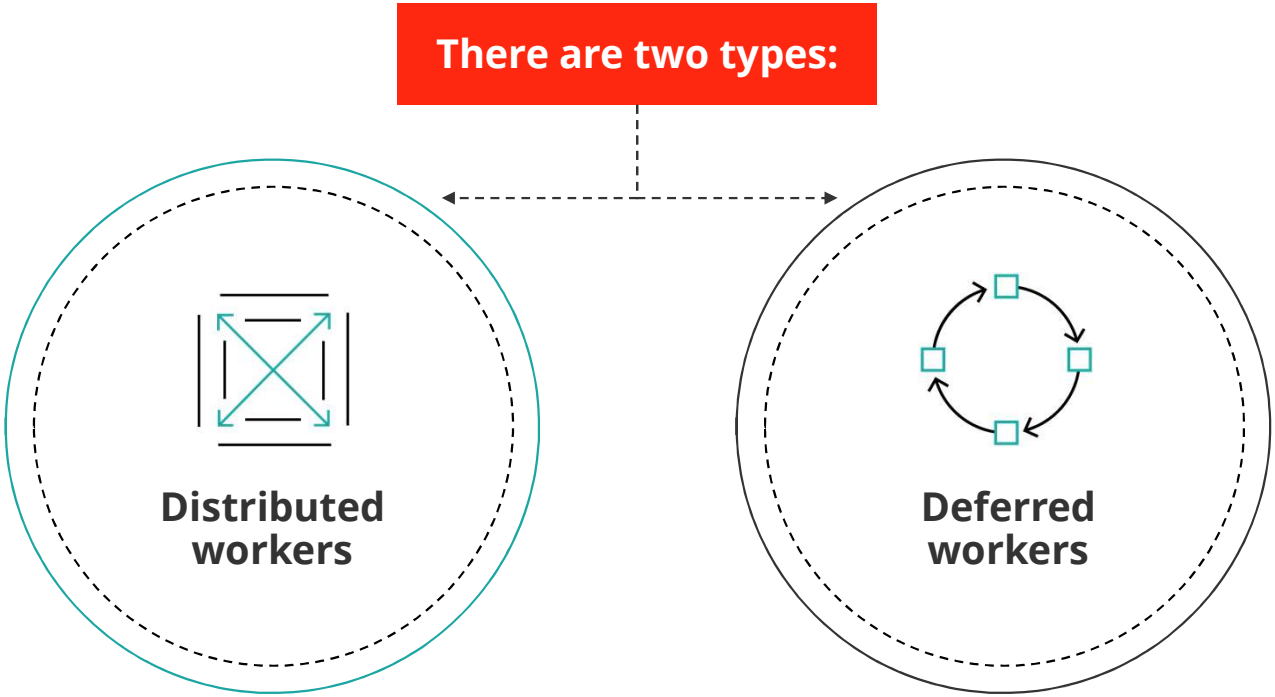
Worker's responsibility is to perform tasks



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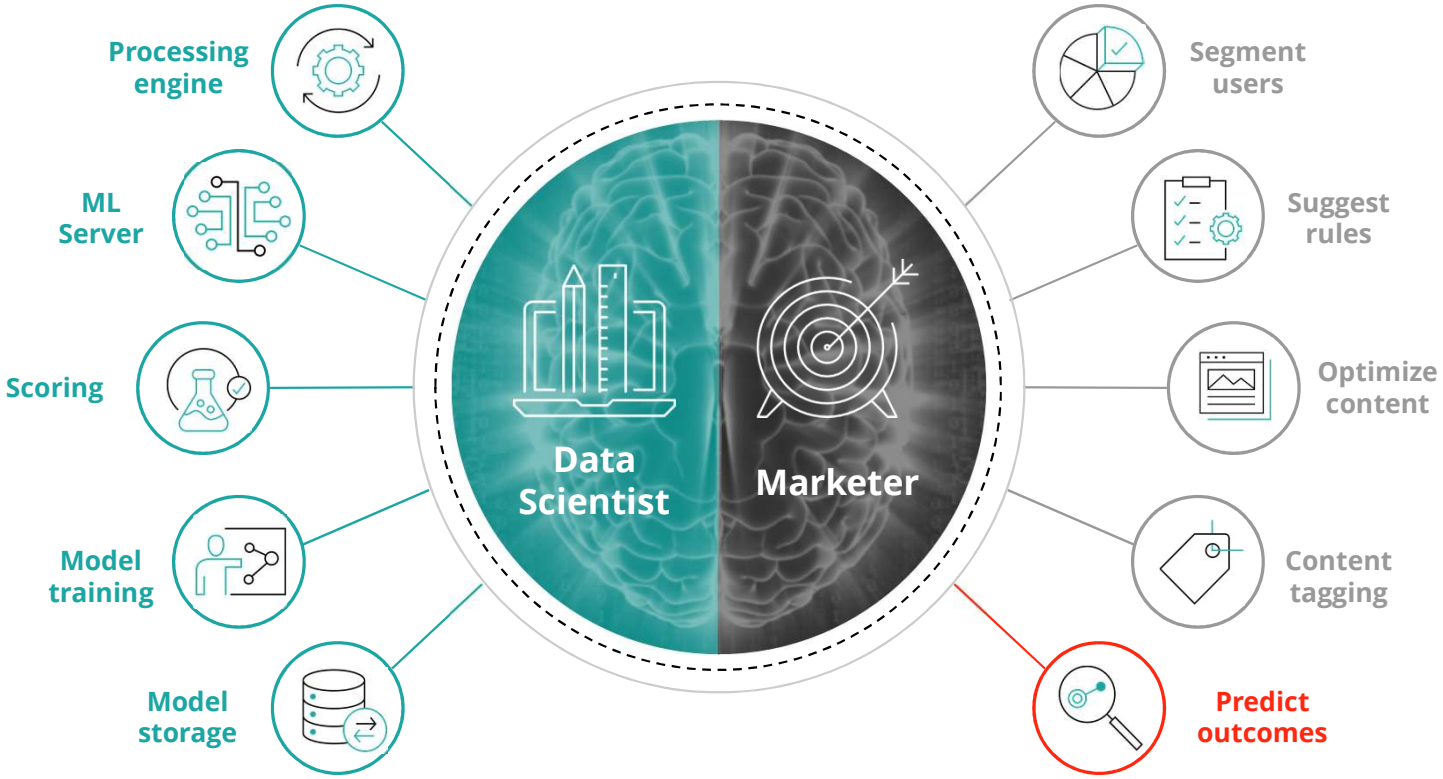
Where do we fit?



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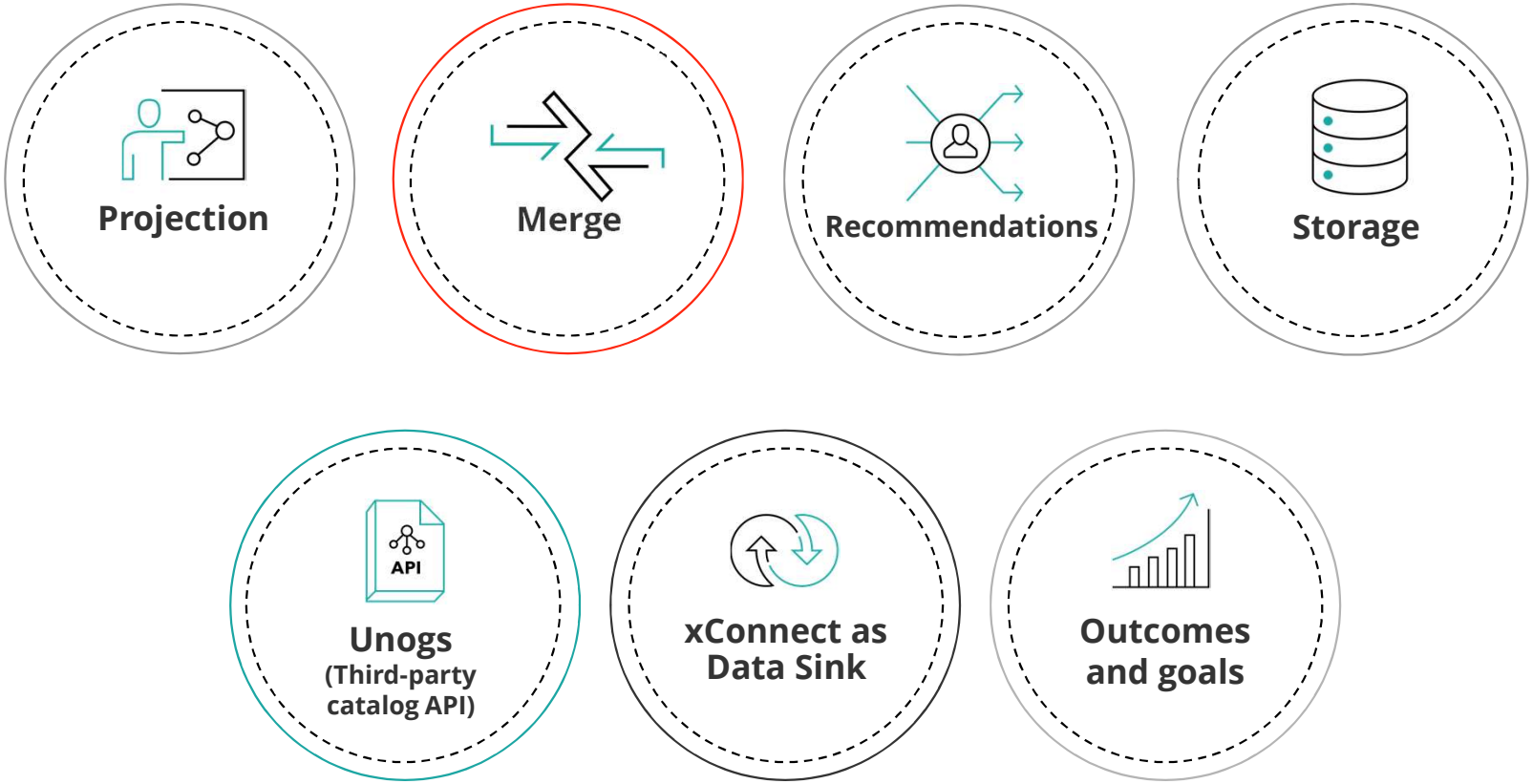
Power pieces



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Projection

```
var query = xConnectClient.Contacts.Where(contact =>
    contact.Interactions.Any(interaction =>
        interaction.Events.OfType<Goal>().Any(x => x.DefinitionId == goalId) &&
        interaction.EndDateTime > DateTime.UtcNow.AddMinutes(-120)
    )
);

var expandOptions = new ContactExpandOptions
{
    Interactions = new RelatedInteractionsExpandOptions()
};

query = query.WithExpandOptions(expandOptions);

var searchRequest = query.GetSearchRequest();

// projection starts here
var dataSourceOptions = new ContactSearchDataSourceOptionsDictionary(
    searchRequest,
    maxBatchSize: 30,
    defaultSplitItemCount: 50
);
```

```
var projectionOptions = new ContactProjectionWorkerOptionsDictionary(
    modelTypeString: typeof(MovieRecommendationModel).AssemblyQualifiedName,
    storageTimeout,
    schemaName: "recommendation",
    new Dictionary<string, string>
    {
        { MovieRecommendationModel.OptionTableName, "contactMovies" }
    }
);


var projectionTaskId = await taskManager.RegisterDistributedTaskAsync(
    dataSourceOptions,
    projectionOptions,
    prerequisiteTaskIds: null,
    taskTimeout
);
```

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Merge

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```
var mergeOptions = new MergeWorkerOptionsDictionary(
    tableName: "contactMoviesFinal", // tableName
    prefix: "contactMovies", // prefix
    storageTimeout, // timeToLive
    schemaName: "recommendation" // schemaName
);

var mergeTaskId = await taskManager.RegisterDeferredTaskAsync(
    mergeOptions, // workerOptions
    prerequisiteTaskIds: new[] // prerequisiteTaskIds
    {
        projectionTaskId
    },
    taskTimeout // expiresAfter
);
```


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Recommendation

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```
var workerOptions = new DeferredWorkerOptionsDictionary(
    typeof(MovieRecommendationWorker).AssemblyQualifiedName, // workerType
    new Dictionary<string, string> // options
    {
        { MovieRecommendationWorker.OptionSourceTableName, "contactMoviesFinal" },
        { MovieRecommendationWorker.OptionTargetTableName, "contactRecommendations" },
        { MovieRecommendationWorker.OptionSchemaName, "recommendation" },
        { MovieRecommendationWorker.OptionLimit, "20" }
    });


//recommendation task
var recommendationTaskId = await taskManager.RegisterDeferredTaskAsync(
    workerOptions, // workerOptions
    prerequisiteTaskIds: new[] // prerequisiteTaskIds
    {
        mergeTaskId
    },
    taskTimeout // expiresAfter
);
```


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Recommendations

```
57          {
58              foreach (var row in sourceRows.Current)
59              {
60                  var movieIds = row["LastMoviesId"].ToString().Split(separator: new[] { "," }, StringSplitOptions.RemoveEmptyEntries);
61                  //grabbing only unique movie ID's
62                  movieIds = movieIds.Distinct().ToArray();
63
64                  if (!movieIds.Any()) { continue;}
65                  var recommendations = _movieRecommendationsProvider.GetRecommendations(movieIds);
66
67                  //clean recommendations to not have any dups
68                  recommendations = recommendations.GroupBy(m => m.netflixid).Select(g => g.FirstOrDefault()).ToList();
69                  if (recommendations.Any())
70                  {
71                      for (var i = 0; i < _limit; i++)
72                      {
73                          if (i < recommendations.Count)
74                          {
75                              var targetRow = new DataRow(targetSchema);
76                              targetRow.SetGuid(index: 0, row.GetGuid(index: 0));
77                              targetRow.SetString(index: 1, recommendations[i].netflixid);
78                              targetRow.SetString(index: 2, recommendations[i].title);
79                              targetRow.SetString(index: 3, recommendations[i].synopsis);
80                              targetRow.SetString(index: 4, recommendations[i].image);
81                              targetRow.SetString(index: 5, recommendations[i].rating);
82                              targetRows.Add(targetRow);
83                          }
84                      }
85                  }
86              }
```


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Facet storage

```
//Facet storage
var storageOptions = new DeferredWorkerOptionsDictionary(
    typeof(RecommendationFacetStorageWorker).AssemblyQualifiedName,
    new Dictionary<string, string>
    {
        { RecommendationFacetStorageWorker.OptionTableName, "contactRecommendations" },
        { RecommendationFacetStorageWorker.OptionSchemaName, "recommendation" }
    });

var storageTask = await taskManager.RegisterDeferredTaskAsync(
    storageOptions, // workerOptions
    prerequisiteTaskIds: new[] // prerequisiteTaskIds
    {
        recommendationTaskId
    },
    taskTimeout // expiresAfter
```


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Facet storage

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```
foreach (var row in rows.Current)
{
    var contactId = row.GetGuid( index: 0);
    var movieId = row.GetString( index: 1);
    var title = row.GetString( index: 2);
    var overview = row.GetString( index: 3);
    var image = row.GetString( index: 4);
    var rating = row.GetString( index: 5);

    var contact = await _xdbContext.GetContactAsync(contactId,
        new ContactExpandOptions( params facets: MovieRecommendationFacet.DefaultFacetKey));

    var facet = contact.GetFacet<MovieRecommendationFacet>( name: MovieRecommendationFacet.DefaultFacetKey) ??
                new MovieRecommendationFacet();

    if (facet.MovieRecommendations.All(x => x.netflixid != movieId))
    {
        facet.MovieRecommendations.Add(new Movie
        {
            netflixid = movieId,
            title = title,
            synopsis = overview,
            image = image,
            rating = rating
        });
    }


    _xdbContext.SetFacet(contact, MovieRecommendationFacet.DefaultFacetKey, facet);
    await _xdbContext.SubmitAsync(CancellationToken.None);
```


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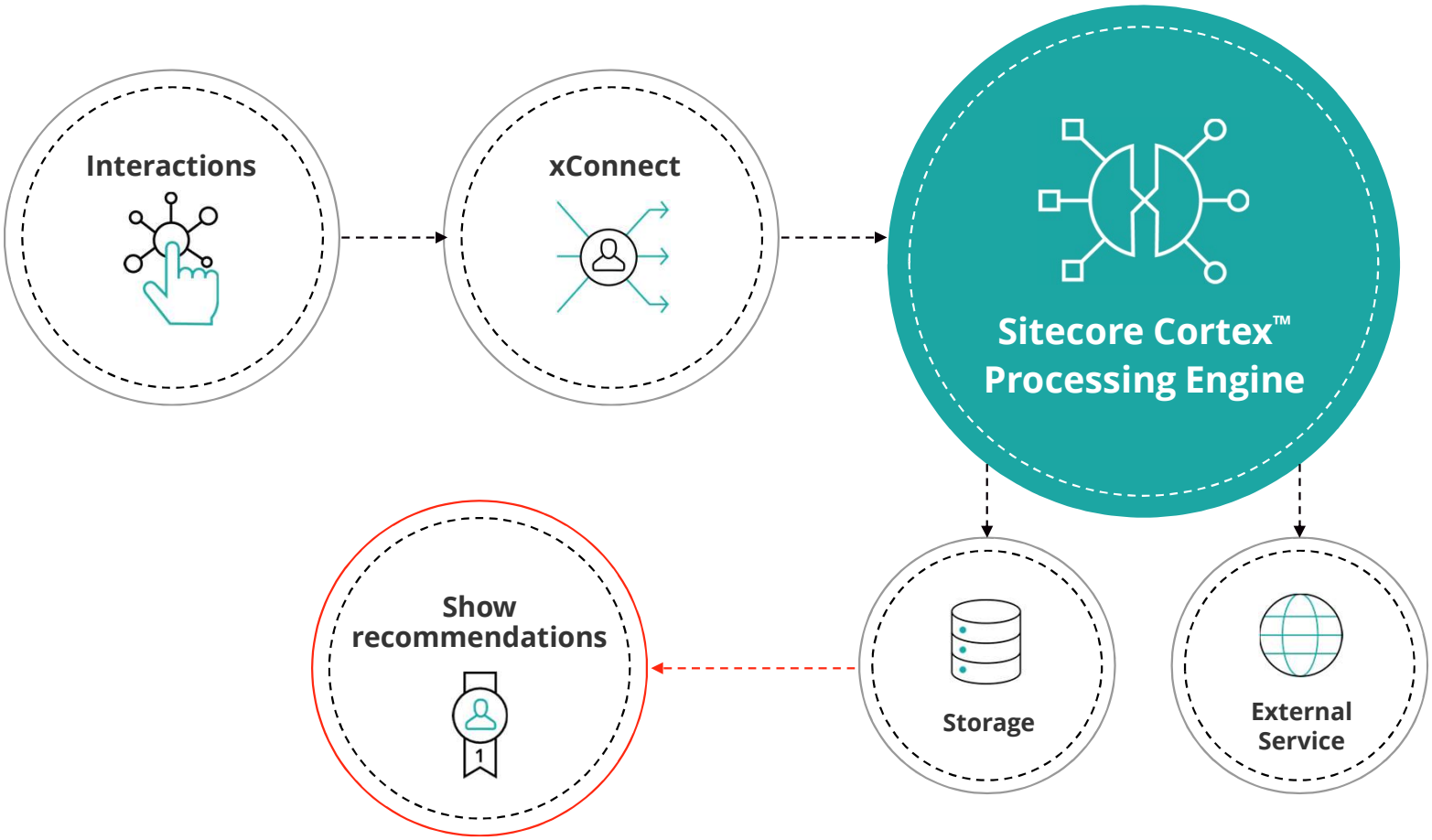
Flow of application/data



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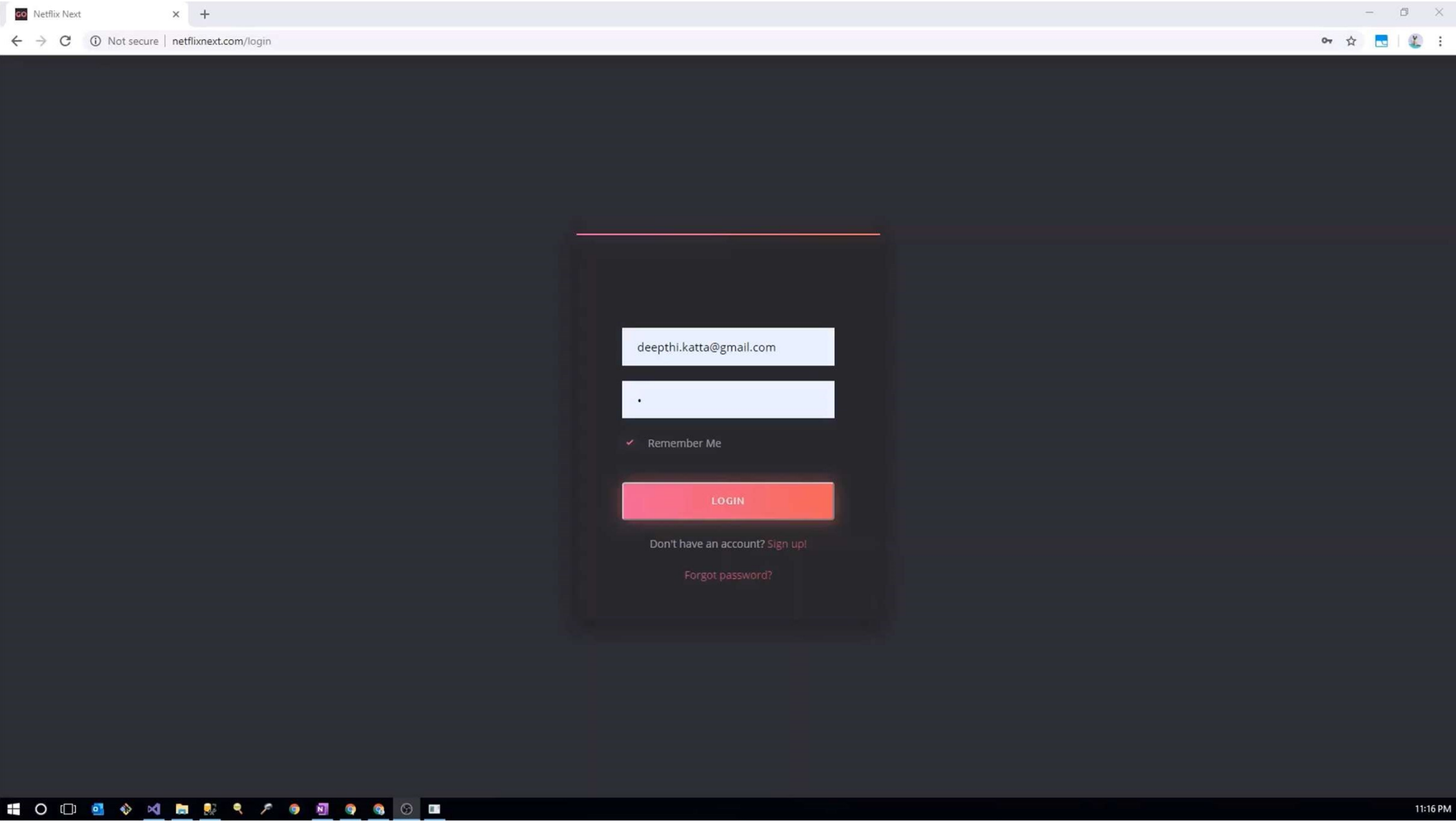
Demo


Netflix Next
Not secure | netflixnext.com/login
deepthi.katta@gmail.com
Remember Me
LOGIN
Don't have an account? Sign up!
Forgot password?
11:16 PM

GitHub link

https://github.com/richardl1/netflixnextsymp2019

"Shoot for the moon.
Even if you miss, you'll land among the stars."

Norman Vincent Peale

American Minister and Author

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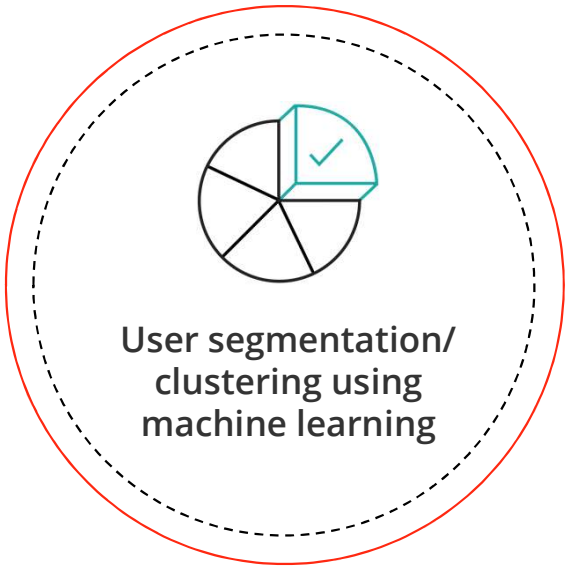
What's next?



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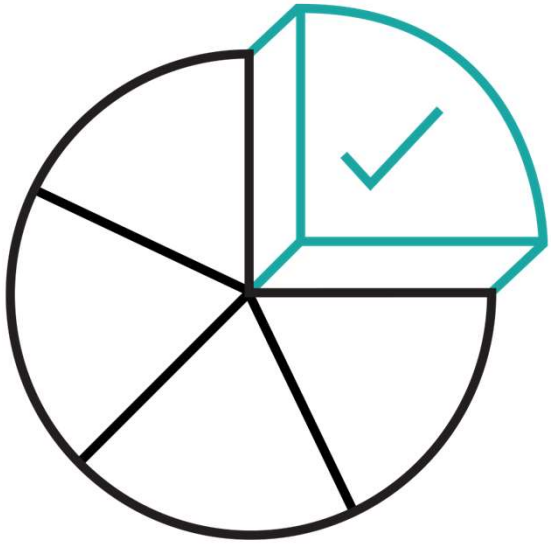
Clustering: User segmentation

- **Unsupervised learning algorithms**
- **Lot of options and flavors of algorithms from which to choose**
- **K-Means clustering algorithm**

  Projected example based on our implementation:
  Genre- and rating-based user grouping



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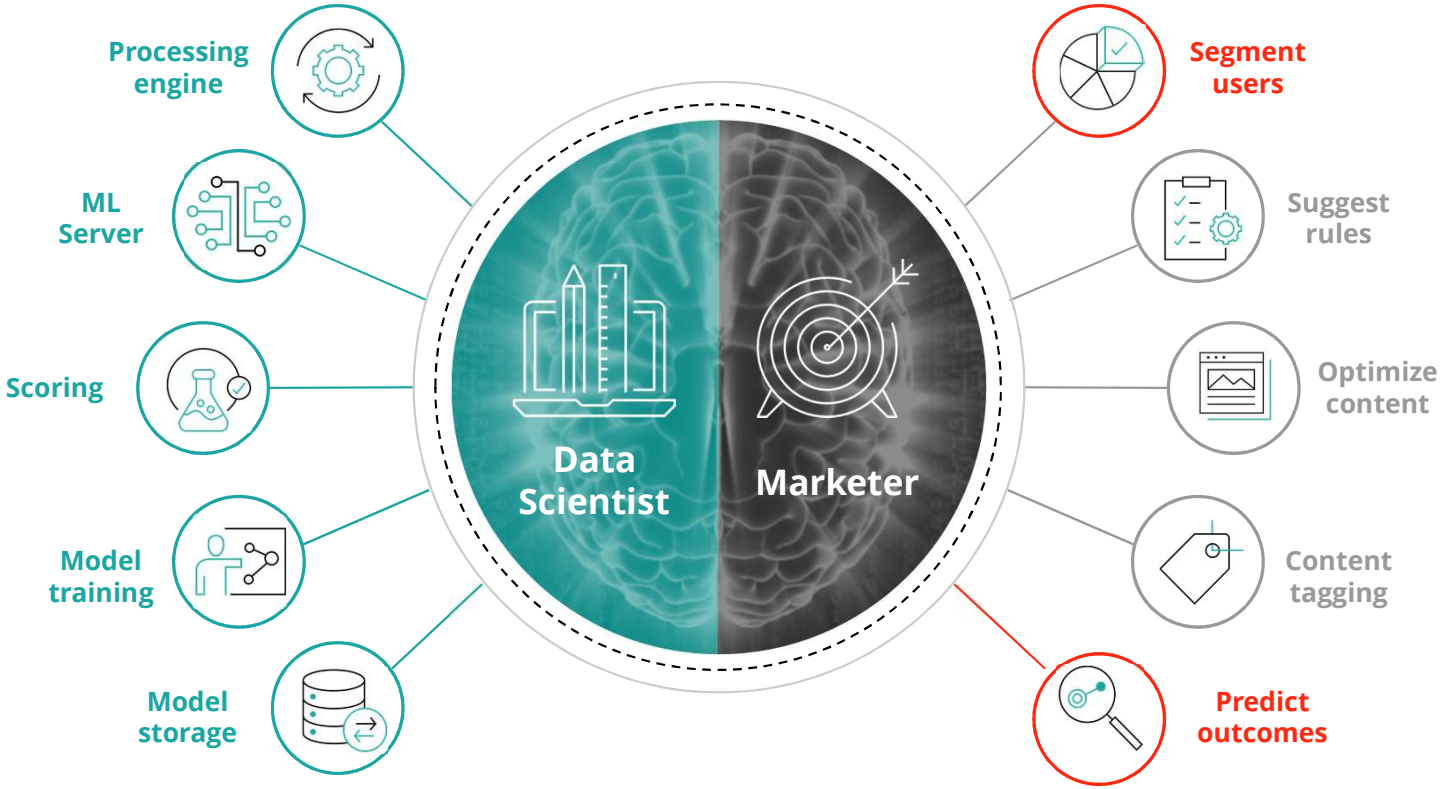
Clustering: User segmentation



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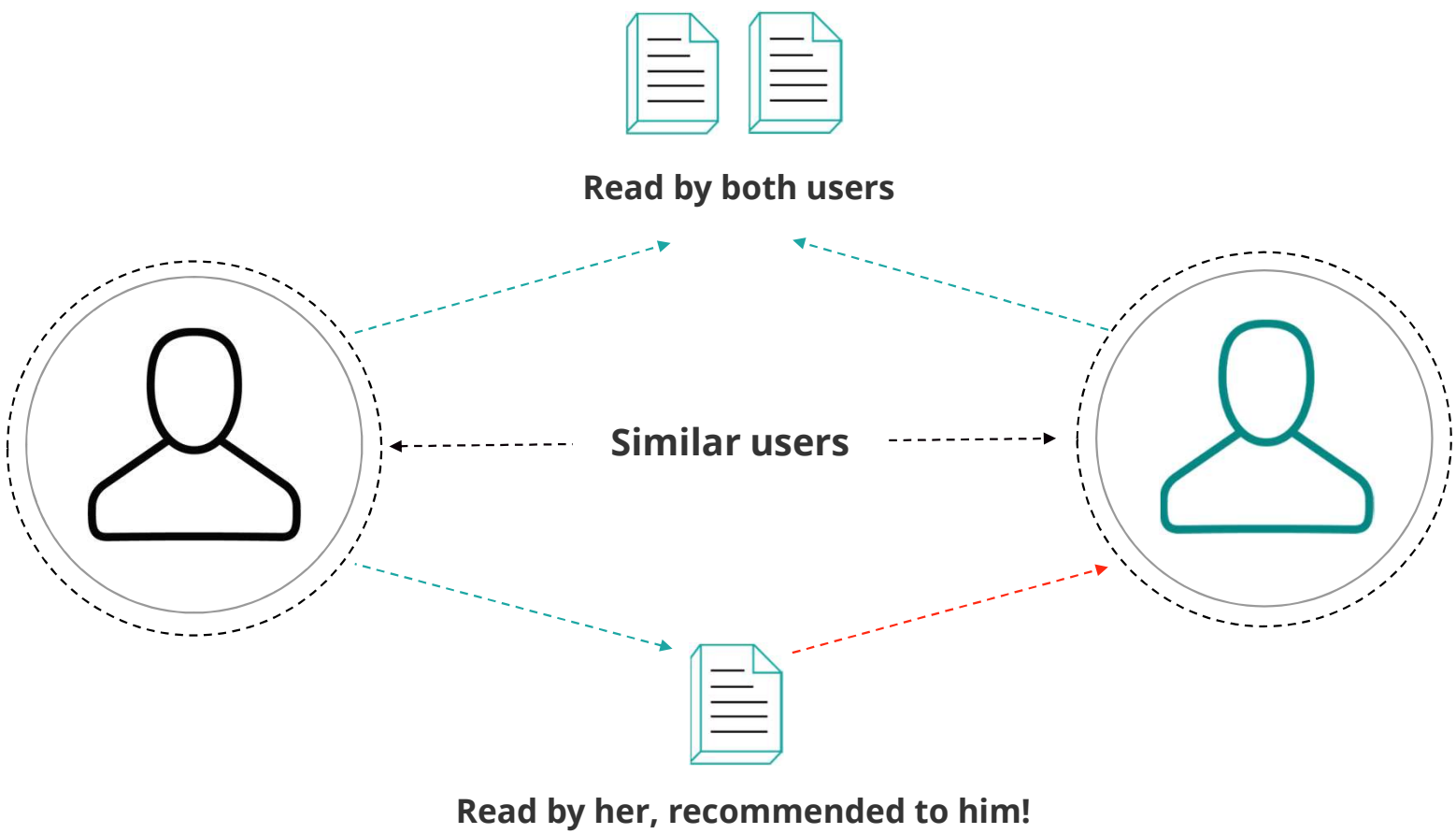
Collaborative filtering: Recommendations



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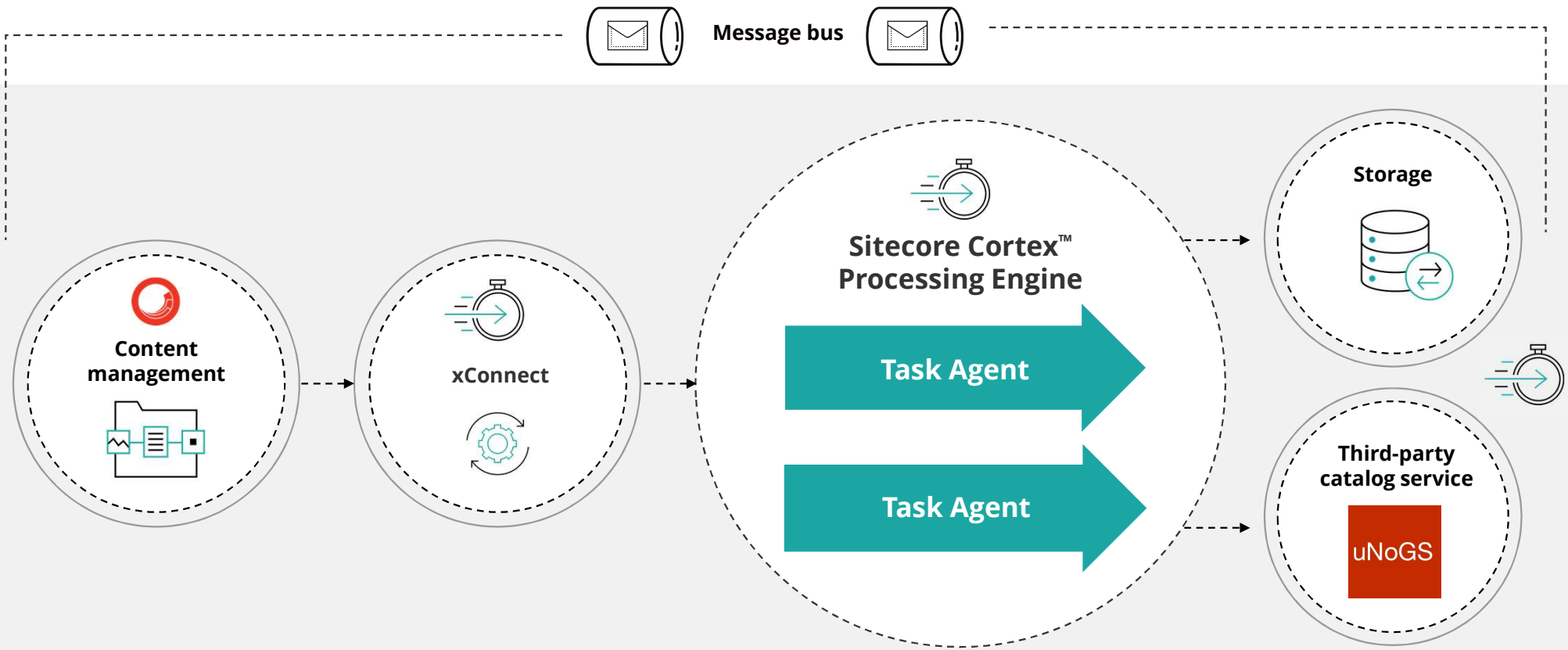
Scaling: Possible based on needs of application



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Helpful resources

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Below are the resources / individuals that helped us get where we stand:

- Verndale and Sitecore: Shout out to all those that helped us hone and deliver on this
  - Anastasiya Flynn - Technical Evangelist (JSS / JavaScript) at Sitecore
  - Lindsey Conners – Art Director at Verndale
  - Executive team at Verndale
- Sitecore documentation
  - Official Sitecore documentation
  - Cortex presentation from Sitecore
  - Recommendations example by Sitecore
- Inspiration from Other sources
  - Front-end plug-in for demo: https://themeforest.net/item/flixgo-online-movies-tv-shows-cinema-html-template/22538349
  - https://github.com/LonghornTaco/tacoflix-demo
  - https://medium.com/@james_aka_yale/the-4-recommendation-engines-that-can-predict-your- movie-tastes-bbec857b8223
  - Clustering Algorithms

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Questions

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We've got one:

What problem/vision/goal will you look at with your Sitecore Lens next?

You got one? Shoot!

Will try our best, if not there are ninjas/resources out there to help.

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