RBAC Authorization on an yii2-framework based system

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Overview

- Purpose of this document:
  Introduce about RBAC on yii2 framework, with some usage example.
- Prerequisite:
  - Audience should have basic experience of using yii2 framework.
  - Read about Authorization on yii2
- References:
  - Sample code on github.

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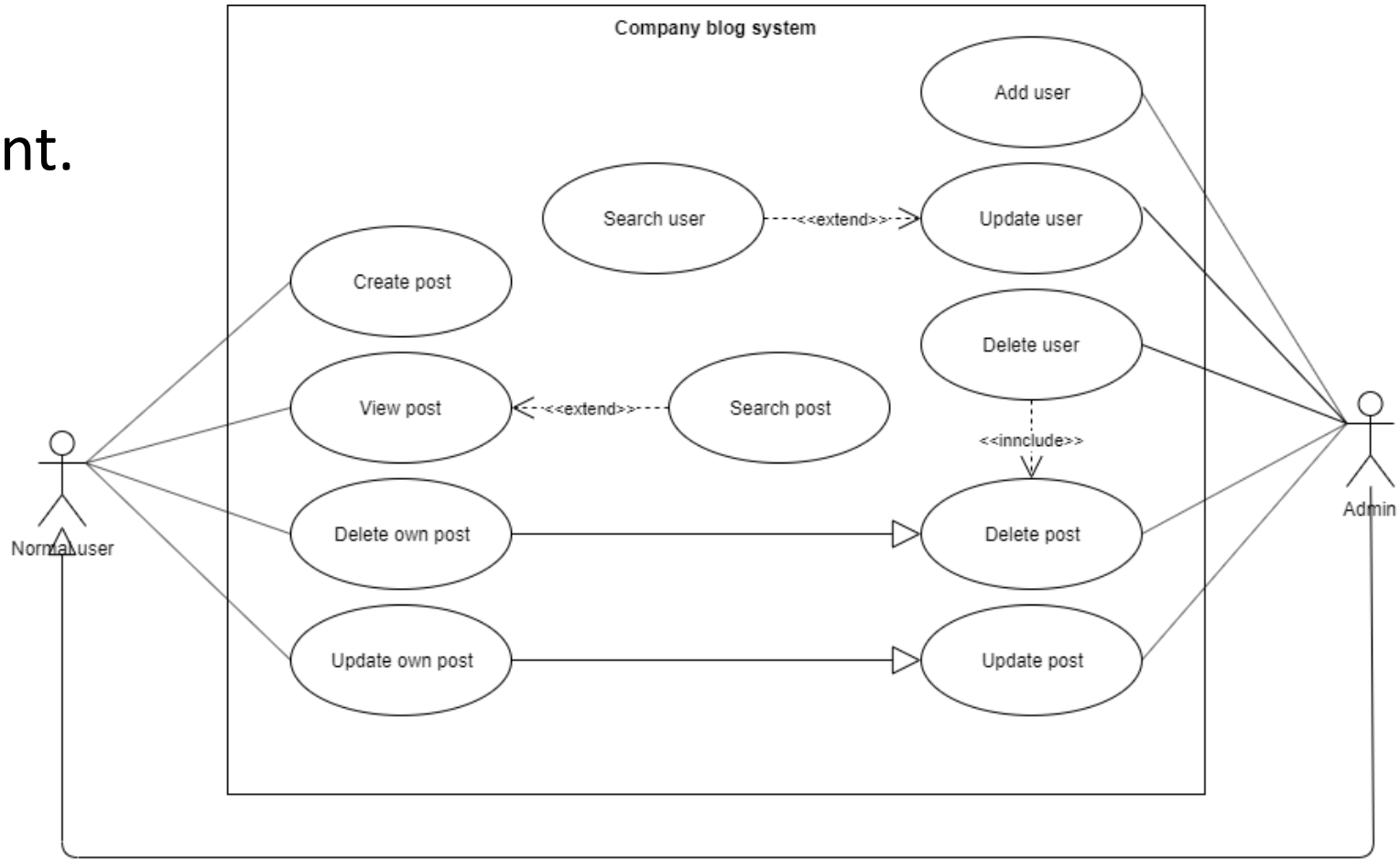
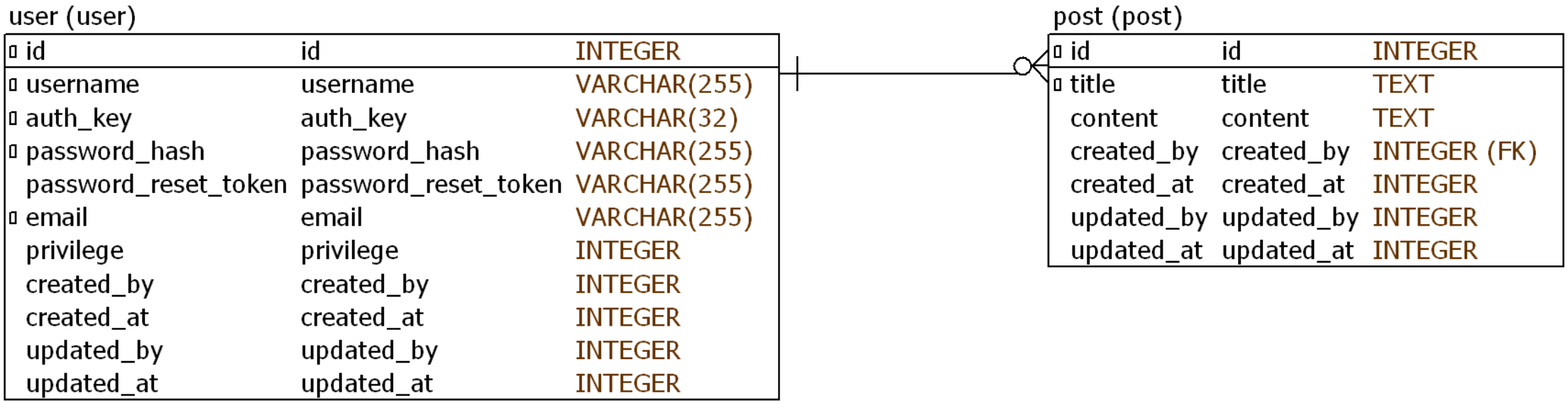
Sample project: Company blog system

- A simple system to post and view content.



Database design



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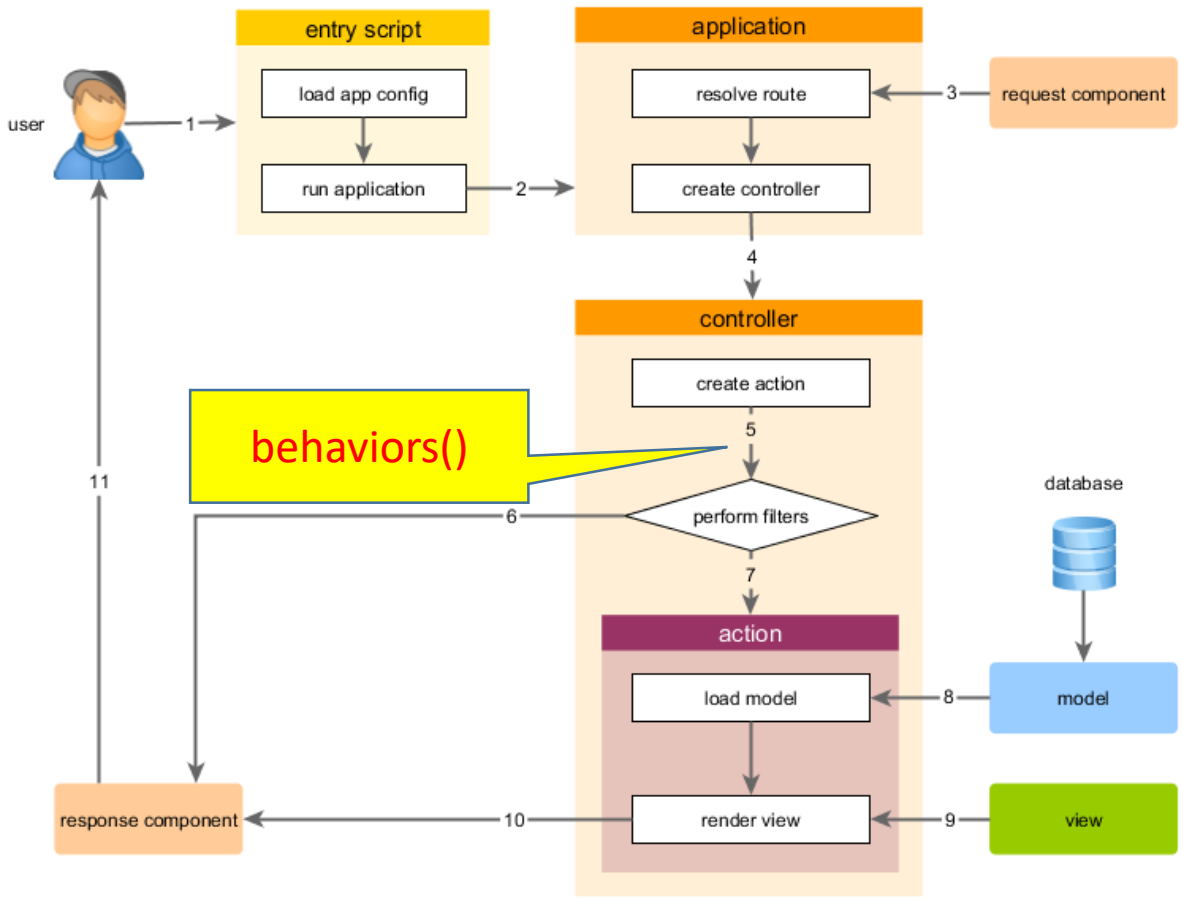
Access Control Filter

- Decide if current web user can access to a controller's action.
- Filter defined in controller's behaviors()
- Reference:
  - [Access Control Filter]
  - [Request handling overview]



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Why we want to use a framework like RBAC

Default function of ACF is for simple case only.
Some easy thinking code like this ☺

```
If ($post->created_by == Yii::$app->user->id || Yii::$app->user->privilege = User::PRIVILEGE_ADMIN) {
    // Do update post
}
```

And we need to write code like this many times in the code to check privilege

By using a good framework, it become short and clear.

```
If (Yii::$app->user->can('updatePost')) {
    // Do update post
}
```

+ We concentrate into writing business code (do update post), leave privilege checking to the framework.
+ By using RBAC combining with ACF, we even move privilege checking out of the business logic code.

RBAC

- RBAC is a method to build access control.
- It builds a way to check if current user have permission to do something.
  - RBAC can be used as filter in ACF.
  - RBAC can be used in any place of code.
- 2 steps to use RBAC:
  1. Build RBAC data (define permission/role/rule and assign permission).
  2. Use RBAC in code.
- Reference: Role Based Access Control

RBAC used in ACF

Simple roles defined in ACF

```
public function behaviors()
{
    return [
        'access' => [
            'class' => AccessControl::className(),
            'only' => ['login', 'logout', 'signup'],
            'rules' => [
                [
                    'allow' => true,
                    'actions' => ['login', 'signup'],
                    'roles' => ['?'],
                ],
                [
                    'allow' => true,
                    'actions' => ['logout'],
                    'roles' => ['@'],
                ],
            ],
        ],
    ];
}
```

ACF using roles defined by RBAC

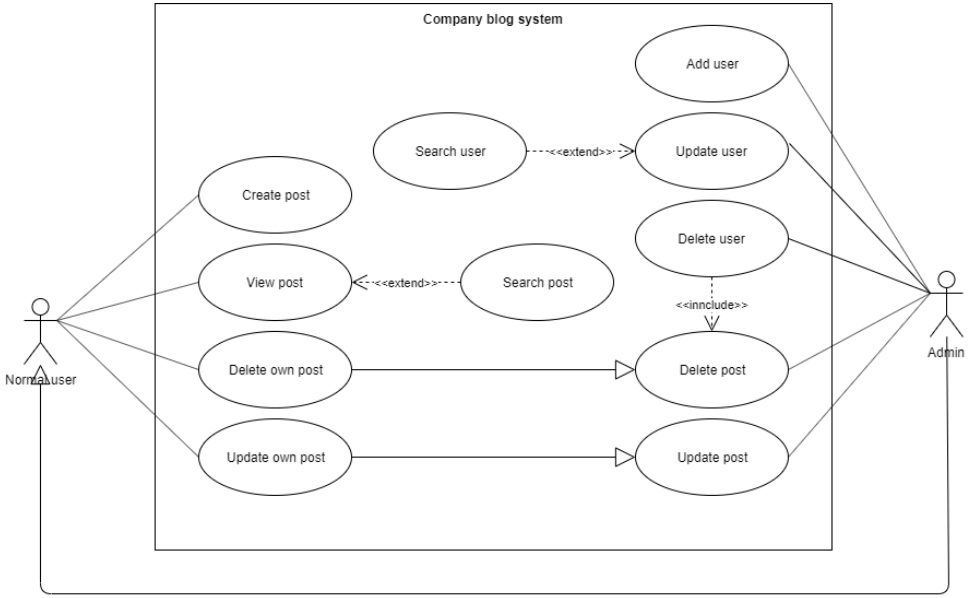
```
public function behaviors()
{
    return [
        'access' => [
            'class' => AccessControl::className(),
            'rules' => [
                [
                    'allow' => true,
                    'actions' => ['index'],
                    'roles' => ['managePost'],
                ],
                [
                    'allow' => true,
                    'actions' => ['view'],
                    'roles' => ['viewPost'],
                ],
                [
                    'allow' => true,
                    'actions' => ['create'],
                    'roles' => ['createPost'],
                ],
                [
                    'allow' => true,
                    'actions' => ['update'],
                    'roles' => ['updatePost'],
                ],
                [
                    'allow' => true,
                    'actions' => ['delete'],
                    'roles' => ['deletePost'],
                ],
            ],
        ],
    ];
}
```

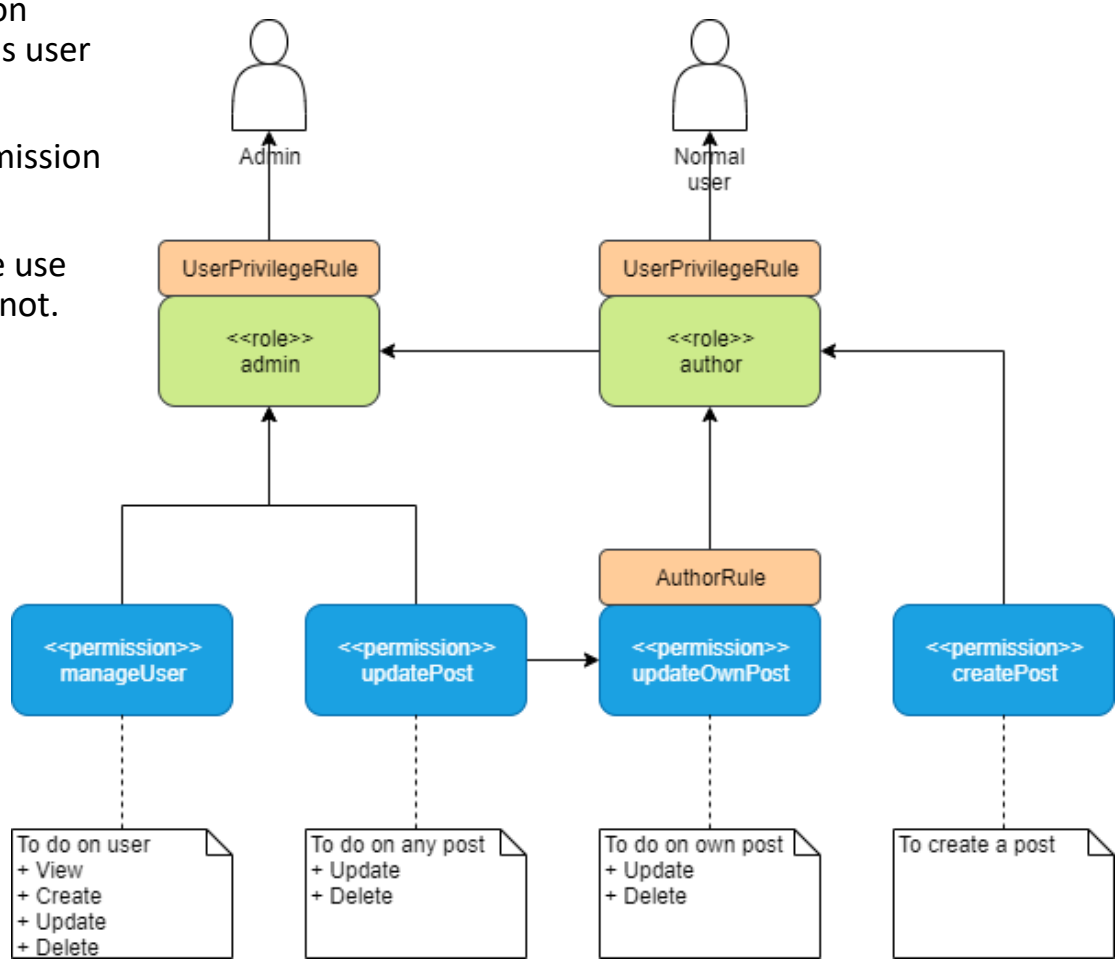
RBAC used in code

```
if (¥Yii::$app->user->can('createPost')) {
    // create post
}

if (¥Yii::$app->user->can('updatePost', ['post' => $post])) {
    // update post
}
```

RBAC data design

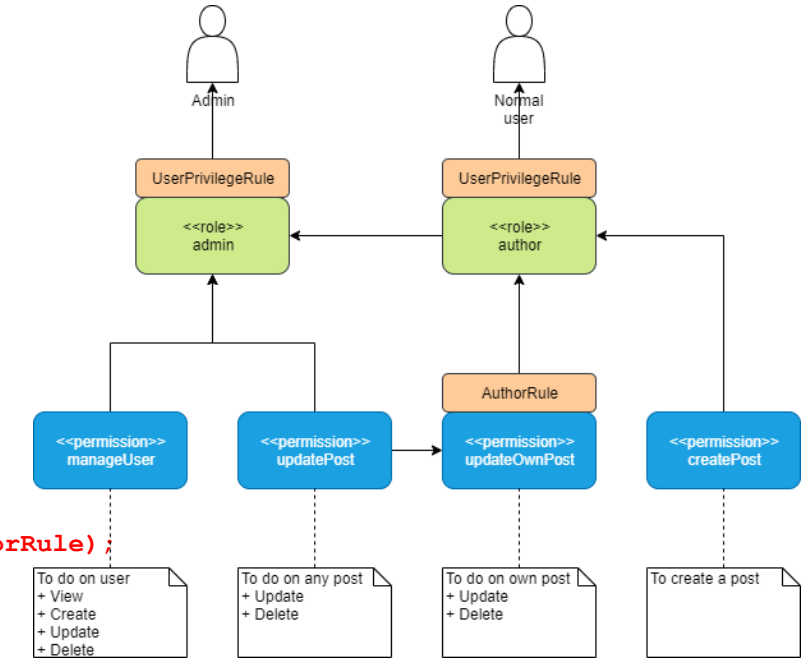
- RBAC data doesn't need relate to system function (it may be common mistake of access control design to create access permission same as user function)
- Any logged in user can view post, so it is unnecessary to define permission for viewing post (we have AFC definition for viewing post).
- We don't assign permission/role to specified user in this system. We use rule (based on User#privilege) to determine if a user is an admin or not.





RBAC permission and role

```
public function actionInit()
{
    $auth = Yii::$app->authManager;
    $auth->removeAll();

    // add the rule "author"
    $authorRule = new AuthorRule();
    $auth->add($authorRule);

    // add "createPost" permission
    $createPost = $this->createPermission('createPost', 'Create a post');

    // add "updatePost" permission
    $updatePost = $this->createPermission('updatePost', 'Update a post');

    // add "updateOwnPost" permission
    $updateOwnPost = $this->createPermission('updateOwnPost', 'Update own post', $authorRule);
    // "updateOwnPost" will be used from "updatePost"
    $auth->addChild($updateOwnPost, $updatePost);

    // add "author" role and give this role the "createPost", "updateOwnPost" permissions
    $author = $this->createRole('author', [$createPost, $updateOwnPost]);

    // add the rule "userPrivilege"
    $userPrivilegeRule = new UserPrivilegeRule();
    $auth->add($userPrivilegeRule);

    // add "manageUser" permission
    $manageUser = $this->createPermission('manageUser', 'Manage user');

    // add "admin" role and give this role the "manageUser", "updatePost" permission
    // as well as the permissions of the "author" role
    $admin = $this->createRole('admin', [$manageUser, $updatePost, $author], $userPrivilegeRule);
}
```



RBAC rule

- A rule is just for checking if current login user (specified by id) is matching with specified role/permission (difficult to understand).

Check for Author

```
class AuthorRule extends Rule
{
    public $name = 'author';

    /**
     * @param string|int $user the user ID.
     * @param Item $item the role or permission
     * @param array $params parameters passed to
     *              ManagerInterface::checkAccess().
     * @return bool
     */
    public function execute($user, $item, $params)
    {
        return isset($params['post']) ?
            $params['post']->created_by == $user : false;
    }
}
```

Check for admin privilege

```
class UserPrivilegeRule extends Rule
{
    public $name = 'userPrivilege';

    public function execute($user, $item, $params)
    {
        if (!Yii::$app->user->isGuest) {
            $privilege = Yii::$app->user->identity->privilege;
            if ($item->name === 'admin') {
                return $privilege == User::PRIVILEGE_ADMIN;
            } elseif ($item->name === 'author') {
                return $privilege == User::PRIVILEGE_ADMIN
                    || $privilege == User::PRIVILEGE_NORMAL;
            }
        }
        return false;
    }
}
```

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Access control on actions (using ACF)

```
class PostController extends Controller
{
    public function behaviors()
    {
        return [
            'access' => [
                'class' => AccessControl::className(),
                'rules' => [
                    [
                        'allow' => true,
                        'actions' => ['index', 'view'],
                        'roles' => ['@'],
                    ],
                    [
                        // In fact, we don't need to define this rule here, but can defined it in roles = @ above.
                        // I put it here just for an example.
                        'allow' => 'true',
                        'actions' => ['create'],
                        'roles' => ['createPost'],
                    ],
                    [
                        'allow' => true,
                        'actions' => ['update', 'delete'],
                        'roles' => ['updatePost'],
                        'roleParams' => function() {
                            return ['post' => Post::findOne(['id' => Yii::$app->request->get('id')])];
                        },
                    ],
                ],
            ],
        ];
    }
}
```

Access control applied on UI

For menu bar

```
$items = [];
if (Yii::$app->user->isGuest) {
    $items[] = ['label' => 'Login', 'url' => ['/site/login']];
} else {
    $items[] = ['label' => 'Post', 'url' => ['/post/index']];
    if (Yii::$app->user->can('manageUser')) {
        $items[] = ['label' => 'User', 'url' => ['/user/index']];
    }
    $items[] = $logoutMenuItem;
}
```

To control displaying of buttons on Post view page

```
<?php if (Yii::$app->user->can('updatePost')) { ?>
    <?= Html::a('Update', ['update', 'id' => $model->id], ['class' => 'btn btn-primary']) ?>
    <?= Html::a('Delete', ['delete', 'id' => $model->id], [
        'class' => 'btn btn-danger',
        'data' => [
            'confirm' => 'Are you sure you want to delete this item?',
            'method' => 'post',
        ],
    ]) ?>
<?php } ?>
```

Behavior based on access permission

- **`Use Yii::$app->user->can() on business logic code`**

The End